

NEW AFRICAN CADDIS-FLIES
(Order TRICHOPTERA)

BY

D. E. KIMMINS *my*

British Museum (Natural History)



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NEW AFRICAN CADDIS-FLIES (Order TRICHOPTERA)

By D. E. KIMMINS

SYNOPSIS

This paper deals mainly with species of the subfamilies Oestropsinae and Leptocerinae and includes a lectotype designation and redescription of the male genitalia of *Phanostoma senegalense* Brauer and a redescription and figures of the female holotype of *Setodellina albopunctata* Lestage. The synonymy of the genus *Phanostoma* Brauer with the genus *Amphipsyche* McLachlan is confirmed and four new species of the latter genus are described. The genus *Chloropsyche* McLachlan is placed as a synonym of *Aethaloptera* Brauer. A revised key to the African genera of the Leptocerinae is given and the genus *Setodellina* is synonymized with *Oecetis*.

THIS paper is based upon material sent for identification by Dr. Marjorie Scott (South Africa), Dr. Philip S. Corbet (Uganda) and on British Museum (Nat. Hist.) accessions. The author wishes to express his thanks to Drs. Scott and Corbet for their generosity in presenting to the British Museum (Nat. Hist.) the types of the new species based upon their material, in addition to other duplicate material. Paratypes of South African material (where available) have been returned to Dr. Marjorie Scott, and will in due course be deposited in the South African Museum.

The South African material was collected by the following workers: Messrs. John Agnew, Brian Allanson, Mark Chutter, Dr. A. D. Harrison and Mr. W. D. Olliff, in addition to Dr. Scott herself, but the individual collectors' names are not given on the locality labels.

For the loan of the type series of *Phanostoma senegalense* Brauer the author is indebted to Dr. M. Beier, Naturhistorisches Museum, Vienna, and for the loan of the type of *Setodellina albopunctata* Lestage to Dr. P. Basilewsky, Musée Royale de l'Afrique centrale, Tervuren, Belgium.

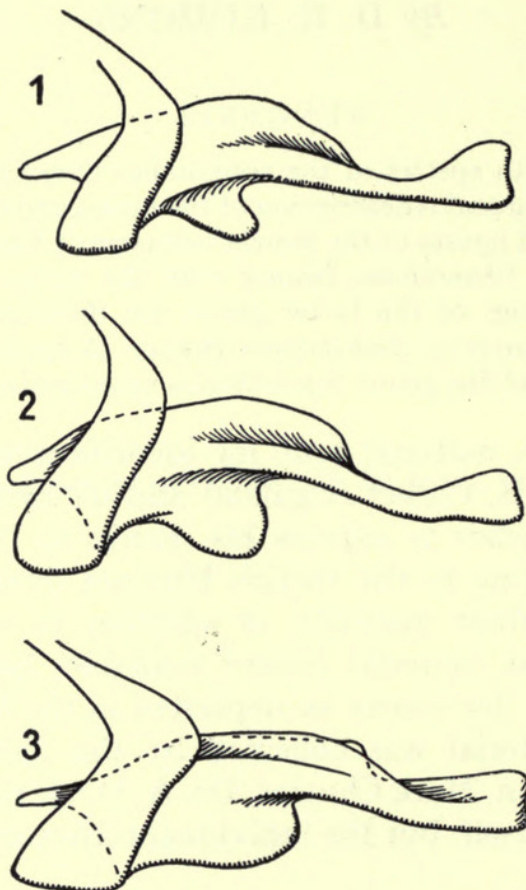
Family PSYCHOMYIIDAE

Paduniella ankya Mosely

Two males, one from Volksrust and the other from the Natal National Park, are referred to this species. The genitalia do not entirely agree with the original description and figures, but I do not consider the differences to be specific. The shape of the clasper of the Natal specimen is intermediate between that of the type specimen and that of an example from the Semliki Forest. The locality of the type (Namwamba Valley) and the Semliki Forest are both in the Ruwenzori region.

Family **HYDROPSYCHIDAE**Subfamily **OESTROPSINAE**THE GENERA *AMPHIPSYCHE* McLACHLAN AND
PHANOSTOMA BRAUER

These two genera were originally separated on the difference in the tibial spur formula (*Amphipsyche* 1.4.4, *Phanostoma* 2.4.2) and on the presence of a weak "false discoidal cell" in *Phanostoma*. As additional species of *Amphipsyche* were



FIGS. 1-3. *Paduniella ankya* Mosely, ♂ clasper from left. 1, Ruwenzori, Semliki Forest ; 2, Ruwenzori, Namwamba Valley (Type) ; 3, Natal National Park.

discovered in Asia, it became evident that the tibial spur formula was not a constant feature of the genus, and Martynov (1935 : 201) proposed that the genus *Phanostoma* should be considered a synonym of *Amphipsyche*. This was not generally accepted and Ulmer (1951 : 197) maintained *Phanostoma* as a distinct genus on the grounds of the false discoidal cell in the fore wing and the tibial spur formula of 2.4.2. I have been able to study the type-series of *Phanostoma senegalense* Brauer and find that Brauer was incorrect in stating that there were two very small tibial spurs on the anterior tibia. Microscopic examination reveals neither spurs nor spur-bases on the inner apical angle of the fore tibia. There is however a variable number of microscopic spines on the outer apical angle, which Brauer may have taken for apical spurs. The spur formula of *Phanostoma senegalense* Brauer is therefore 0.4.2,

which falls within the range admitted by Ulmer for *Amphipsyche*. It is at times difficult to decide whether a false discoidal cell is present and both genera have the intermediate tibiae and tarsi of the male moderately flattened.

I therefore adopt Martynov's proposal and to combine the genera *Amphipsyche* and *Phanostoma*. The synonymy is as follows :

AMPHIPSYCHE McLachlan, 1872

McLachlan, 1872 : 68, pl. 2, figs. 7-7e.

Type-species (monotypic) *Amphipsyche proluta* McL., 1872.

Phanostoma Brauer, 1875 : 69, pl. 4, figs. 5-5e.

Type-species (monotypic) *Phanostoma senegalense* Brauer, 1875.

? *Amphipsychella* Martynov, 1935 : 201.

Type-species (monotypic) *Amphipsychella extrema* Martynov, 1935.

Spur formula ♂, ♀, 1.4.4, 1.4.3, 1.4.2, 0.4.3, 0.4.2. Mid-tibia and first three basal tarsal segments moderately flattened in ♂, strongly so in ♀. Maxillary palpi weak, rather short. Aedeagus with or without parameres. (*A. proluta* and *A. senegalensis* are certainly without spine-like parameres, nor does Martynov's figure of *A. distincta* give any indication of them. The four new African species have such parameres, as do *A. indica* Mart. and *A. bengalensis* Mart.)

KEY TO AFRICAN SPECIES OF *Amphipsyche* (MALES)

- 1 Stem of R_{2+3} in fore wing closely approximated to R_4 ; aedeagus without spiniform parameres ***senegalensis*** (Brauer)
- Stem of R_{2+3} in fore wing widely separated from R_4 ; aedeagus with two spiniform parameres 2
- 2 Lobes of tenth segment, in dorsal view, arising from broad, shouldered bases 3
- Lobes of tenth segment, in dorsal view, not arising from broad bases 4
- 3 Lobes of tenth segment parallel in dorsal view, deep in side view ***corbeti*** sp. n.
- Lobes of tenth segment divergent in dorsal view, narrow in side view ***berneri*** sp. n.
- 4 Apex of aedeagus, in side view, strongly clavate, parameres angled abruptly upwards.
Lobes of tenth segment deep in side view ***ulmeri*** sp. n.
- Apex of aedeagus, in side view, produced but not strongly clavate, parameres gently curved. Lobes of tenth segment narrow in side view ***scottae*** sp. n.

Amphipsyche senegalensis (Brauer)

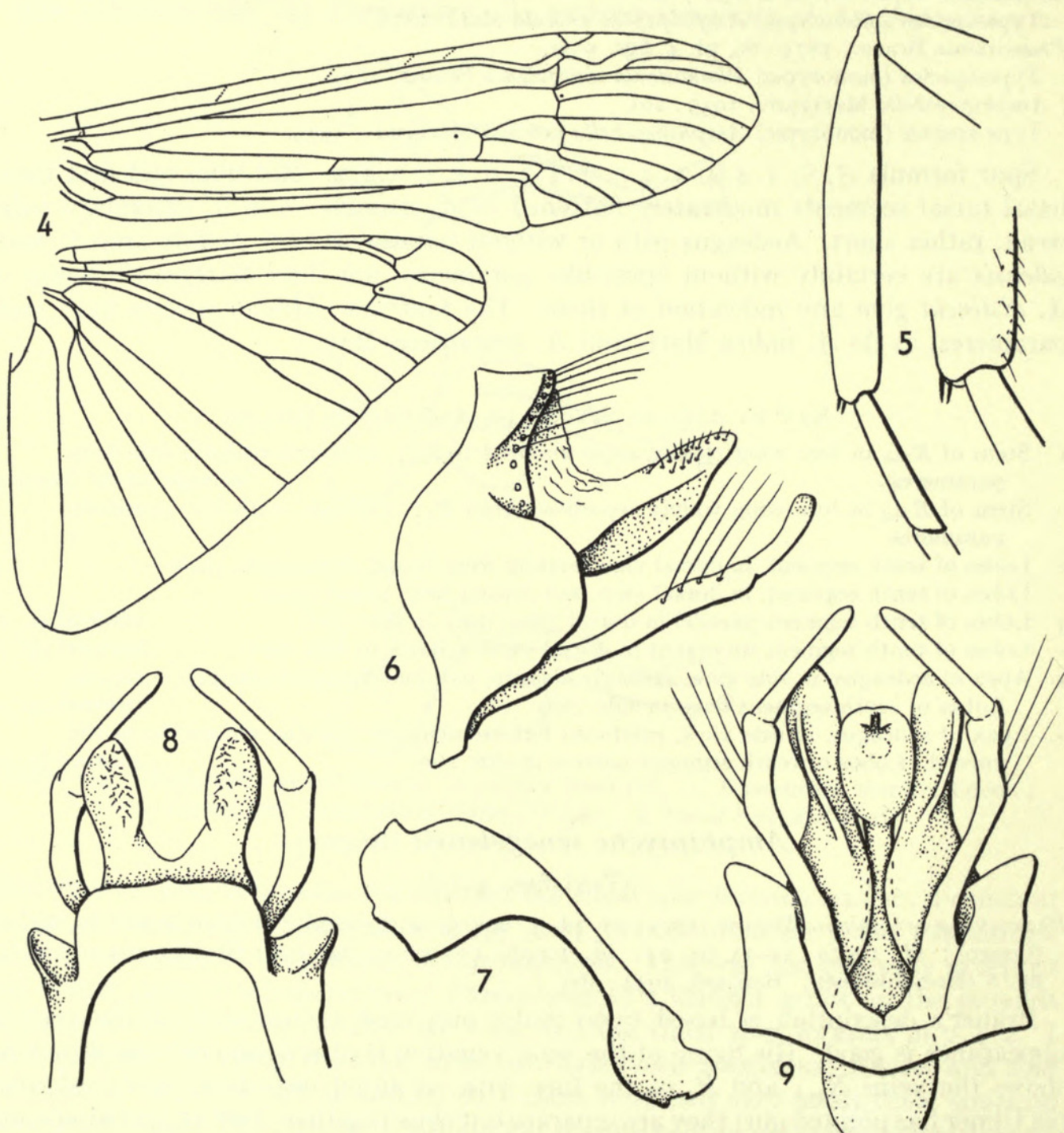
(Text-figs. 4-13)

Phanostoma senegalense Brauer, 1875 : 71, pl. 4, figs. 5-5e (Senegal); Ulmer, 1907 : 26, fig. 12 (Congo); *id.*, 1907a : 32-33, fig. 24; *id.*, 1907b : 159, pl. 21, fig. 198; Mosely, 1932 : 5, pl. 1, fig. 6 (Mozambique); Barnard, 1934 : 369.

Brauer's description is based upon males only and the account of the general appearance is good. His figure of the wing venation is also reasonably good, but he shows the veins R_{2+3} and R_4 in the fore wing as fused near their bases, whereas (as Ulmer has pointed out) they are separate but close together. Cell R_{2+3} in hind wing may be either just sessile or with a short footstalk. His description and figures of the male genitalia, being made from the dried material, are rather inadequate by modern standards and I am therefore giving a new description and figures.

DESIGNATION OF LECTOTYPE

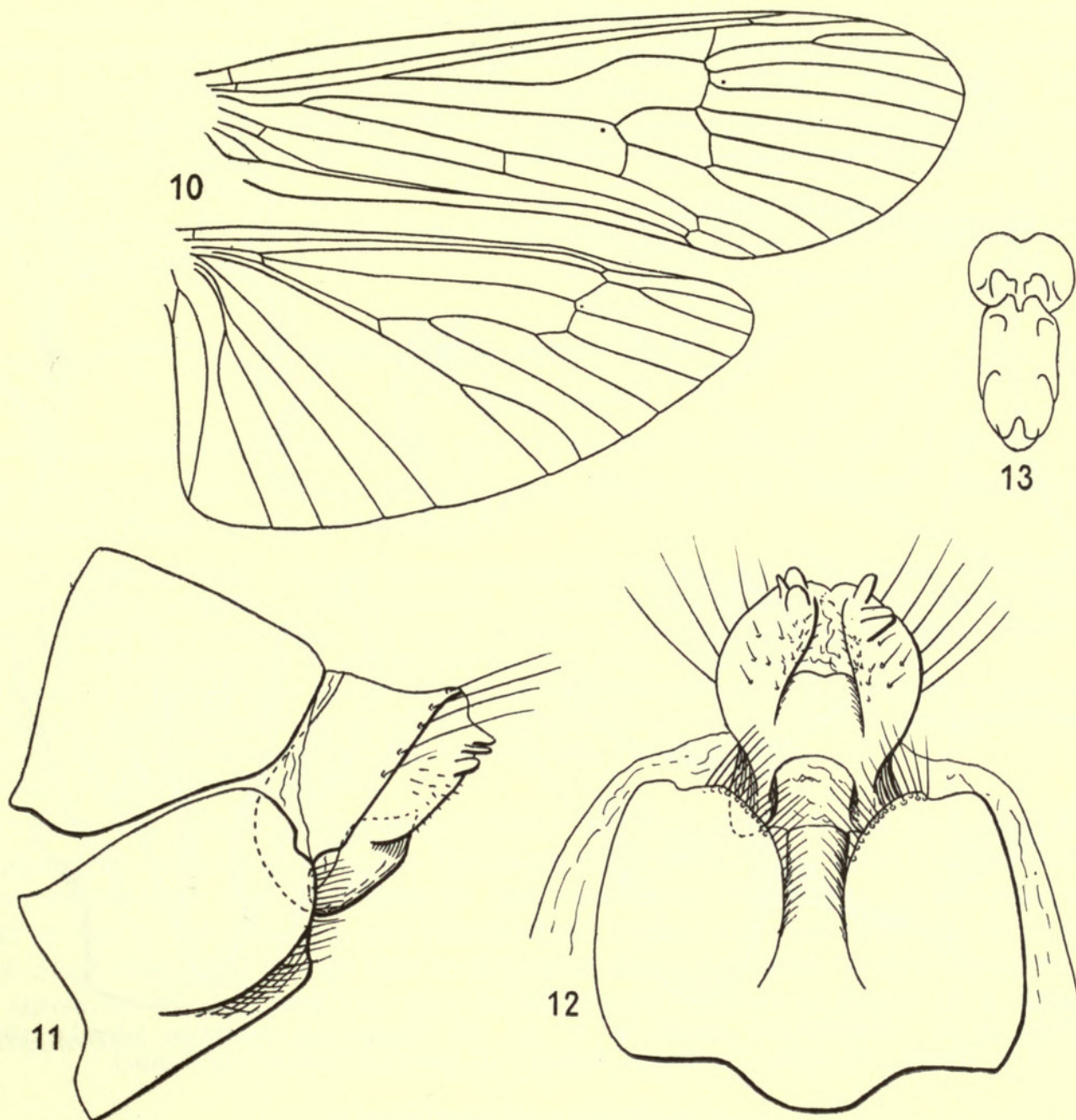
No lectotype has been selected from Brauer's type series, so I take this opportunity of designating the example with the following labels: "Steindachner, 1869, *Senegal*"; "*senegalense* det. Brauer"; "*senegalense* det. Ulmer"; "*Phanostoma senegalense* Brauer, ♂, LECTOTYPE, D. E. Kimmins det. 1960" (Vienna Museum). The lectotype has one pair of wings mounted between sheets of celluloid, the abdomen and one fore leg cleared in KOH solution and preserved in a small vial of glycerine, both prepara-



FIGS. 4-9. *Amphipsyche senegalensis* (Brauer), ♂ Lectotype. 4, wings; 5, fore tibia, with apex more enlarged; 6, genitalia, lateral; 7, aedeagus, lateral; 8, genitalia, dorsal; 9, ventral and from behind.

tions being attached to the staging pin. There are also four other males from the type-series.

♂ GENITALIA of lectotype. Ninth segment with the dorsal apical margin only slightly produced at its centre. Side-pieces large and rounded. Tenth segment deeply excised at its centre to form

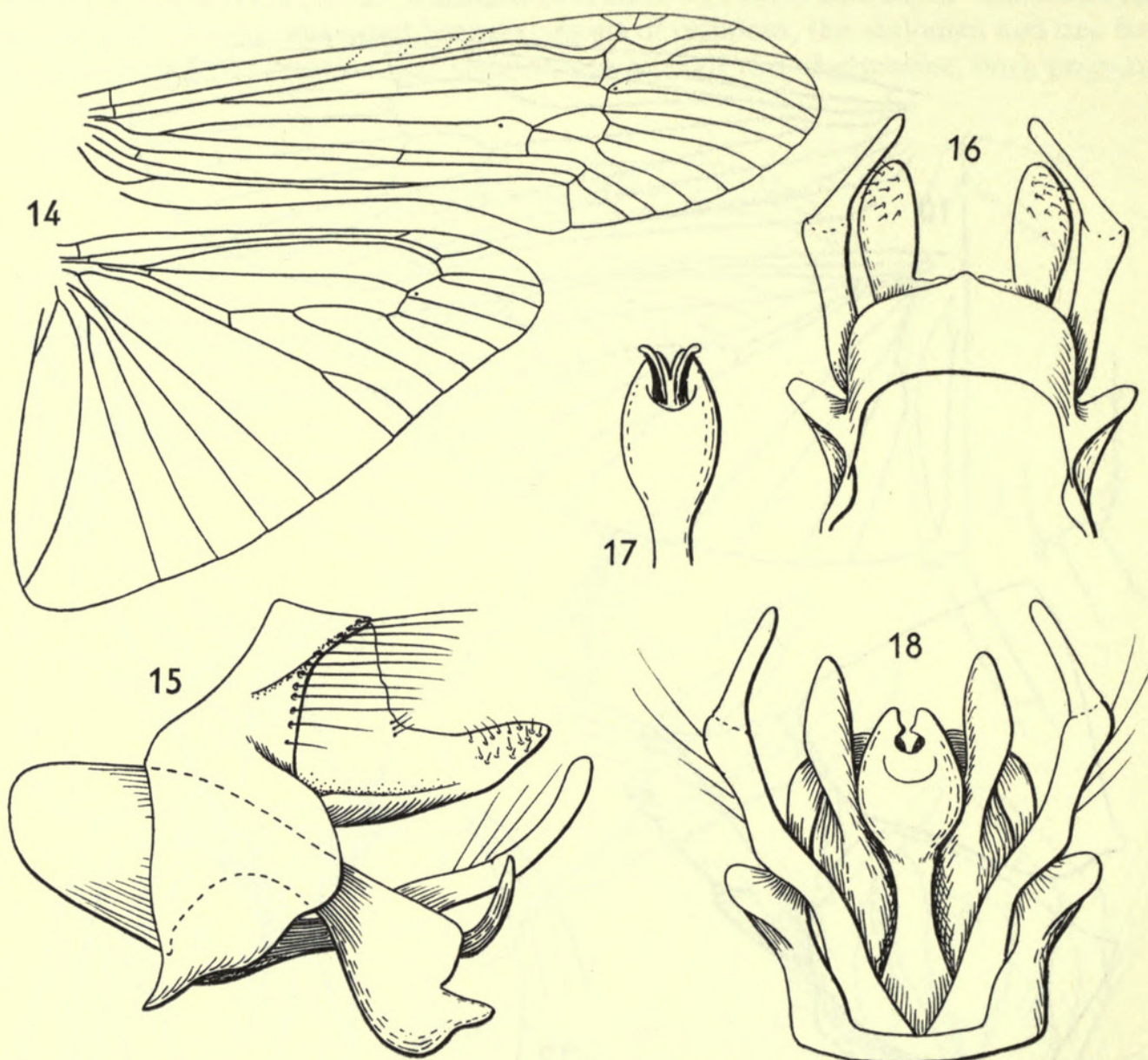


FIGS. 10-13. *Amphipsyche senegalensis* (Brauer), ♀ (Lualaba River). 10, wings; 11, genitalia, lateral; 12, ventral; 13, bursa copulatrix, ventral, more enlarged.

a pair of narrow ovate lobes, set well below the level of the ninth tergite and linked to the latter by membrane. The upper surface of the lobes bears a number of small setae. Lower margins of the tenth segment partly enfold the stem of the aedeagus. The latter organ has a wide base, constricting to a slender stem and then dilating to form a clavate apex. The apical surface of aedeagus bears two small triangular teeth or lobes (shown in Brauer's fig. 5e). There are no

spiniform parameres. Claspers long, slender and sinuous, the articulation between the basal and terminal segments somewhat indefinite.

♀ GENITALIA (Congo, Lualaba River). Pleurosternum of eighth segment large, plate-like, its convex lower margin almost meeting that of the opposite side ventrally. Posterior margin slightly excised. Eighth sternite reduced to a narrow, lightly sclerotized tongue, not extending



FIGS. 14-18. *Amphipsyche ulmeri* sp. n. ♂. 14, wings; 15, genitalia, lateral; 16, dorsal; 17, apex of aedeagus, dorsal; 18, genitalia, ventral and behind.

as far as apices of the pleurosterna. Ninth tergite forming a hood, clasper groove obscure. Ninth sternite narrow, apex slightly excised. Tenth segment with the usual three pairs of processes.

Length of fore wing, ♂, 13-15 mm.; ♀, 9-10 mm.

I have seen no females from the type-locality, Senegal. I have therefore endeavoured to fix the female of *senegalensis* by examination of females taken at the same time and place as males of *senegalensis*. Examination of females fulfilling these conditions from the Congo (Lualaba R.) and Lake Nyasa suggests that the female

venation differs appreciably from that of the male. In the fore wing, veins R_{2+3} and R_4 are not closely approximated and Rs is more or less strongly sinuous, much more so than in the male. Examples from Lake Victoria also show this sinuosity of Rs in the fore wing, and in this locality the males would appear to be extremely rare, since I have seen only one example, although Dr. Corbet and Dr. Hickin have sent me several hundred females. The fact that females with a sinuous Rs in the fore wing appear to be associated with male *senegalensis* suggests that *Phanostoma curvinerve* Navás, based upon females from Egypt, may be a synonym of *senegalensis*. This sinuosity of Rs in the fore wing does not appear to be a constant generic character in *Amphipsyche* since, in the females of *A. scottae* sp. n. from S. Africa, Rs is almost straight.

DISTRIBUTION. I have seen males from SENEGAL, CONGO, S. RHODESIA, NYASALAND and UGANDA.

Amphipsyche ulmeri sp. n.

(Text-figs. 14-18)

Phanostoma senegalense Brauer; Ulmer, 1923: 19 (*partim*, Sennar); *id.*, 1924: 2 (Sennar).

EGYPTIAN SUDAN: Sennar, 18-27.ii.1914, Ebner, 7 ♂, two labelled "*Phanostoma senegalense* Brau." in Ulmer's writing.

♂ HOLOTYPE (pinned). General colour pale tawny, antenna finely annulated with reddish. Thorax clothed with short, pale pubescence. Fore wing very pale tawny, with slightly darker clouding over the anastomosis. Rs almost straight, R_{2+3} separated from R_4 at their bases by about the distance between R_4 and R_5 . In the hind wing, cell R_{2+3} is sessile.

♂ GENITALIA following the general pattern of the genus. Aedeagus with two curved spine-like parameres, angled abruptly upwards. Stem of aedeagus less slender than in *senegalensis*, apex clavate, its lower margin projecting in two rounded, triangular lobes.

Length of fore wing, 13-14 mm.

♂ HOLOTYPE (pinned, with wings between celluloid and abdomen in a small vial of glycerine) and paratypes in the Naturhistorisches Museum, Vienna. In the course of correspondence with Dr. Ulmer in 1956 concerning *Phanostoma*, he informed me that he had in his collection two females from Sennar and that they had Rs in the fore wing curved but less so than in Egyptian examples which he had identified as *P. curvinerve* Navás. This fact may be additional evidence in favour of *A. ulmeri* being distinct from *A. curvinervis*.

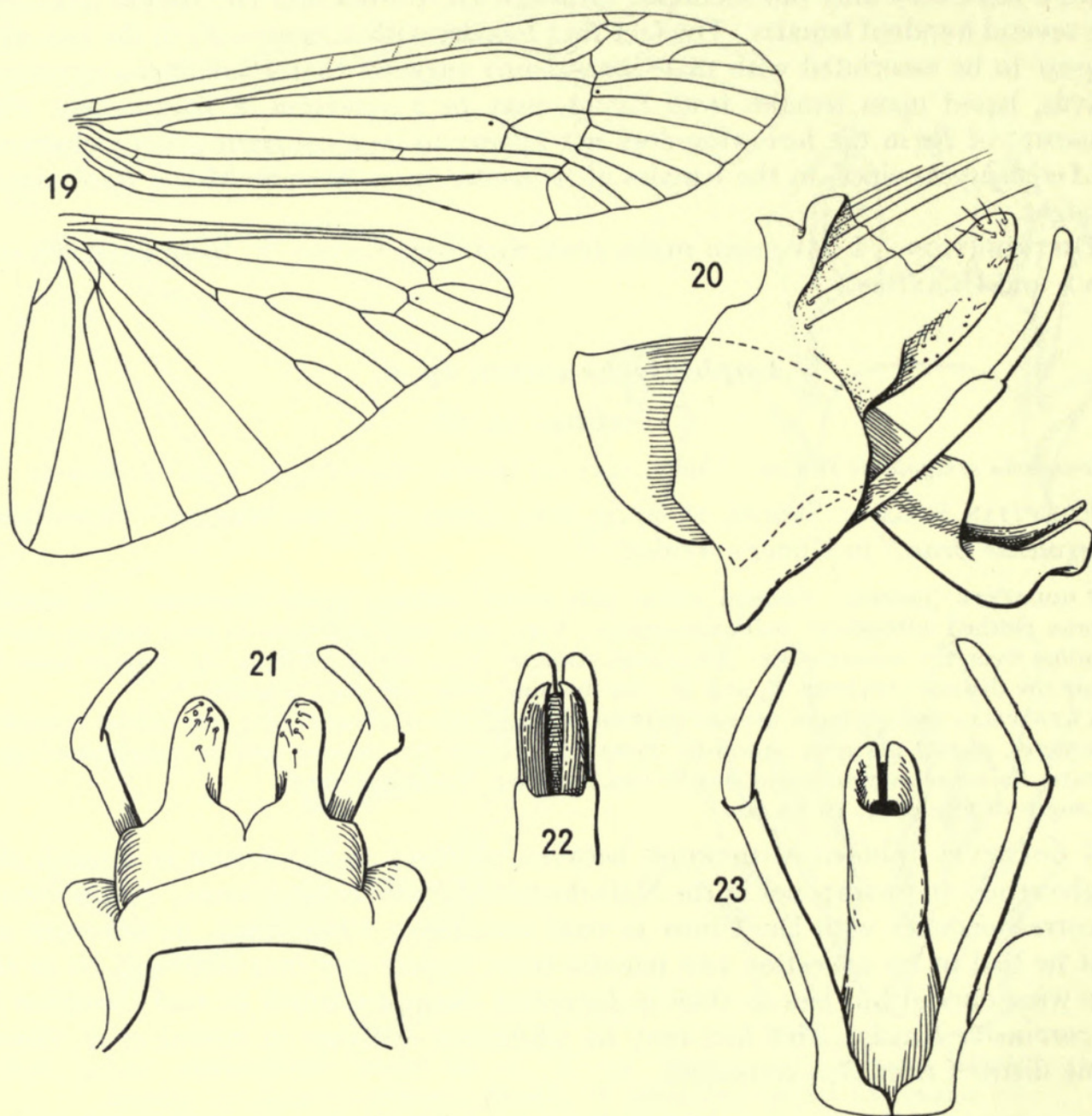
Amphipsyche corbeti sp. n.

(Text-figs. 19-23)

UGANDA: Northern Province, Victoria Nile, Karuma Falls, P. S. Corbet, numerous males.

♂ HOLOTYPE (in alcohol). General colour very pale tawny. Antenna finely annulated with fuscous. Anterior femur with a longitudinal fuscous streak on ventral surface. Mesonotum rather darker tawny. Abdominal segments whitish, faintly marked with very pale purplish transverse bands on the tergites and with a similarly coloured median ventral streak. In fore wing, R_{2+3} widely separated from R_4 basally.

♂ GENITALIA. Ninth segment with its dorsal apical margin only slightly produced. Side-pieces rounded. Lobes of the tenth segment broad basally, the apical portion about half as wide as the basal, which projects laterally as a shoulder. In dorsal view, the lobes are parallel, with rounded apices. Aedeagus with a stout stem, in side view somewhat constricted about mid-way, lower apical margin produced in a pair of lobes. In ventral view, the inner margins



FIGS. 19-23. *Amphipsyche corbeti* sp. n. ♂. 19, wings; 20, genitalia, lateral; 21, dorsal; 22, apex of aedeagus, dorsal; 23, genitalia, ventral and behind.

of the lobes are parallel, their basal angles hooked. Above these lobes are a pair of stout, spini-form parameres, curving upwards in side view. Claspers slender, indistinctly two-segmented.

♀ unknown.

Length of fore wing, 11 mm.

♂ HOLOTYPE (now mounted as microscope preparations), paratypes in 2% formaldehyde solution, in British Museum (Nat. Hist.). This species differs from *A. ulmeri*

in the less constricted stem of the aedeagus, whose apex is more produced, and in the stouter parameres. The tenth segment is wider at the base in dorsal view, with definite shoulders.

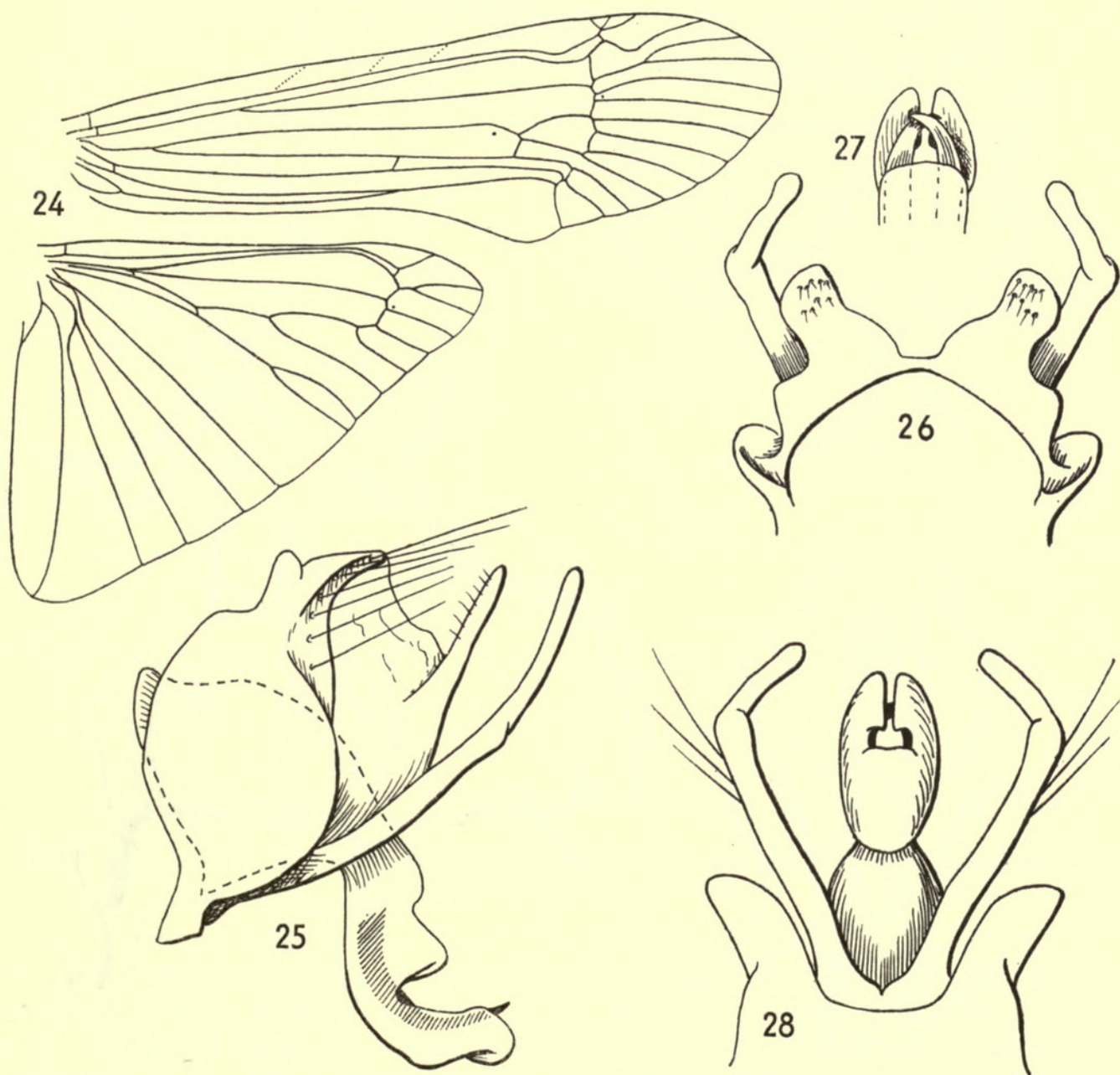
Amphipsyche berner sp. n.

(Text-figs. 24-28)

Phanostoma senegalense Brauer ; Kimmins, 1957 : 13 (Gold Coast examples).

GOLD COAST : Volta River, Senchi, 1.viii.1950, *Lewis Berner*, 4 ♂.

♂ HOLOTYPE. Specimen originally preserved in alcohol, general colour tawny yellow, antenna with fine fuscous annulations, abdomen with faint purplish markings. Fore wing yellowish



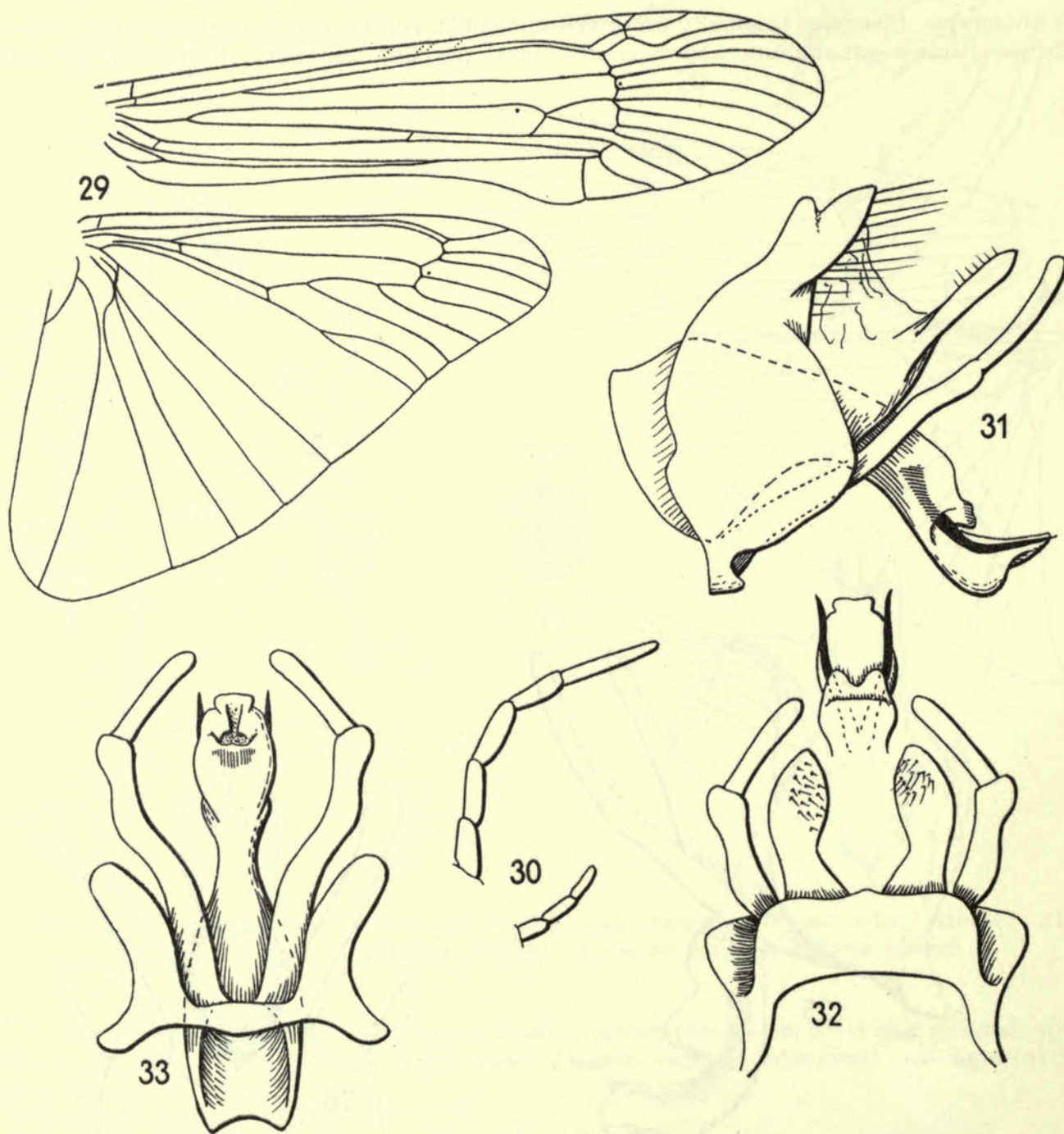
FIGS. 24-28. *Amphipsyche berner* sp. n. ♂. 24, wings ; 25, genitalia, lateral ; 26, dorsal ; 27, apex of aedeagus, dorsal ; 28, genitalia, ventral and behind.

brown, with darker shading behind the sinuously curved portions of Sc and R_1 . Cell R_{2+3} at base at least as wide as cell R_4 . Rs straight.

♂ GENITALIA resembling *A. corbeti* in general pattern. Tenth segment also shouldered at its base, but in the type the lobes of the tenth tergite are strongly divergent in dorsal view and in side view appear as narrow plates. The aedeagus is similar but, in side view, there two projections on the dorsal margin. In ventral aspect the apex is more clavate.

Length of fore wing, 12 mm.

♂ HOLOTYPE (mounted as microscope preparations) and 1 paratype in 2% formaldehyde solution, in British Museum (Nat. Hist.), 2 ♂ paratypes in University of Florida.

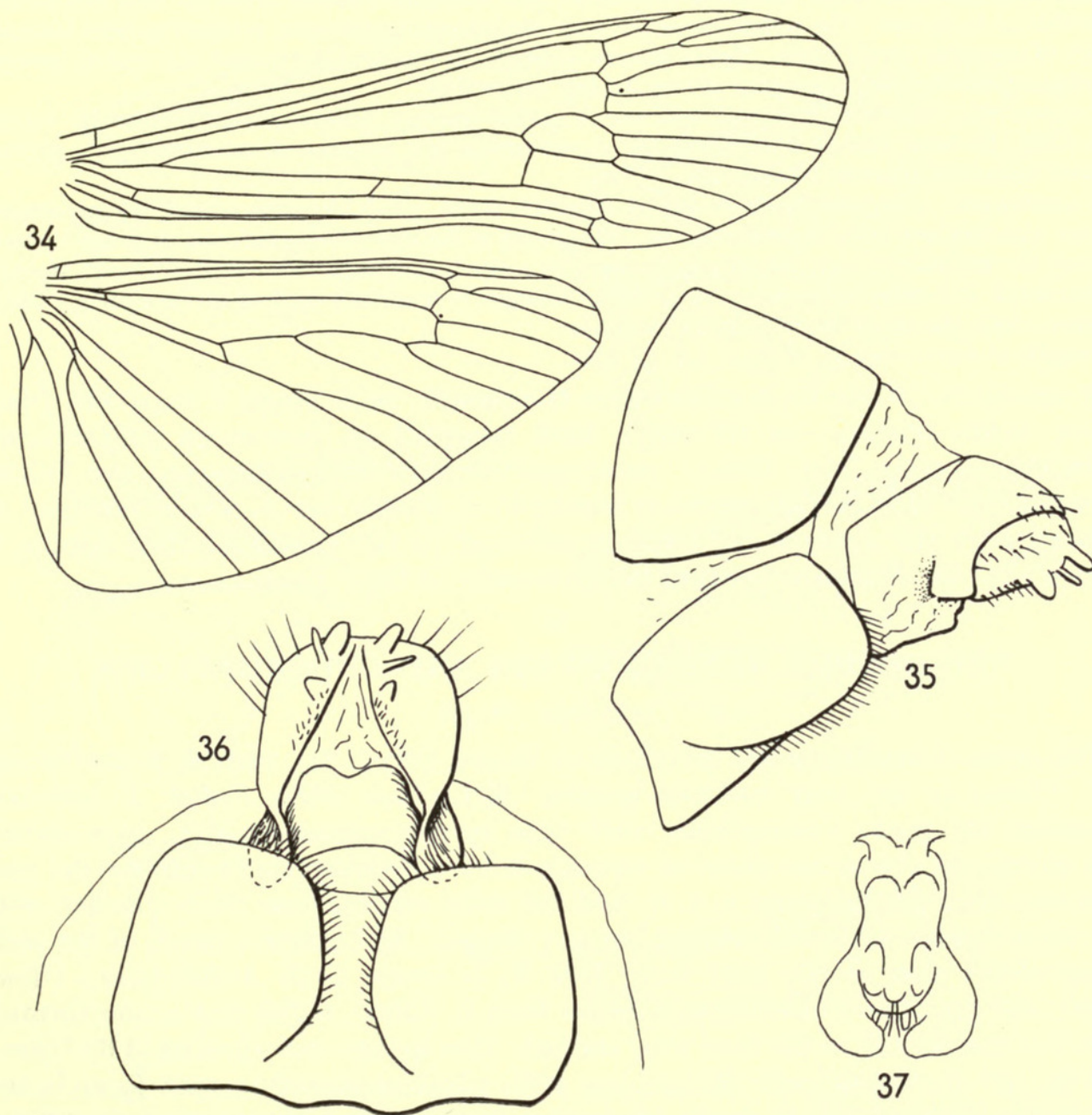


FIGS. 29-33. *Amphipsyche scottae* sp. n. ♂. 29, wings; 30, palpi; 31, genitalia, lateral; 32, dorsal, with apex of aedeagus; 33, ventral and behind.

Amphipsyche scottae sp. n.

(Text-figs. 29-37)

SOUTH AFRICA: Vaal River barrage, 20.iii.1956, 6 ♂, 31.iii.1958, 1 ♂; below Vaal barrage wall, 29.vi.1956, 8 ♂; Vaal River, below barrage, 23.viii.1957, 1 ♀



FIGS. 34-37. *Amphipsyche scottae* sp. n. ♀. 34, wings; 35, genitalia, lateral; 36, ventral; 37, bursa copulatrix, ventral.

and pelt; Waterval River, at Joburg-Durban Road, 16.x.1958, 2 ♂; Wilge River at Warden-Reitz Road, 8.xii.1958, 8 ♂; Wilge River at Frankfort, 8.xii.1958, 3 ♂; Waterval River, on National Road between Standerton and Greylingstad, 12.i.1959, 3 ♂; Wilge River, 5 miles below Harrismith, 10.ii.1959, 3 ♂; Wilge River, between Warden and Reitz, 9.ii.1959, 9 ♂. All specimens in alcohol.

♂ HOLOTYPE. As the specimen was in alcohol, one can only say of its general appearance that it was tawny yellow, antenna finely annulated with reddish at the joints. Abdomen lightly tinged with reddish purple. Fore wing faintly clouded with brownish. R_s almost straight, R_{2+3} not closely adjacent to R_4 , the space between them not much less than that between R_4 and R_5 . In hind wing, cell R_{2+3} generally broadly sessile.

♂ GENITALIA following the general pattern of *A. corbeti* and *A. bernerii*. Tenth segment not broadly shouldered at base, the lobes with their inner margins concave in dorsal view and in side view thin as in *bernerii*. The aedeagus with a pair of spiniform parameres, projecting from beneath a pair of rounded dorsal lobes. Apical lobe of aedeagus truncate, not divided, its ventral surface bearing a pair of small triangular plates, facing each other.

♀ ALLOTYPE. This specimen was bred and is rather teneral. Colours much as in male. In the fore wing, R_s runs almost straight to the anastomosis, not sinuous as in *senegalensis*. Apical cellules narrower than in *senegalensis*.

♀ GENITALIA. Pleurosternum of eighth segment large, plate-like, its curved lower margins almost meeting over the eighth sternite. The latter is lightly sclerotized and does not extend beyond the pleurosternum. Ninth tergite forming a hood, clasper groove shallow. Ninth sternite in the shape of a transverse plate, whose apical margin is shallowly excised at the centre. Tenth segment with the usual three pairs of processes.

Length of fore wing, ♂, 18 mm.; ♀, 14 mm.

♂ HOLOTYPE (Wilge R., 5 miles below Harrismith, 10.ii.1959), ♀ ALLOTYPE (Vaal River, below barrage, 23.viii.1957), both mounted as microscope preparations in British Museum (Nat. Hist.); paratypes in South African Museum and British Museum (Nat. Hist.). This species is related to *A. corbeti* and *A. bernerii* but may be separated by the form of the tenth tergite and of the aedeagus. This species is named after Dr. Marjorie Scott, of the University of Cape Town.

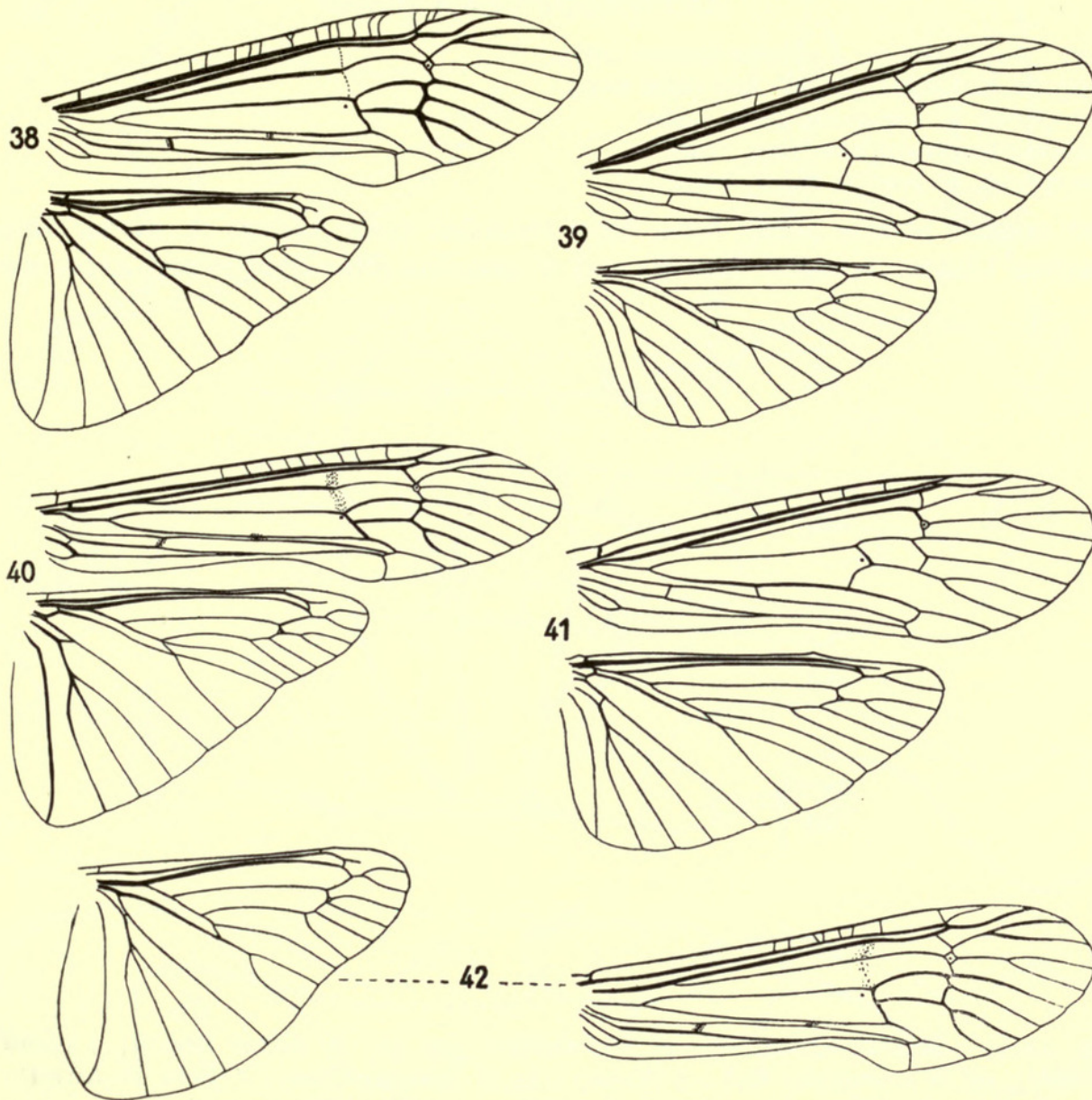
THE GENERA *AETHALOPTERA* AND *CHLOROPSYCHE*

(Text-figs. 38-47)

The genus *Aethaloptera* was described by Brauer (1875 : 71), with *A. dispar* Brauer (W. Africa) as the only included species. McLachlan (1880, *Suppl.* 2 : lxix-lxx) described the genus *Chloropsyche*, with type species *evanescens* McL. (Amurland), and among the characters given to separate it from *Aethaloptera* Brauer are the spur formula 0.2.2 (*Aethaloptera* 0.3.2), and the male intermediate tibiae slender, with the tarsi slightly flattened, fringed but not dilated. McLachlan's figure of the male wings shows that in the hind wing, fork R_4 is sessile as in *Aethaloptera*. Ulmer (1906 : 62) described *Aethaloptera maxima* from S. Africa, which had a spur formula of 0.2.2, and fork R_4 in the hind wing stalked. This species was transferred by Ulmer, (1907a : 17) to *Chloropsyche* McLachlan, with which it agreed in spur formula but not in the shape of fork R_4 in the hind wing. As a result, *Chloropsyche* then differed from *Aethaloptera* only in possessing two instead of three spurs on the intermediate tibiae, the latter being not or less dilated than in *Aethaloptera*.

As the male genitalia of *Chloropsyche maxima* appeared to be almost identical with those of *A. dispar*, it was decided to investigate more thoroughly the type-specimen of *Chloropsyche evanescens* McL. It was at once obvious that McLachlan's statement (1880 : lxix) "All the legs are slender in the male" was not strictly accurate. The intermediate tibiae and tarsi are slightly but definitely dilated, the latter being nearly twice as wide as the posterior tarsi. The intermediate tibiae also showed a slight

swelling just beyond the base and in this area (in the pinned specimen) near the anterior margin there appeared to be a minute pit. Examination of the cleared intermediate tibiae of a second specimen under a compound microscope suggested that this pit was the rudimentary socket of the third or pre-apical spur. No actual spur was seen in the four specimens studied and it would seem that the pre-apical



FIGS. 38-42. Wings of *Aethaloptera* spp. 38, *A. dispar* Brauer, ♂ (Uganda) ; 39 *A. dispar*, ♀ (Sierra Leone) ; 40, *A. maxima* Ulmer, ♂ (S. Africa) ; 41, *A. maxima*, ♀ (SW. Africa) ; 42, *A. evanescens* McLachlan, ♂ (Amur).

spur of the intermediate tibia is either very easily detached or obsolete in *evanescens*. Specimens of *C. maxima* have the intermediate tibiae and tarsi about as much dilated as in *evanescens*, but microscopic examination reveals neither a swelling just beyond the base nor any evidence of a spur socket. Other cases are known in which the tibial spur formula has proved variable and unreliable as a generic character and the genus *Chloropsyche* does not appear to me to be worthy of separation from *Aethaloptera*

and I place it in the synonymy of that genus. *Paraethaloptera* Martynov (1935 : 193), type species *P. gracilis* Mart., 1935, also seems doubtfully distinct from *Aethaloptera*. The type of *Paraethaloptera punctata* Banks has a spur formula of 0.3.2, and should be transferred to *Aethaloptera*.

AETHALOPTERA Brauer

1875 : 71. Type-species, *A. dispar* Brauer, 1875.

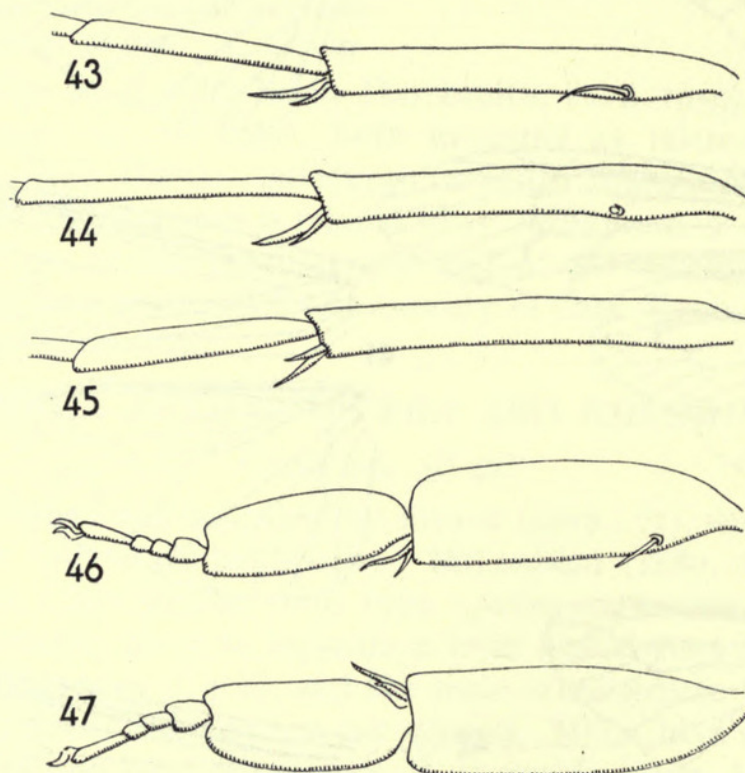
Chloropsyche McLachlan, 1880 : lxix (**syn. nov.**).

Type species, *C. evanescens* McL., 1880.

? *Paraethaloptera* Martynov, 1935 : 193.

Type species, *P. gracilis* Mart., 1935.

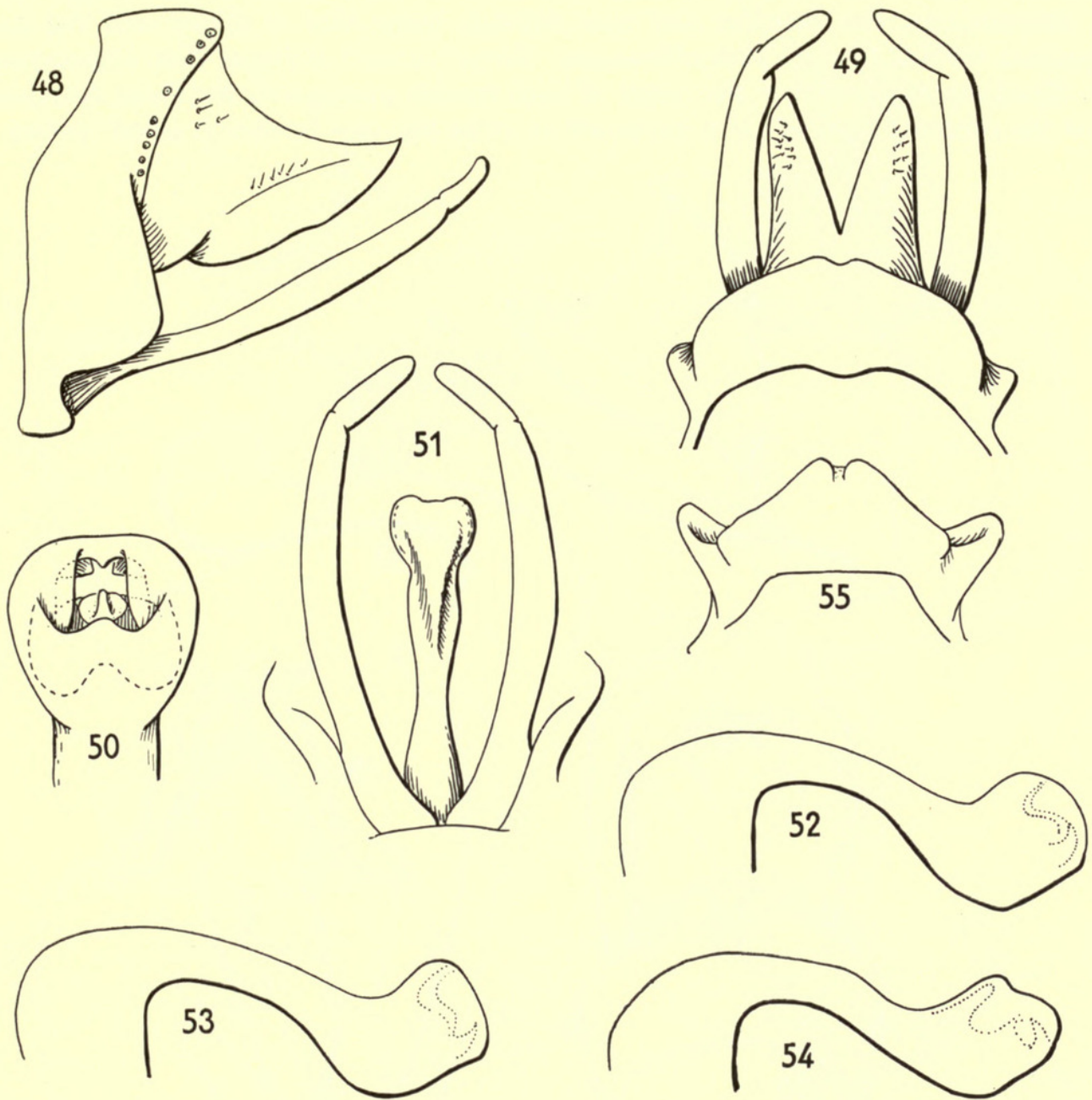
Four species of this genus have been recorded from Africa, *A. dispar* Brauer, *A. maxima* Ulmer, *A. maesi* (Navás) and *A. marcina* (Navás), the two latter species



FIGS. 43-47. Median tibiae, etc., of *Aethaloptera* spp. 43, *A. dispar* Brauer, ♂ (Gold Coast) ; 44, *A. evanescens* McL., ♂ (Amur) ; 45, *A. maxima* Ulmer, ♂ (Port. E. Africa) ; 46, *A. dispar*, ♀, (Sierra Leone) ; 47, *A. maxima*, ♀, (SW. Africa).

being considered as synonyms of *A. dispar*. Whilst *A. dispar* and *A. maxima* can generally be separated on the spur formula of the intermediate tibiae and on the stalked or sessile condition of fork R_4 in the hind wing, both Ulmer and Barnard have commented on the fact that the male genitalia are apparently identical. I have examined numerous specimens and a number of cleared preparations of both species and find that the genitalia, though similar, are not uniform in details, but the variations do not appear to be correlated with any particular spur formula or arrangement of wing venation. The females similarly do not show any constant differences

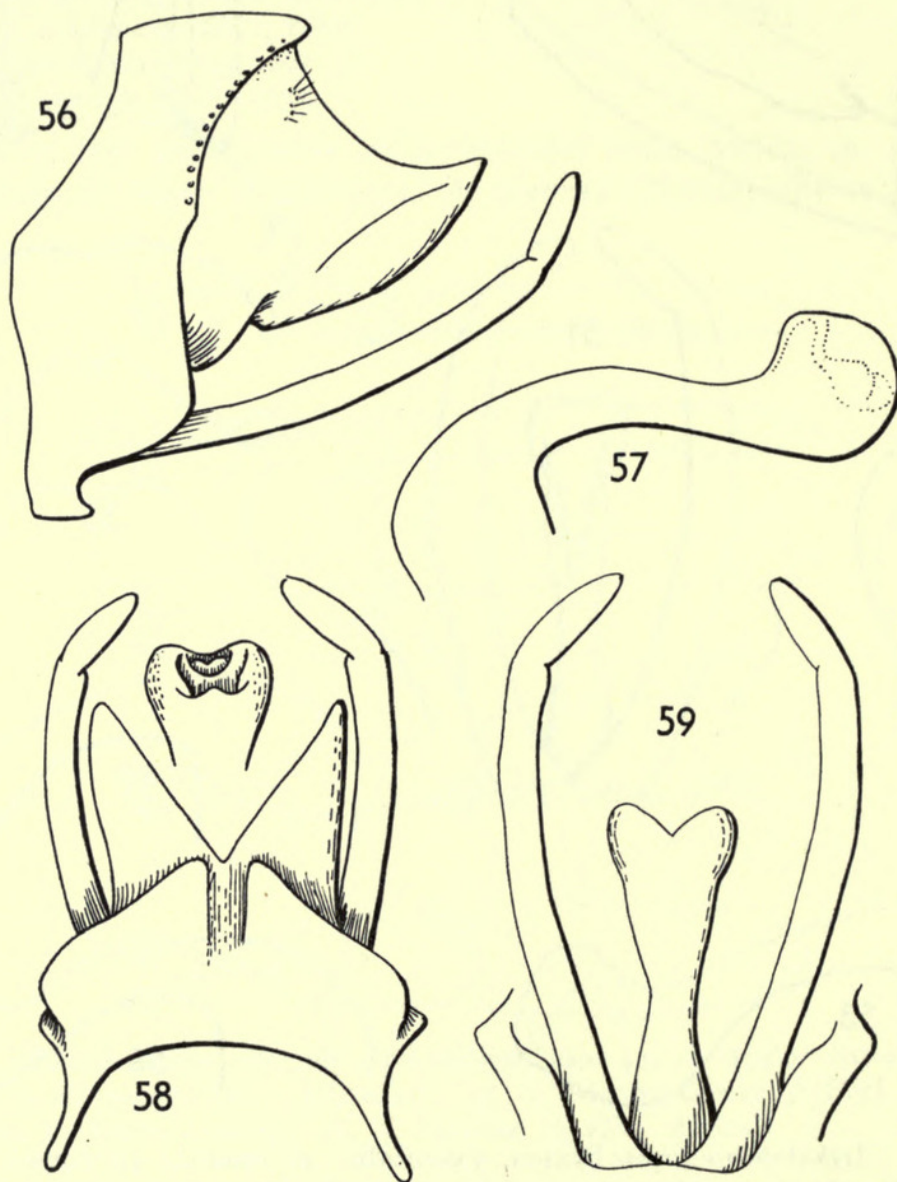
in genitalia which might be considered as specific. The venation of the hind wing in the females also shows some variation, specimens with three tibial spurs sometimes having a short footstalk to fork R_4 instead of having it sessile. Such variation is not



FIGS. 48-55. *Aethaloptera dispar* Brauer, ♂ genitalia. 48, lateral; 49, dorsal; 50, apex of aedeagus, dorsal, more enlarged; 51, claspers and aedeagus, ventral; 52, aedeagus, lateral (Gold Coast); 53, the same (Sierra Leone); 54, the same (Nyasaland); 55, ninth segment, dorsal (Nyasaland).

surprising when one considers that the stalked state of fork R_4 in this genus is a secondary condition. R_4 and R_5 separate at the anastomosis, rapidly running together again, forming a small cell enclosing the corneous point, subsequently separating again to form fork R_4 . Fork M_3 in the fore wing of the female may be either sessile or stalked in *dispar* and usually stalked in *maxima*.

These two species in Africa possibly represent local forms of one widespread species, *maxima* being centred in S. Africa and spreading northwards into N. Rhodesia and Portuguese East Africa. *A. dispar* has its centre in equatorial Africa, extending from west to east and northwards into the Sudan. In Nyasaland one gets a form which is intermediate, the venation and spur formula being that of *dispar* and the male genitalia tending towards that of *maxima*. Ulmer's record of *dispar* from Livingstone, N. Rhodesia suggests that the range of both species overlaps in Northern Rhodesia. For the present, however, it is proposed to treat the two as closely allied species.



FIGS. 56-59. *Aethaloptera maxima* Ulmer, ♂ genitalia. 56, lateral; 57, aedeagus, lateral; 58, genitalia, dorsal; 59, claspers and aedeagus, ventral.

Aethaloptera dispar Brauer

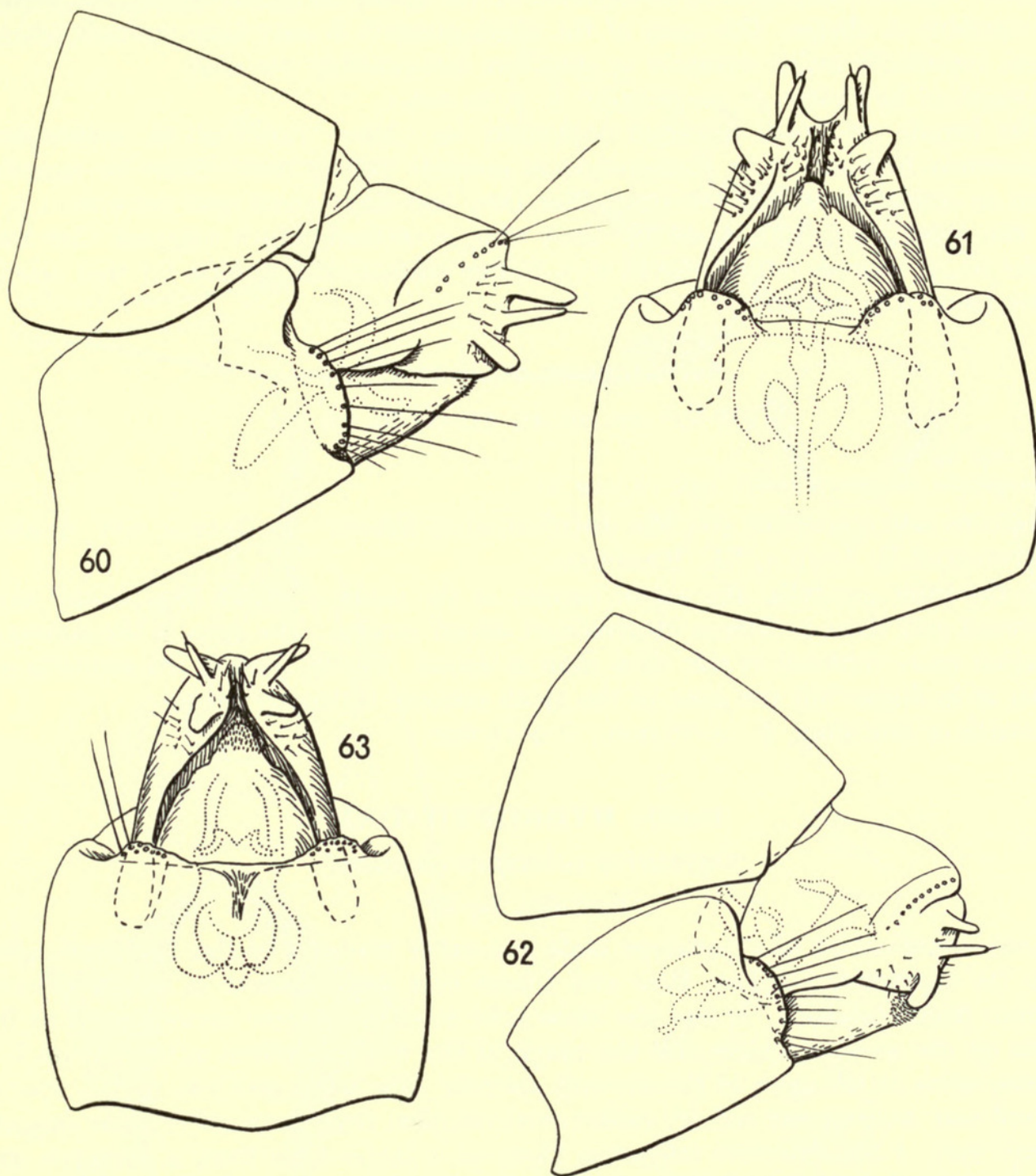
(Text-figs. 38, 39, 43, 46, 48-55, 60-61)

1875 : 72, pl. 4, figs. 4-4c.

Primerenca maesi Navás, 1914 : 182.

Primerenca marcina Navás, 1916 : 26.

From records and specimens the distribution appears to be SENEGAL, SIERRA LEONE, GOLD COAST, S. NIGERIA, BELGIAN CONGO, S. SUDAN, UGANDA, TANGANYIKA, NORTHERN RHODESIA (Livingstone) and NYASALAND.



FIGS. 60-63. Female genitalia of, 60-61, *A. dispar* Brauer (Uganda), and 62-63, *A. maxima* Ulmer (S. Africa). 60, lateral ; 61, ventral ; 62, lateral ; 63, ventral.

Figures are given of the ♂ genitalia of an example from Gold Coast, and comparative figures of the aedeagus in side view of specimens from Sierra Leone and Nyasaland. It will be seen that the shape of the apex is by no means uniform and that there is variation in the contour of the lower margin of the stem. The lower surface towards

the apex is often more keeled than in *maxima*. The apical margin of the ninth segment varies in the amount of its production but is generally without a median dorsal furrow. The degree to which the lobes of the tenth segment diverge is not constant.

In the female, the produced setose lobes on the apical margin of the eighth sternite are variable in shape. The apex of the ninth sternite is only very sparsely setose. Bursa copulatrix rather complex in structure but possibly variable.

Length of fore wing, ♂, 10–16 mm.; ♀, 7–10 mm.

The female specimens recorded doubtfully by Ulmer (1912: 95) as *Aethaloptera sexpunctata* Kolenati from Kamerun may possibly belong here. Since he recorded them as *Aethaloptera*, one presumes that they had the typical spur formula 0.3.2. On the other hand, fork R_4 in the hind wing is stalked, which suggests that they might be *A. maxima*, which would be a rather unusual distribution for that species as we know it at present.

Aethaloptera maxima Ulmer

(Text-figs. 40, 41, 45, 47, 56–59, 62, 63)

1906: 62, fig. 66.

Chloropsyche maxima (Ulmer), 1907: 17, fig. 2.

Records and specimens give the distribution as follows: S. AFRICA, SW. AFRICA, PORTUGUESE E. AFRICA, NE. RHODESIA.

In the male genitalia, the apical margin of the ninth segment is generally more produced and there is often a longitudinal dorsal furrow. The apex of the aedeagus is rather more rounded in side view than in *dispar*. In the female, the genitalia are much as in *dispar* but the apex of the ninth sternite is densely setose.

Length of fore wing, ♂, 14–18 mm.; ♀ 9–13 mm.

Family HYDROPTILIDAE

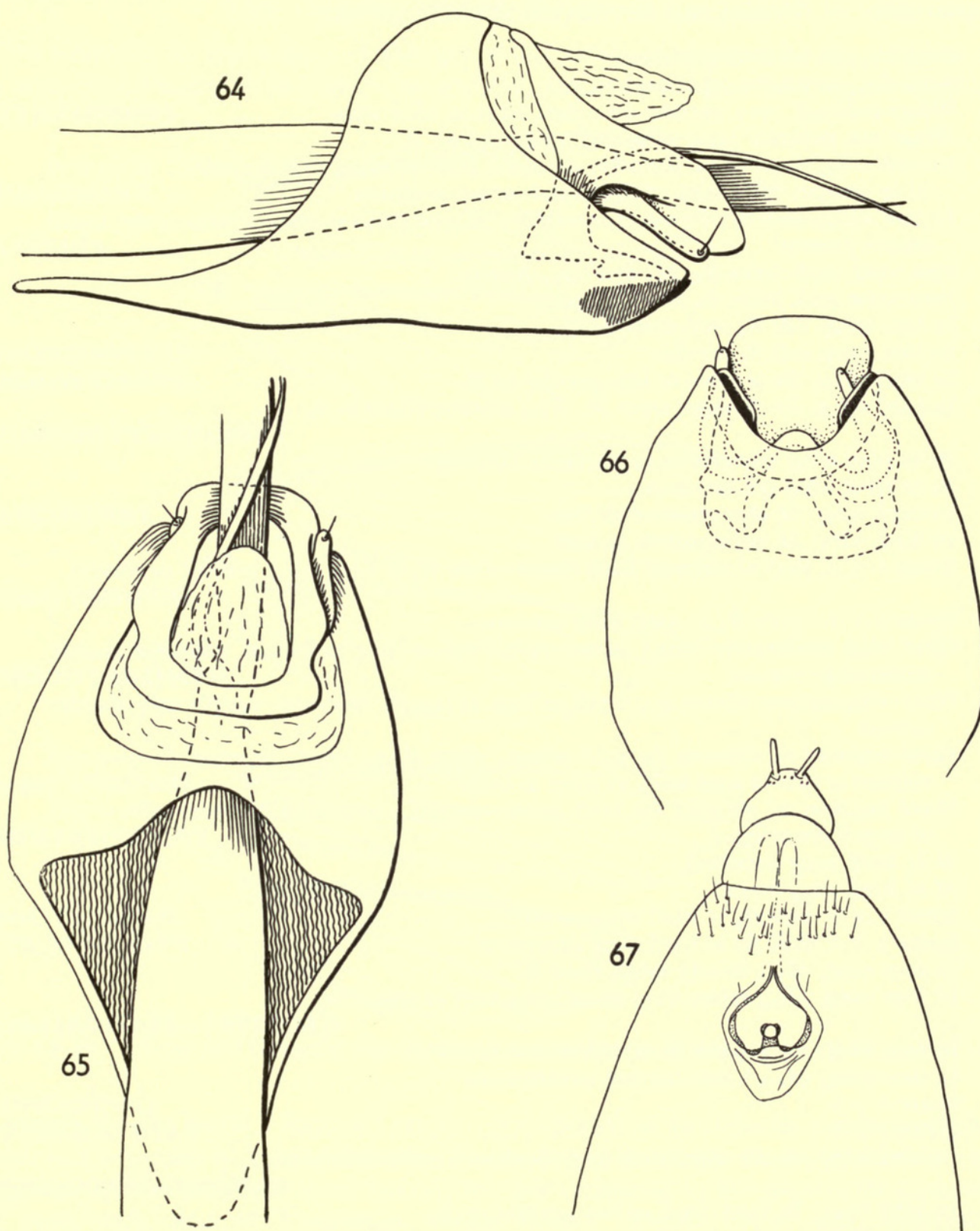
Oxyethira velocipes (Barnard)

(Text-figs. 64–67)

After examination of a paratype male and other material of this species, I agree with the suggestions of Drs. Ross and Ulmer that *Argyrobothrus* is not generically distinct from *Oxyethira*. It has the same spur formula and the arrangement of the warts on the mesoscutellum and the shape of the metascutellum agree. There is a slender spine at the apex of the seventh sternite. The male genitalia of this species are not easy to interpret and are rather more complex than Barnard's figures suggest (1934: 392). I am therefore refiguring them on a larger scale from a paratype and giving a new description of them.

♂ GENITALIA. Eighth segment synscleritous, almost completely encasing the ninth segment, from the side obliquely truncate, and from beneath with its apex excavate. Ninth segment about as long ventrally as eighth, but dorsally narrowed to a transverse band. Apex of ninth segment also excavate ventrally. Aedeagus long, slender, with a spiral spine somewhat beyond mid-way, and another curved spine shortly before the apex. Claspers reduced to two short, wide lobes, projecting a little beyond the margin of the ninth segment in the excavation. Basally they are linked to a structure, possibly the basal plate, which takes the form of a quadrate plate

beneath the aedeagus. Its upper margins extend dorsally at the base and completely encircle the aedeagus, this upper part being joined by membrane to the ninth segment. On each side of the basal plate is a digitate, transparent process, terminating in a seta. Above the aedeagus is a membranous lobe (? tenth segment). The basal plate is the structure referred to by Barnard as the tenth segment.



FIGS. 64-67. *Oxyethira velocipes* (Barnard), genitalia. 64, ♂, lateral; 65, ♂, dorsal; 66, ♂, ventral; 67, ♀, ventral.

Family **LEPTOCERIDAE**Subfamily **LEPTOCERINAE**

Whilst Kimmins' (1956) paper on the African Leptocerinae was in the press, Marlier (1955:150) added one new genus, *Limnoecetis*, and I therefore take this opportunity of revising my key to the African genera.

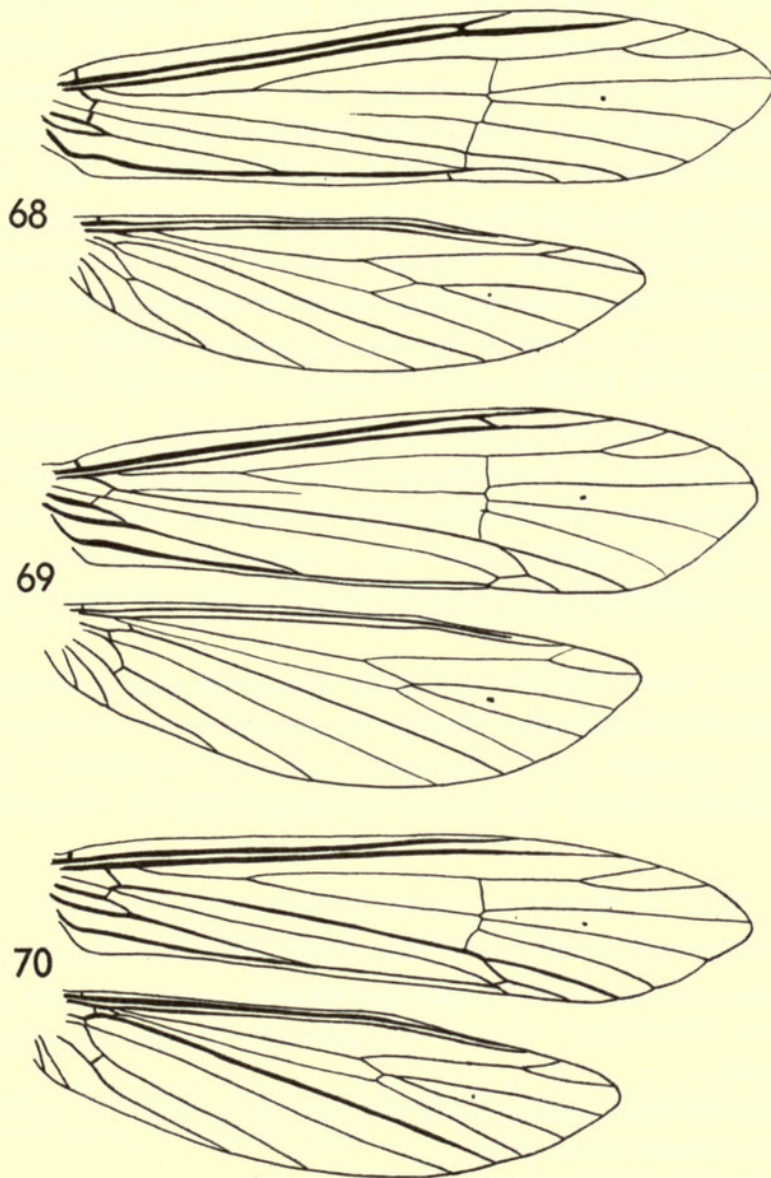
- | | | |
|----|--|--|
| 1 | Fork Cu_{1o} in hind wing present | 4 |
| — | Fork Cu_{1a} in hind wing absent | 2 |
| 2 | Wings reduced, very narrow, no apical forks in hind wing | LIMNOECETIS* |
| — | Wings not reduced, hind wing with at least fork R_2 | 3 |
| 3 | In fore wing, stem of M (usually) obsolete, thus thyridial cell is absent; if stem of M is present, then stem of epicranial suture is absent | TRIAENODES |
| — | In fore wing, stem of M present, complete, thyridial cell present; stem of epicranial suture present | ADICELLA |
| 4 | Fore wing with forks R_2 , M_1 and Cu_{1a} present | 5 |
| — | Fore wing with forks R_2 and Cu_{1a} only | 7 |
| 5 | In fore wing, cell R_5 with a footstalk | 6 |
| — | In fore wing, cell R_5 sessile | LEPTOCERINA ♀ |
| 6 | In hind wing, R_s is more or less parallel to R_1 | ATHRIPSODES ♀ |
| — | In hind wing, R_s diverges from R_1 , R_{2+3} arching towards R_1 | PSEUDOLEPTOCERUS ♀ |
| 7 | R_s in hind wing completely or partially obsolete | 8 |
| — | R_s in hind wing not obsolete | 12 |
| 8 | In hind wing, M also obsolete at base | LEPTOCELLA |
| — | In hind wing, M not obsolete at base | 9 |
| 9 | Spurs 1.2.2, that of anterior tibia small; fork R_2 in hind wing present or absent | SETODES (<i>partim</i>) |
| — | Spurs 0.2.2; fork R_2 in hind wing present | 10 |
| 10 | Hind wing moderately broad (about $2\frac{1}{2}$ –3 times as long as broad), posterior margin moderately convex | HEMILEPTOCERUS |
| — | Hind wing narrow (about 4–5 times as long as broad), posterior margin only slightly convex | 11 |
| 11 | Basal segment of antenna (in both sexes) rather short, stout, tapering to apex and without a tuft of long hairs at apex in male | SETODES (<i>partim</i>) |
| — | Basal segment of antenna (in both sexes) slender, cylindrical, in male with a tuft of long hairs at apex | TRICHOSETODES |
| 12 | M in hind wing unforked | 13 |
| — | M in hind wing forked | 14 |
| 13 | Spurs 1.2.2, fork R_2 in hind wing present | PARASETODES |
| — | Spurs 2.2.2, fork R_2 in hind wing absent | PTOCHOECETIS |
| 14 | In fore wing, M_{3+4} clearly arises from M | 15 |
| — | In fore wing, M_{3+4} arises from $m-cu$ cross-vein or from Cu_{1a} | OECETIS (= SETODELLINA) |
| 15 | In fore wing, M_{3+4} arises at or before anastomosis | 16 |
| — | In fore wing, M_{3+4} arises beyond anastomosis | 17 |
| 16 | Spurs 0.2.2 | LEPTOCERUS |
| — | Spurs 2.2.2 | LEPTOCERINA ♂ |
| 17 | In hind wing, R_s diverges from R_2 to enclose a wide radial area | PSEUDOLEPTOCERUS ♂ |
| — | In hind wing, R_s runs more or less parallel to R_1 | 18 |

* In October, 1961, after this paper had gone to press, Marlier ((*Inst. R. Sci. nat. Belg.*, *Bull.* **38** (28): 1–6) transferred his genus *Limnoecetis* to the family Polycentropodidae, Dipseudopsinae. Couplet 2 in the key should therefore be deleted.

18	In fore wing, venation differing in the sexes, fork M_1 present in the ♀	ATHRIPSODES
—	In fore wing, venation alike in both sexes	19
19	Fork R_2 present in hind wing	HOMILIA
—	Fork R_2 absent in hind wing	LEPTECHO

THE GENUS *TRIAENODES* McLACHLAN

The majority of the species of this genus are easily recognized by the absence of the stem of the media in the fore wing and this has been used as the main recognition



FIGS. 68–70. Wings of *Triaenodes* spp. n. 68, *T. uncata*, ♂; 69, *T. uncata*, ♀; 70, *T. moselyi*, ♂.

character for the genus. Barnard (1934 : 357) described as *Adicella sicula* a species which had venation typical of *Adicella*, that is, it had the media normally formed and complete, but he commented on the remarkable similarity of the genital structure of the male with that of *Triaenodes serrata* Ulmer. Mosely (1936 : 434) described *Triaenodes darfurica*, which has the male genital structure of the *Triaenodes* pattern ; he figures the venation but strangely enough makes no comment on the fact that

the venation is atypical, having the stem of the media complete in the fore wing. Since then, several other species of *Triaenodes* have been described in which the stem of the media in the fore wing shows varying degrees of completeness, the extreme base being most often obsolete. Thus the absence of the stem of the media in the fore wing can no longer be relied upon entirely as a character of the genus *Triaenodes*.

On the other hand, judging by the male genital structures, there does not seem to be any question that *Triaenodes* and *Adicella* are generically distinct. Other possible characters were therefore investigated and it seems that a feature mentioned by Ross (1944 : 212) may be used to supplement the venational character. This is the presence or absence of the stem of the epicranial suture. In *Triaenodes* it is absent in nineteen out of twenty species examined, the exception being the unique type of *Triaenodes chelifera* (Mosely), in which it is present but weakly formed. This species is the type-species of Mosely's genus *Triaenodella*, which was distinguished from *Triaenodes* primarily on the presence in the male of a lobe covering a scent tuft on the basal segment of the antennae. Similar lobes occur in other species of *Triaenodes* which do not have the stem of the epicranial suture developed. In *Adicella* this stem is well developed in six out of eight species examined and in *Erotesis* (closely allied to *Adicella*) it is present in both species examined. The exceptions are *A. triaenodiformis* Ulmer (known only from the female type) and *A. pulcherrima* Ulmer. In the first of these exceptions, it is perhaps significant that Ulmer has given it a name suggesting a resemblance to *Triaenodes*, and it may be that when the male is recognized, it will prove to have genitalia of the *Triaenodes* pattern. In the second case, I have seen only two examples and in these, the genitalia are more like those of *Adicella* than *Triaenodes*.

As a result of these investigations, I have reversed my opinion (1956 : 146) when I transferred *Triaenodes darfurica* Mosely to *Adicella* on venational grounds, and I am also considering *Adicella sicula* Barnard to be a *Triaenodes*. I also propose that *Adicella triaenodiformis* Ulmer be placed provisionally in *Triaenodes*.

KEY TO MALES OF AFRICAN SPECIES OF *Triaenodes*
(EXCLUDING THOSE OF THE MEDITERRANEAN REGION).

The following species are omitted : *T. africana* Ulmer, figures of male genitalia inadequate ; *T. palpalis* Banks, no description of genitalia, sex not given ; *T. triaenodiformis* (Ulmer), known from female only.

- | | | |
|---|---|-------------------------|
| 1 | Clasper with a curved spine arising from the base, in addition to a basal branch | 2 |
| — | Clasper without a curved basal spine | 6 |
| 2 | Clasper slender, basal branch very small | <i>elegantula</i> Ulmer |
| — | Clasper stouter, basal branch conspicuous | 3 |
| 3 | Clasper, in side view, short, rectangular (known to me from literature only) | <i>hastata</i> Ulmer |
| — | Clasper, in side view, not rectangular | 4 |
| 4 | Apex of clasper, in side view, obliquely truncate | <i>uncata</i> sp. n. |
| — | Apex, in side view, acutely produced | 5 |
| 5 | Apex of clasper directed caudad in ventral view | <i>darfurica</i> Mosely |
| — | Apex incurved | <i>wambana</i> Mosely |
| 6 | Tenth segment with one (rarely two) arched spine, arising from a socket on dorsal surface | 7 |

- Tenth segment without such spine 9
- 7 Clasper, in side view, short, about as long as deep, basal branch short and broad, apex scarcely bifid *falculata* Kimmins
- Clasper, in side view, at least twice as long as deep, basal branch slender with bifid apex 8
- 8 Cerci shorter than tenth segment (excluding spine). Lower fork of basal branch of clasper shorter than apical branch *sicula* (Barnard)
- Cerci longer than tenth segment. Lower fork of basal branch of clasper longer and narrower than apical branch *serrata* Ulmer
- 9 Basal branch of clasper slender, terminating in two long, slender forks 10
- Basal branch stouter, not terminating in two long, slender forks 12
- 10 Inner and outer margins of clasper, in ventral view, straight and parallel, clasper abruptly narrowed at apex *moselyi* sp. n.
- Inner margins convex or sinuous, clasper not abruptly narrowed at apex 11
- 11 Clasper, in ventral view, three times as long as wide, upper fork of basal branch clavate *difformis* Mosely
- Clasper, in ventral view, twice as long as wide at base, tapering to apex. Upper fork spine-like *hickini* Kimmins
- 12 Side lobes of tenth segment fused to form a single spine; median lobe reduced to two small processes, or absent 13
- Side lobes separate, except at base, spiniform; median lobe well developed or reduced 14
- 13 Basal branch of clasper simple, clavate, with a ventral spine *kimila* Mosely
- Basal branch of clasper bifid, both forks arched downward *ghana* Kimmins
- 14 Median lobe of tenth segment reduced to two small, transparent fingers at the bases of the cerci *legona* Mosely
- Median lobe of tenth segment produced, finger-like, longer than cerci 15
- 15 Clasper, from beneath, not longer than wide, basal branch strongly incurved *polystachya* Marlier
- Clasper, from beneath, distinctly longer than wide 16
- 16 Apical part of basal branch of clasper flattened, blade-like, lower edge serrate and with a long acute tooth *clavata* (Mosely)
- Apical part of basal branch forming a rounded lobe, with a stout, blunt projection beneath it *chelifera* (Mosely)

Triaenodes moselyi sp. n.

(Text-figs. 70-75)

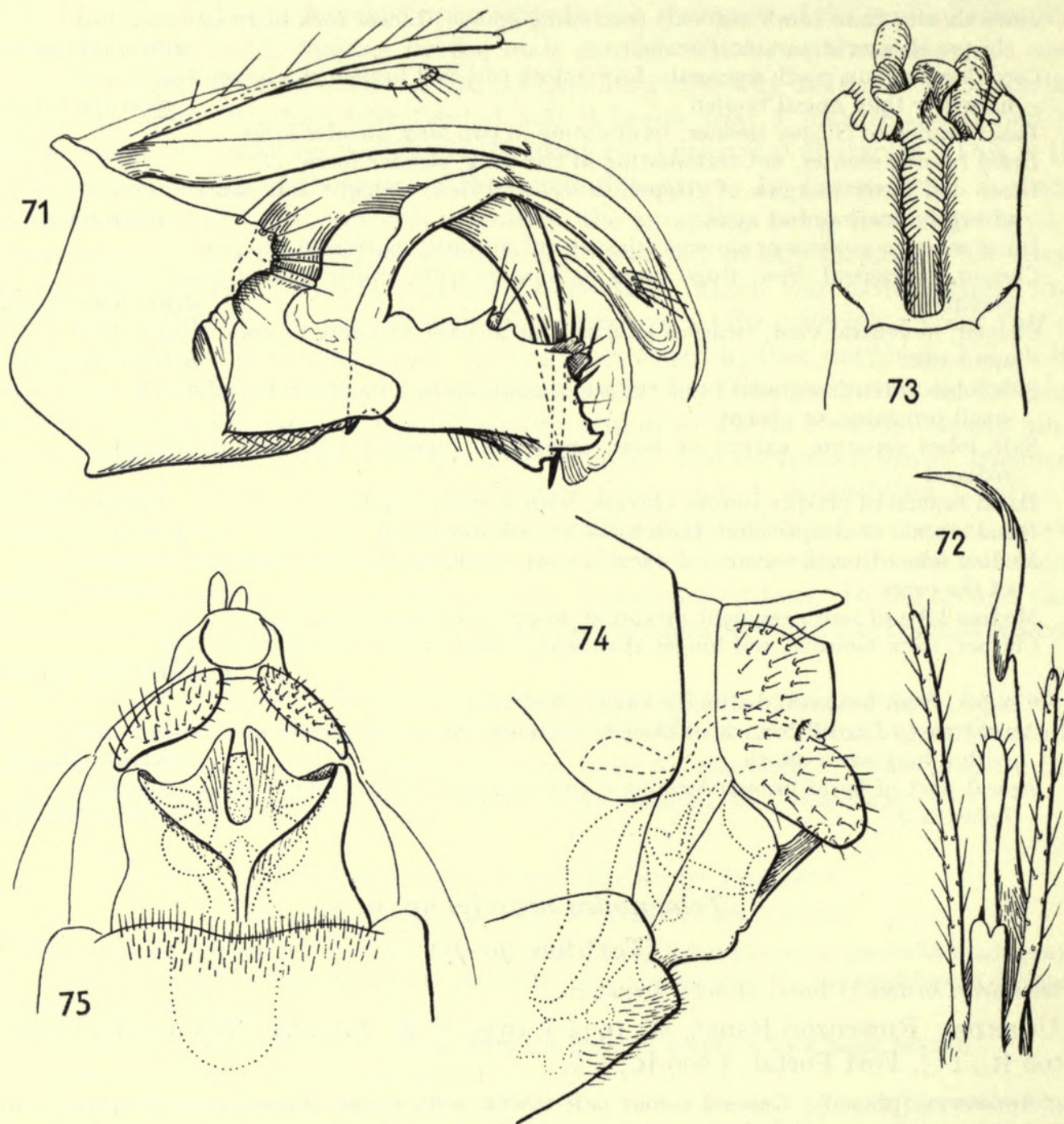
Triaenodella hastata (Ulmer) Mosely, 1939 : 16.

UGANDA : Ruwenzori Range, xii. 1934-i. 1935, *F. W. Edwards*, Namwamba Valley, 6,500 ft., 1 ♂, Fort Portal, 5,000 ft., 5 ♀.

♂ HOLOTYPE (pinned). General colour pale tawny, with golden pubescence. Antenna finely annulated with fuscous, basal segment long and slender and with a plate covering the dorsal surface, although no pencil of hairs is visible beneath it. Palpi long, sparsely pubescent. Fore wing with golden pubescence and with indistinct spots of brownish pubescence in the apical half. Hind wing with sparse brownish pubescence. Fore wing rather narrow, discoidal cell long, almost twice as long as its footstalk. In hind wing, fork R_4 has a short footstalk.

♂ GENITALIA. Ninth segment long ventrally but reduced dorsally to a narrow transverse band. Side-pieces large and triangular, with rounded setose apices. Lateral margins at base of claspers extended upwards and inwards to support the base of the aedeagus. Median lobe of tenth segment inconspicuously trifid, the side branches very short, centre branch slender, slightly clavate and setose at apex. Side lobes fused together beneath the median lobe to form

a long, blade-like, curved spine, with a short projection about mid-way on the left side. Cerci long and slender, of unequal length. Aedeagus arched, with a median dorsal furrow, membranous towards apex dorsally and with a membranous upper lobe on each side. Clasper about twice as long as wide, quadrate in side and ventral views, the outer apical angle, in ventral view, produced



FIGS. 71-75. *Triaenodes moselyi* sp. n. Genitalia. 71, ♂, lateral; 72, ♂, tenth segment, dorsal; 73, ♂, claspers and aedeagus, ventral; 74, ♀, lateral; 75, ♀, ventral.

in a short, blunt, incurved process. Dorsal, apical and inner margins serrate, set with stout setae. Inner margins parallel. From the base of the left clasper, the upper margin is produced upwards in a long finger, which bifurcates about mid-way into two spines. The outer spine is directed tailward and is setose apically, the inner (and longer) spine is bent downwards alongside the aedeagus. In the right clasper of the type, this basal branch is either asymmetric or damaged, taking a bigger sweep basally and its apex is broken away.

♀ ALLOTYPE. General appearance much as in male. Basal segment of antenna similarly elongate, but without the dorsal flap. Wings rather denuded but apparently with similar markings.

♀ GENITALIA. Eighth sternite with its apical margin sinuous, the margin itself and the area anterior to it densely setose. Ninth and tenth tergites fused, forming a short, truncate anal tube. From the dorsal surface of the fused segments arise two short, unequal, transparent processes, directed caudad. Sides of anal tube raised to form two low, hairy warts. Lateral gonapophyses short, foliate, with rounded apices, directed obliquely downward, outer surfaces convex and setose. Beneath them is a broad, bifid subgenital plate, deep in side view, the branches directed obliquely upwards between the lateral gonapophyses. From beneath, the branches are separated by a deep narrow excision.

Length of fore wing, ♂, 8.5 mm.; ♀, 9–9.5 mm.

♂ HOLOTYPE (now mounted as microscope preparations), ♀ ALLOTYPE, pinned (abdomen mounted as microscope preparation) and ♀ paratypes in British Museum (Natural History). These specimens were originally determined by Mosely as *Triaenodella hastata* (Ulmer), but even allowing for the fact that Ulmer's figure of the male genitalia was drawn from a dried example, I do not think that they could justifiably be placed as *hastata*. The latter is shown with definite curved, blade-like basal spines arising from the clasper and the basal branch is clavate, not bifid. *T. moselyi* is closely related to *T. hickini* Kimmins (1957 : 22) from Kenya, both in male and in female genital structures. In the male the centre branch of the median lobe of the tenth segment is much longer than the side branches and the two side lobes are fused into a single spine. In side view, the clasper is more rectangular and in ventral view the inner margins are parallel to each other and to the outer margins. In the female, there are two dorsal processes on the fused ninth and tenth segments and the lower lip of the anal tube is not produced and the lateral gonapophyses are rounded (not acute) apically.

Triaenodes uncata sp. n.

(Text-figs. 68, 69, 76–81)

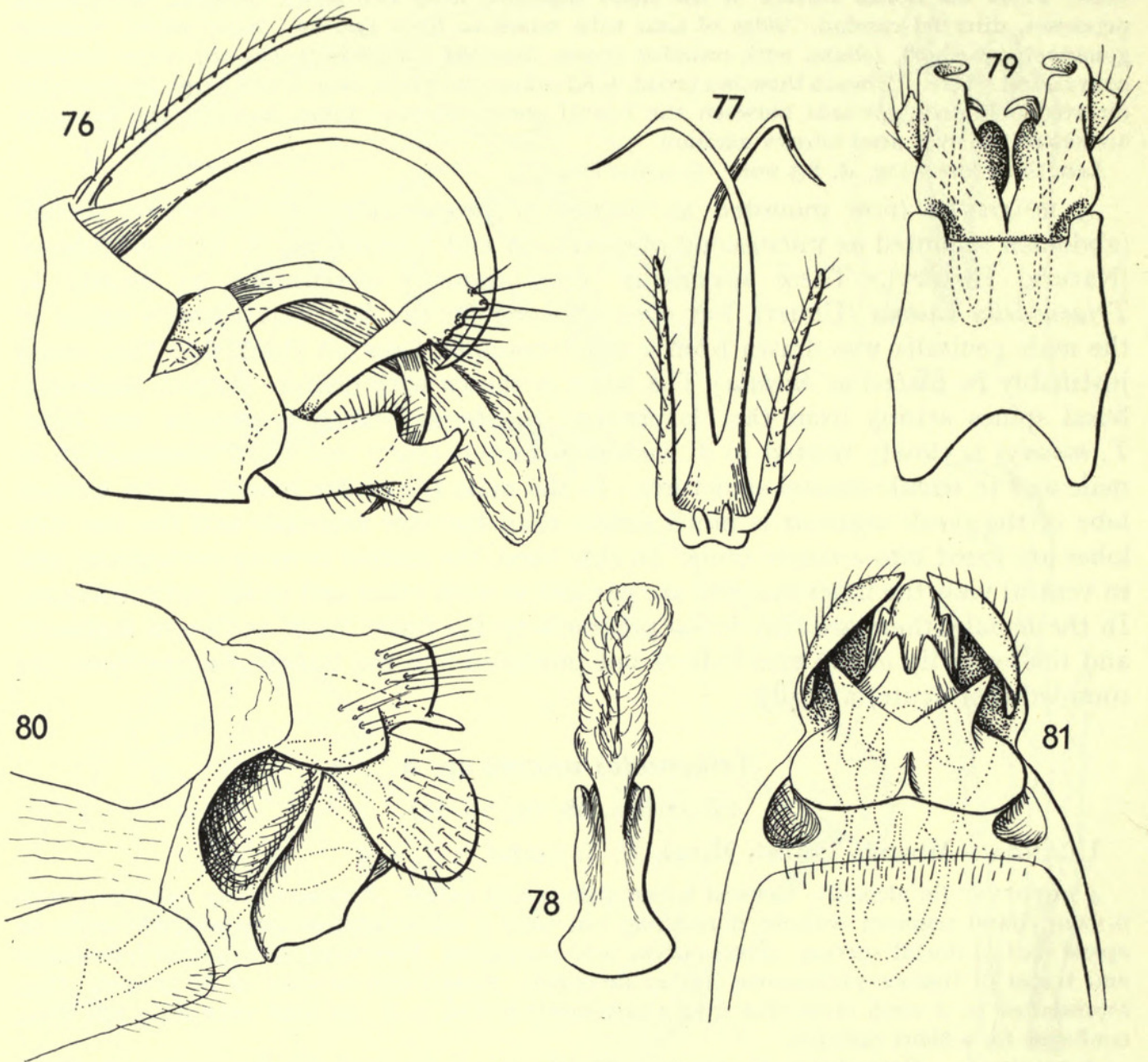
UGANDA : Mbanga Forest, Mpigi, P. S. Corbet, 1 ♂, 4 ♀.

♂ HOLOTYPE (in alcohol). General colour pale tawny yellow. Antenna finely annulated with fuscous, basal segment without dorsal flap but with a small, median, longitudinal carina on apical half of dorsal surface, which curves over outwards. Fore wing with golden pubescence and traces of fuscous pubescence (rather denuded). Apical half of stem of *M* present. *Cu*_{1b} represented by a weak cross-vein from anastomosis to *Cu*₂ + *A*. In hind wing, *R*₄₊₅ and *M*₁₊₂ confluent for a short distance.

♂ GENITALIA. Resembling *T. wambana* Mosely (1939 : 15), but differing in detail. Ninth segment with prominent, triangular side-pieces and below them there is a triangular excision of the lateral margin. Tenth segment comprising a pair of long, slender spines, strongly arched in side view, their apices crossing in the type. Above these spines (which are fused basally) are two long, slender cerci and two short processes. Aedeagus arched basally, with a median dorsal groove, apical part membranous. Clasper stout, about twice as long as wide in side view, its upper margin elevated about mid-way, then excised before the acute apex. Lower margin sinuous in side view, apex obliquely truncate. In ventral view, the clasper tapers gradually from base almost to apex and is then suddenly constricted to a finger, curving inwards from the outer angle. Inner margin of the clasper produced upwards in apical half to form a rounded setose lobe. At the extreme base of the clasper there arises, from the dorsal margin, a strong, sickle-shaped spine, adjacent to the stem of the aedeagus. Just posterior to this spine arises the basal

branch, slender basally, directed obliquely upward and caudad, dilating apically and setose. This branch is very thin and lightly sclerotized and in the course of mounting has twisted spirally and changed its direction.

♀ ALLOTYPE (in alcohol). General appearance as in male. Antenna without median carina on basal segment. In fore wing there is a weak, incomplete vein representing the basal half of



FIGS. 76-81. *Triaenodes uncata* sp. n. Genitalia. 76, ♂, lateral; 77, ♂, tenth segment, dorsal; 78, ♂, claspers, ventral; 80, ♀, lateral; 81, ♀, ventral.

the stem of *M*. Cu_{1b} normal. In hind wing, R_{4+5} and M_{1+2} touching or linked with a short cross-vein.

♀ GENITALIA. Apical margin of eighth sternite straight, setose. Ninth and tenth segments fused, forming a short anal tube, ventral margin of which is produced in a short spatulate lobe. Sides of anal tube convex, with long setae. Lateral gonapophyses large, ovate, outer surfaces convex. Subgenital plate complex; on each side at the base is a deep, ovate hollow. From beneath, the plate is broad, with rounded lateral margins and a raised median carina at base.

The anterior margin has a wide, V-shaped excision, outer angles acute. Beyond the excision is another triangular plate, convex and with a deep and narrow apical excision. This plate is directed obliquely upwards between the lateral gonapophyses.

Length of fore wing, ♂, ♀, 7 mm.

♂ HOLOTYPE, ♀ ALLOTYPE (mounted as microscope preparations) and ♀ paratypes in 2% formaldehyde solution, in British Museum (Natural History). The male genitalia of this species are similar in structure to those of *T. wambana* Mosely. The chief differences are in the clasper, which in side view is shorter and obliquely truncate at apex; the inner marginal lobe is smaller; the sickle-shaped spine has no spur. From beneath, the clasper tapers much more abruptly at its apex.

Parasetodes maguira (Mosely)

Leptocerus magivrus Mosely, 1948 : 32, figs. 1-4.

Parasetodes maguira (Mosely) Kimmins, 1956 : 124.

Mosely describes and figures the upper branch of the clasper as being clavate or truncate at the apex. Examples from the Vaal and Wilge Rivers have genitalia almost identical with the figure of *maguira*, apart from the fact that the apex of the upper branch of the clasper is produced in a slender finger. Mosely's description was based upon a single example; I have studied the preparation carefully and, under a $\frac{1}{4}$ in. objective, it is evident that the extreme apex is damaged and it is probable that there was originally a similar slender finger in the type of *maguira*.

Athripsodes harrisoni (Barnard)

Leptocerus harrisoni Barnard, 1934 : 337-338, figs. 25-26.

Leptocerus calcaratus Barnard, 1941 : 106-07; fig. B (**syn. nov.**).

Barnard distinguished his species *calcaratus* from *harrisoni* on the presence of an acute tooth on each side of the ninth segment (10th tergite of Barnard) and slight differences in the shape of the clasper. These differences seem to me to be no more than individual variation, especially as a paratype of *harrisoni* shows traces of the lateral acute processes on the ninth segment.

OECETIS McLachlan

1877 : 329-330 (type-species *Leptocerus ochraceus* Curtis, 1825).

Setodellina Lestage, 1919 : 202, fig. 5. (type-species *Setodellina albopunctata* Lestage, 1919) (**syn. nov.**).

The genus *Setodellina* was based by Lestage upon a single example, but in neither the generic nor the specific description does he give any indication of the sex of this example, merely remarking that the genitalia are difficult to describe on account of the bad state of the apex of the abdomen. He figures the venation and compares it with *Pseudosetodes* Ulmer. No comparison is made with *Oecetis*, with which genus it agrees in most characters other than the absence of fork R_2 in the hind wing, a character which has since been found to be variable in the genus *Athripsodes*. His figure shows Sc and R_1 to be completely fused in the fore wing but no comment is

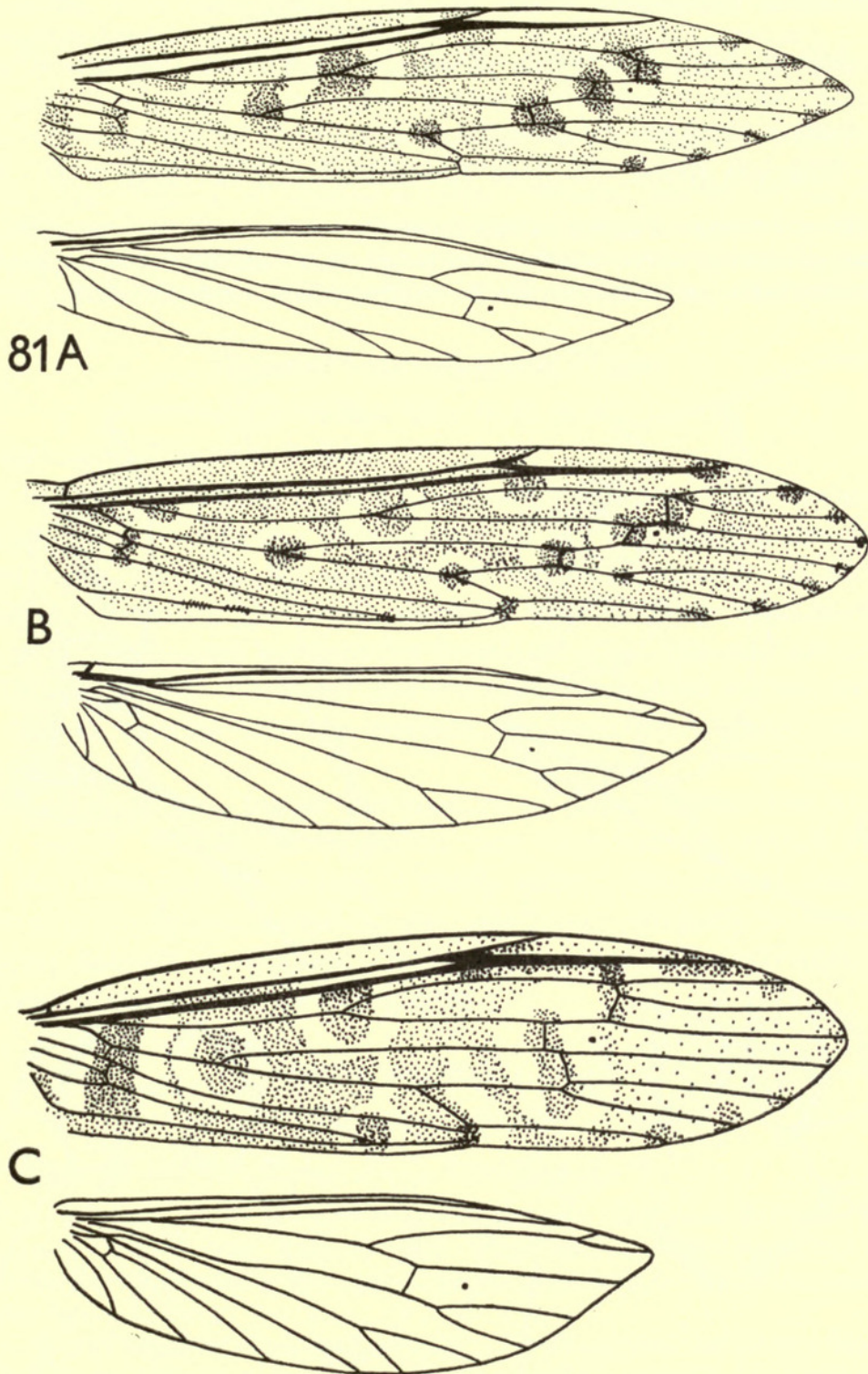
made on this point; in the hind wing these veins are shown as separate for most of their length but in his description they are said to be almost fused and scarcely visible.

Ulmer (1923 : 15) placed a second species (*S. brunnescens*) in the genus *Setodellina*, figuring the venation and the male genitalia. The hind wing of this species also lacks the fork R_2 , but the wings are broader than in the figure of *S. albopunctata* and Ulmer comments that they are otherwise similar to those of *Oecetis*. The genitalia of *S. brunnescens* resemble those of *Oecetis gradata*, both having the cerci more or less fused to the tenth segment, forming a broad plate. Martynov (1936 : 271) placed a number of Asiatic and African species into *Setodellina* and gave an extended diagnosis of the genus, including genital characters, particularly the fused cerci. As regards venation, he remarks that apical fork R_2 may be present or absent in the hind wing, a fact that lessens its value as a character separating *Setodellina* from *Oecetis*. As far as I know, Martynov did not have the opportunity of studying the type of *S. albopunctata* and the genital characters which he gives for *Setodellina* are based upon *S. brunnescens* Ulmer, upon his own new species and upon various other species of *Oecetis*, which he had transferred to *Setodellina*. In my own paper (1956 : 135), I accepted Martynov's interpretation of the genus *Setodellina*, but as material of further African species has come to hand it has become increasingly difficult to decide when the cerci cease to be fused with the tenth segment to form a broad plate or anal tube, some species being intermediate in this respect between *Setodellina* and *Oecetis*, as defined by its type-species, *O. ochracea* (Curtis). Both have the inflated, somewhat globular aedeagus with a downwardly-hooked apex.

Thus a conception of the genus *Setodellina* had grown up which was based largely upon species subsequently placed in it and which were not necessarily congeneric with it. I have been able to study the holotype of *Setodellina albopunctata* Lestage. The specimen as sent to me lacked the preparation of the hind wing (Lestage had removed both left wings for figuring and attached them by their bases to a card with gum; the hind wing has at some time become detached from the gum and was missing). For greater safety, I have now mounted the left fore wing and the right hind wing (which was somewhat damaged) between two pieces of celluloid. It is clear from these wings that Lestage's figure of the venation is incorrect as far as the subcosta and radius of both wings are concerned. I can see no definite evidence of fork R_2 in the remaining hind wing, although there is a slight thickening of the vein at the point where the fork might be expected to occur. A female of *albopunctata* in the British Museum (Nat. Hist.) from Nigeria, Gadau, has a definite fork R_2 in the hind wing. I am refiguring the wings of the type (with fore wing reversed) and have attempted an impression of the pigmentation of the fore wing. The pattern is rather more definite than I had expected from Lestage's description and recalls that of examples from Uganda determined by myself as *S. maculipennis* (Ulmer). Examination of the abdomen of the type of *albopunctata* suggested that it was a female, an impression which was confirmed by clearing in KOH solution.

Comparison of the wing venation of the female holotype of *albopunctata* with Ulmer's figure of *maculipennis* (1922 : 61) reveals one difference which, though not of generic importance, may be considered specific (Text-figs. 81A-C). In the fore

wing of *albopunctata*, M forks basad of the $r-m$ cross-vein. M_{3+4} simulates a cross-vein from M to Cu_{1a} and fuses with the latter vein for a short distance, appearing as a short stalk to the false fork formed by the divergence of M_{3+4} and Cu_{1a} . In Ulmer's figure (and in the Uganda examples now placed as *maculipennis*) the fork of M is situated beyond the $r-m$ cross-vein and M_{3+4} does not fuse with Cu_{1a} but is linked to it by a cross-vein. The use of this character to separate *Setodellina* from



FIGS. 81A-C. *Oecetis* spp., wings. 81A, *O. albopunctata* (Lestage), ♀ holotype; B, presumed male of *O. albopunctata*; C, *O. maculipennis* Ulmer, male.

Oecetis is not supported by other characters in the various species examined and it does not seem worth while to maintain any longer the separation of these two genera.

***Oecetis albopunctata* (Lestage)**

(Text-figs. 8IA, B, D, E, H-J)

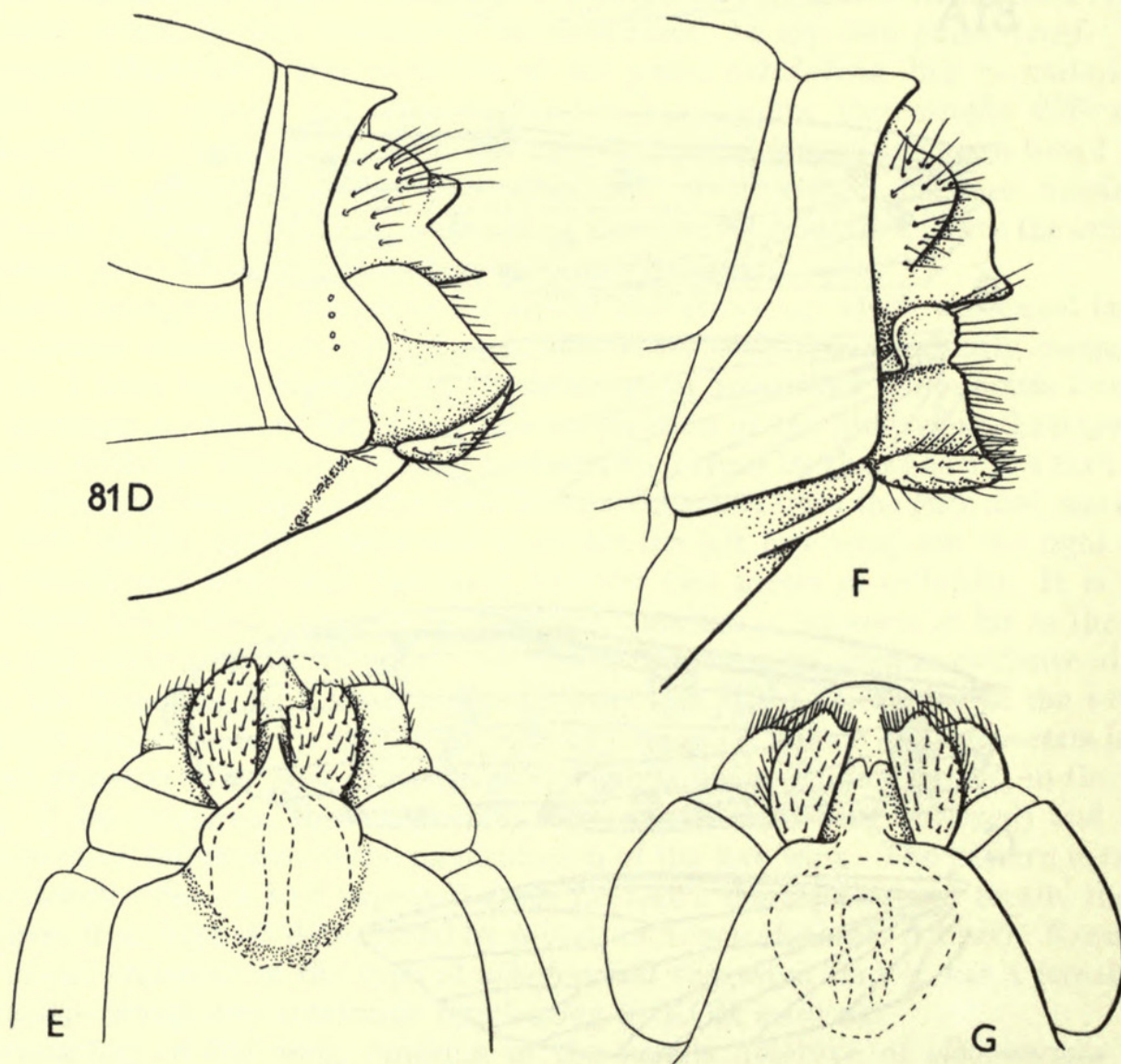
Setodellina albopunctata Lestage, 1919 : 202-203, fig. 5 (Congo).

UGANDA : Albert Nile, Pakwach, 28-29.iv.1956, near Laropi, 27-28.iv.1956, P. S. Corbet, ♂.

NIGERIA : Gadau, ii.1933, Buxton & Lewis, 1 ♀.

S. AFRICA : Pongola River, Pongola Settlements, 17.ix.1954, 1 ♂.

♀ GENITALIA OF HOLOTYPE. Eighth sternite produced at the centre of its apical margin in an acutely cuspidate subgenital plate, which is margined at its base by a narrow band of brownish pigment, which simulates an excision. Ninth tergite rather short and deep, the centre of its



FIGS. 81D-G. *Oecetis* spp., female genitalia. 81D, *O. albopunctata* (Lestage), holotype, lateral ; E, the same, ventral ; F, *O. maculipennis* Ulmer, lateral ; G, the same, ventral.

apical margin acutely produced in side view. Tenth segment and cerci fused to form an anal tube with upper and lower margins produced. Lateral gonapophyses large, thin, the ventral margin of each turned outwards, slightly hairy, forming a pair of somewhat reniform lobes in ventral view.

Amongst examples from various localities, originally determined as *maculipennis* Ulmer, a short series of males from Albert Nile, Pakwach has the form of *M* in the fore wing basad of the *r-m* cross-vein and the pigmentation of the membrane much as in the type of *albopunctata*. Fork *R*₂ is present in the hind wing (although I do not attach much importance to this), the examples are smaller than *maculipennis* and show certain differences in male genitalia. It is proposed to consider them as the probable male of *O. albopunctata* (Lestage).

♂ GENITALIA. Ninth segment with its dorsal apical margin moderately produced at its centre. Side-pieces broadly triangular. Cerci ovate, almost completely fused to the tenth segment, which projects somewhat beyond it in a convex plate with a shallowly excised apical margin. Aedeagus short, moderately inflated, its apex produced downwards in a short lobe, which is rounded in side view (acute in S. African example). Clasper slender in side view, extending beyond the tenth segment. It curves slightly upwards, upper margin sinuously curved. The apex is not strongly curved upwards beyond mid-way. From beneath, the clasper is moderately broad at base, apical half constricted and incurved, inner and outer margins sinuous.

Oecetis maculipennis Ulmer

(Text-figs. 81C, F, G, K-M)

1922 : 61-63, figs. 22-25 (Egyptian Sudan).

Specimens from Uganda and Ghana determined by myself as *maculipennis* agree fairly well with Ulmer's figures. New figures of the ♂ genitalia are given from an example from Lake Victoria, for comparison with *albopunctata*, in which it will be seen that the side-pieces of the ninth segment are narrower than in the presumed *albopunctata*, and the claspers are broader basally in side view and are curved sharply upwards in the apical half. The chief difference between these figures and those given by Ulmer is that in ventral view the claspers are incurved apically, not divergent as shown by Ulmer.

The female genitalia also follow the pattern of *albopunctata*, but as in the male, they differ in detail. The ninth tergite in side view has the apical margin almost straight and the lower lateral margin is much wider. The lateral gonapophyses are rather shorter and the apical margin in side view is less obliquely truncate. In ventral view the apical margin is sinuous. Subgenital plate more abruptly shouldered. Cerci less closely fused to the tenth segment.

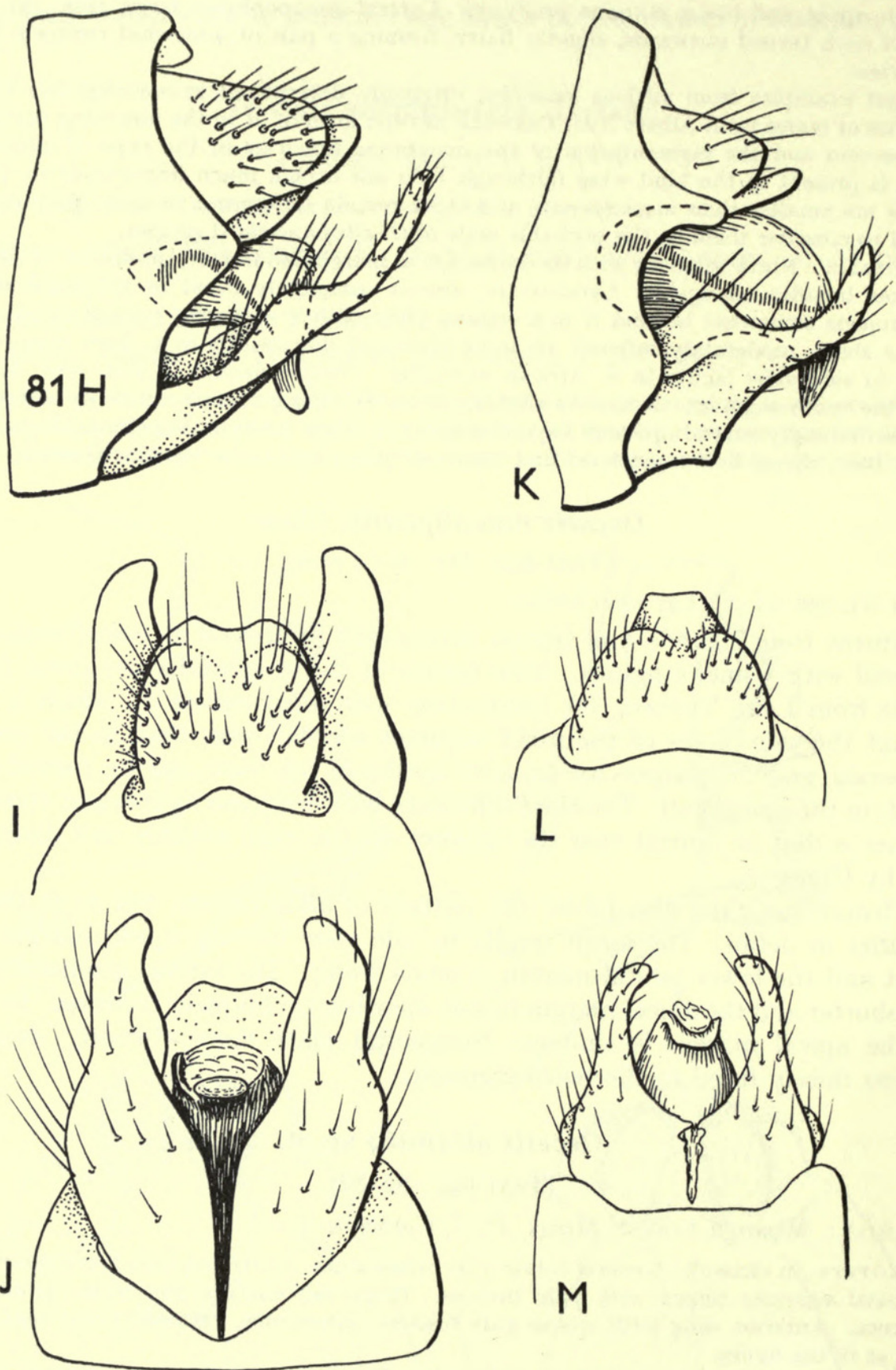
Oecetis absimilis sp. n.

(Text-figs. 82-88)

UGANDA : Mbanga Forest, Mpigi, P. S. Corbet, 2 ♂.

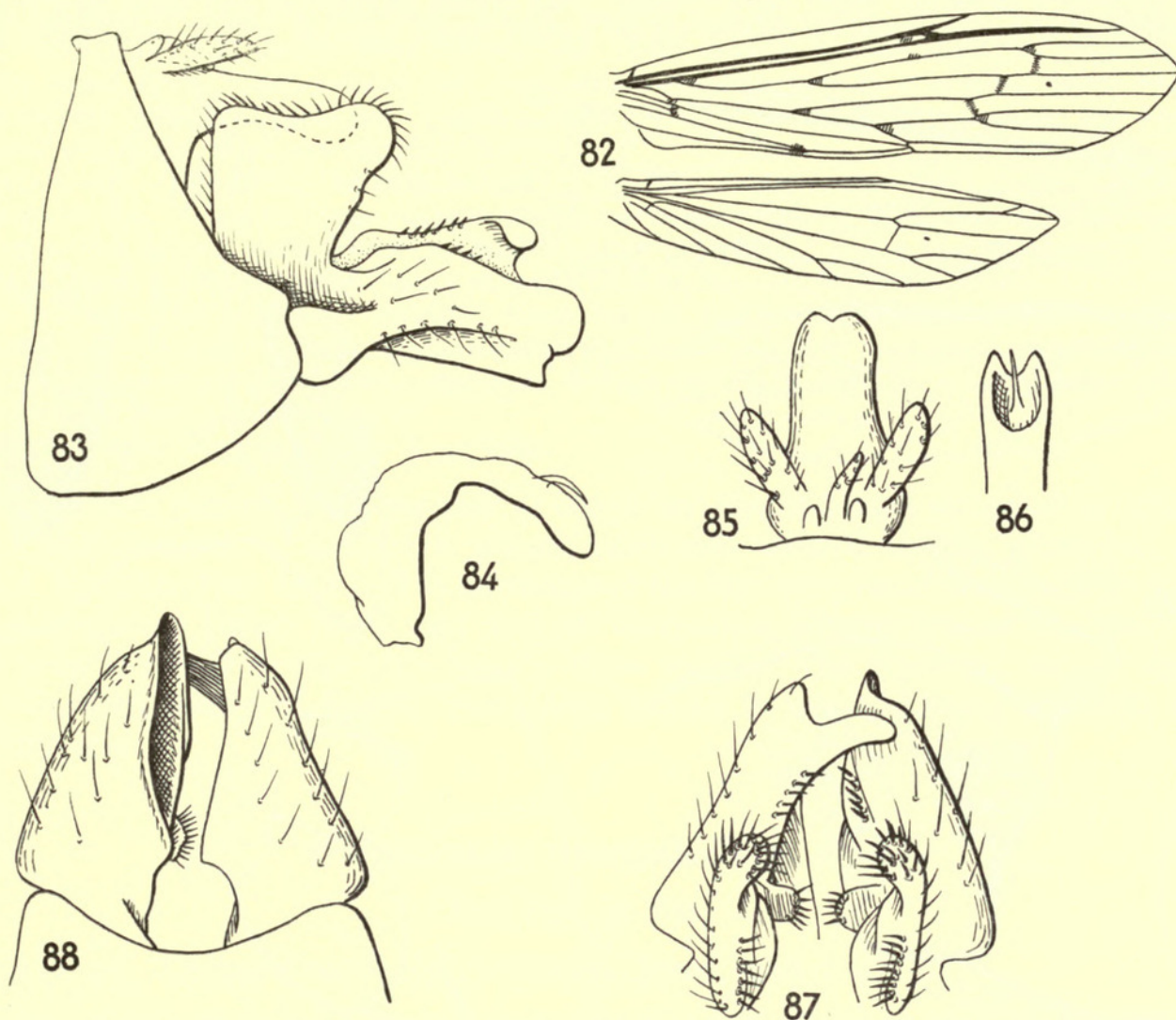
♂ HOLOTYPE (in alcohol). General colour pale ochraceous. Antennae with fine piceous annulations, basal segment tinged with pale fuscous. Palpi and anterior legs with sparse fuscous pubescence. Anterior wing with sparse pale fuscous pubescence, the membrane marked with fuscous as in the figure.

♂ GENITALIA. Ninth segment narrowed dorsally. Tenth segment forming a narrow, hood-like plate, dilated basally in dorsal view and with the apex slightly excised. At its base, on the dorsal surface, arise two very short, transparent processes, one on each side of a longer, slender finger, bearing a few setae. Cerci short and blunt, rather less than half the length of the tenth segment.



FIGS. 81H-M. *Oecetis* spp., male genitalia. 81H, presumed *O. albopunctata* (Lestage), lateral; I, the same, dorsal; J, the same, ventral; K, *O. maculipennis* Ulmer, lateral; L, the same, dorsal; M, the same, ventral.

Aedeagus short, strongly arched downwards, its apical part with a median dorsal furrow, in which arises a short, slender, arched spine. Clasper large, with a flattened, erect basal lobe, its apex broader than its base, slightly concave in side view and armed with strong setae. The main part of the left clasper is roughly rectangular in side view, slightly arched and with the upper apical angle rounded. From above or beneath, the clasper is subtriangular, upper margin bearing a few stout setae, inner surface concave apically. The upper margin of the right clasper is



FIGS. 82–88. *Oecetis absimilis* sp. n. ♂. 82, wings ; 83, genitalia, lateral ; 84, aedeagus, lateral ; 85, tenth segment, dorsal ; 86, apex of aedeagus, dorsal ; 87, claspers, dorsal ; 88, the same, ventral.

produced in an inwardly directed, spatulate lobe, overlapping the left clasper. Internally, near the base of each clasper, is a strongly setose lobe.

Length of fore wing, ♂, 6 mm.

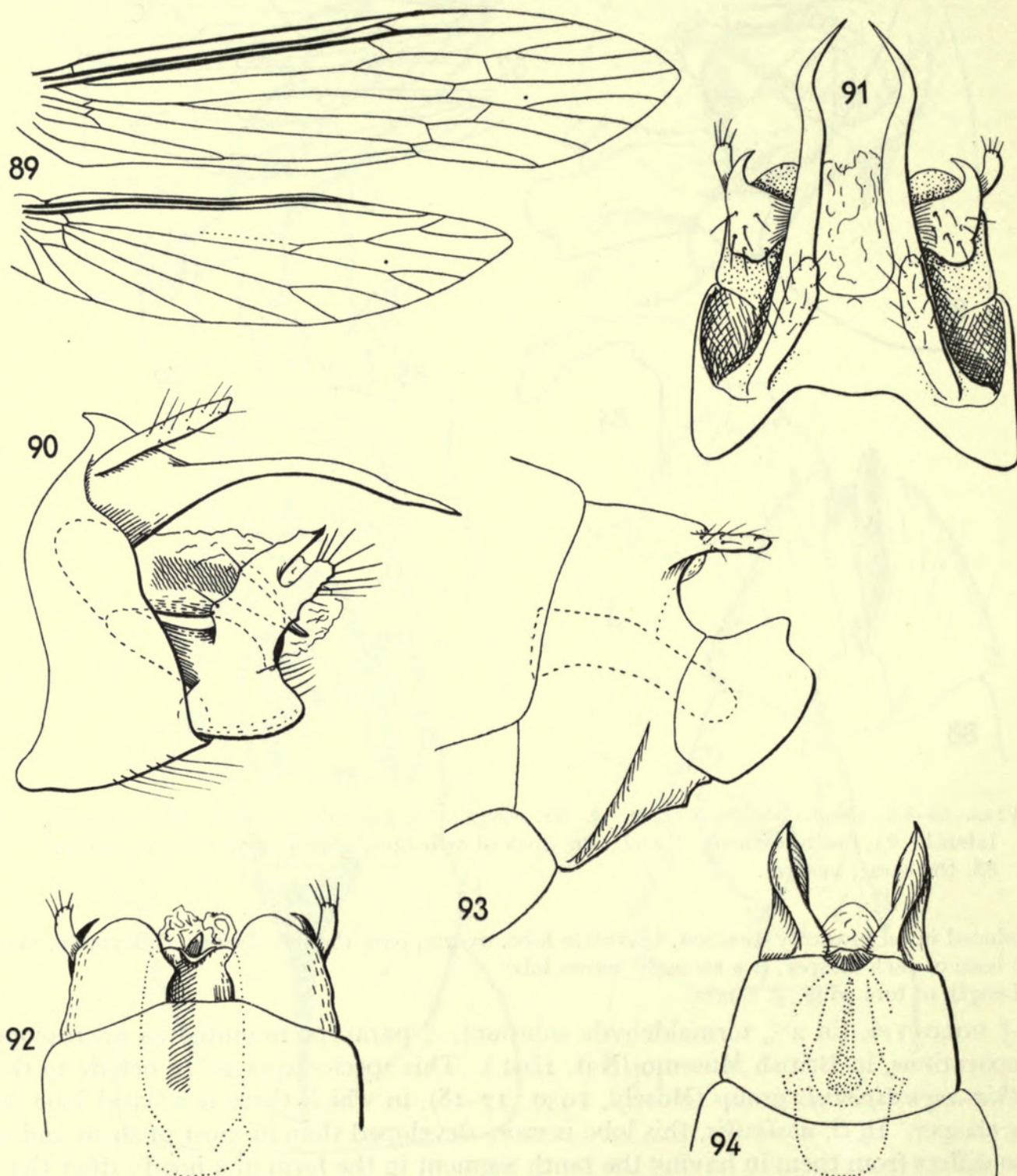
♂ HOLOTYPE (in 2% formaldehyde solution), ♂ paratype mounted as microscope preparations, in British Museum (Nat. Hist.). This species appears to belong to the *kathia-angustipennis* group (Mosely, 1939 : 17–18), in which there is a basal lobe on the clasper. In *O. absimilis*, this lobe is more developed than in most of them and it also differs from them in having the tenth segment in the form of a hood rather than a pair of spines. The specific name refers to the dissimilarity in the form of the right and left claspers.

Setodes njala sp. n.

(Text-figs. 89-94)

SIERRA LEONE: Njala, 1.iv.1932, *E. Hargreaves*, 1 ♂, "*Setodes* sp. n. det. M. E. Mosely", 1 ♀, "*Setodes* sp. det. M. E. Mosely".

♂ HOLOTYPE (pinned). Head tawny yellow, with golden pubescence and three snow-white longitudinal lines on vertex. Antenna tawny yellow, basal segment with a snow-white line



FIGS. 89-94. *Setodes njala* sp. n. 89, wings, ♂; 90, ♂, genitalia, lateral; 91, ♂, dorsal; 92, ♂, claspers and aedeagus, ventral; 93, ♀, genitalia, lateral; 94, ♀, ventral.

externally. Palpi tawny. Thorax tawny, with golden pubescence and three snow-white longitudinal lines. Legs pale luteous. Fore wing with dense golden brown pubescence, most of the cells with a longitudinal white line bordered with fuscous pubescence. Apical cells with a white spot bordered with fuscous. Hind wing hyaline.

♂ GENITALIA. Ninth segment rather short, its dorsal margin short and fused with the tenth segment. Cerci about as long as the ninth segment, slender, somewhat flattened dorsoventrally. Tenth segment produced in two long, slender, slightly sinuous spines arising from a common base. Aedeagus short, stout, apex downcurved, upper surface membranous and enclosing a shorter, stout spine. Clasper short and stout, the lower part forming a rounded plate, whose inner margin is slightly produced. Upper portion produced in two short processes, the upper incurved and acute, the lower digitate and hairy.

♀ ALLOTYPE. Resembling the male but rather smaller. ♀ GENITALIA. Ninth segment forming a complete ring. From its upper margin project two short, digitate lobes, bearing a few setae. Centre of the ventral margin with a small rounded depression, giving the appearance of an excision. Lateral gonapophyses large, subquadrate, from the side, shallowly excised at the apex. From beneath, they are acute apically, lower margin carinate, inner surface convex, outer surface concave basally. Tenth tergite reduced to a small, rounded, transparent knob between the digitate processes of the ninth segment. Within the ninth segment is a shallow, convex subanal plate, with a rounded apex.

Length of fore wing, ♂, 4 mm.; ♀, 3.7 mm.

♂ HOLOTYPE pinned (with one pair of wings and the abdomen mounted as microscope preparations), ♀ ALLOTYPE pinned (abdomen cleared and in glycerine), in British Museum (Nat. Hist.). The markings of the fore wing recall those of *Hemileptocerus gregarius* Ulmer (1922: 56) and *H. hargreavesi* (Ulmer, 1931: 25), but the hind wing is relatively less wide than in these species. The types are smaller than any described species of *Setodes* from Africa known to me, and the ♂ genitalia are also different.

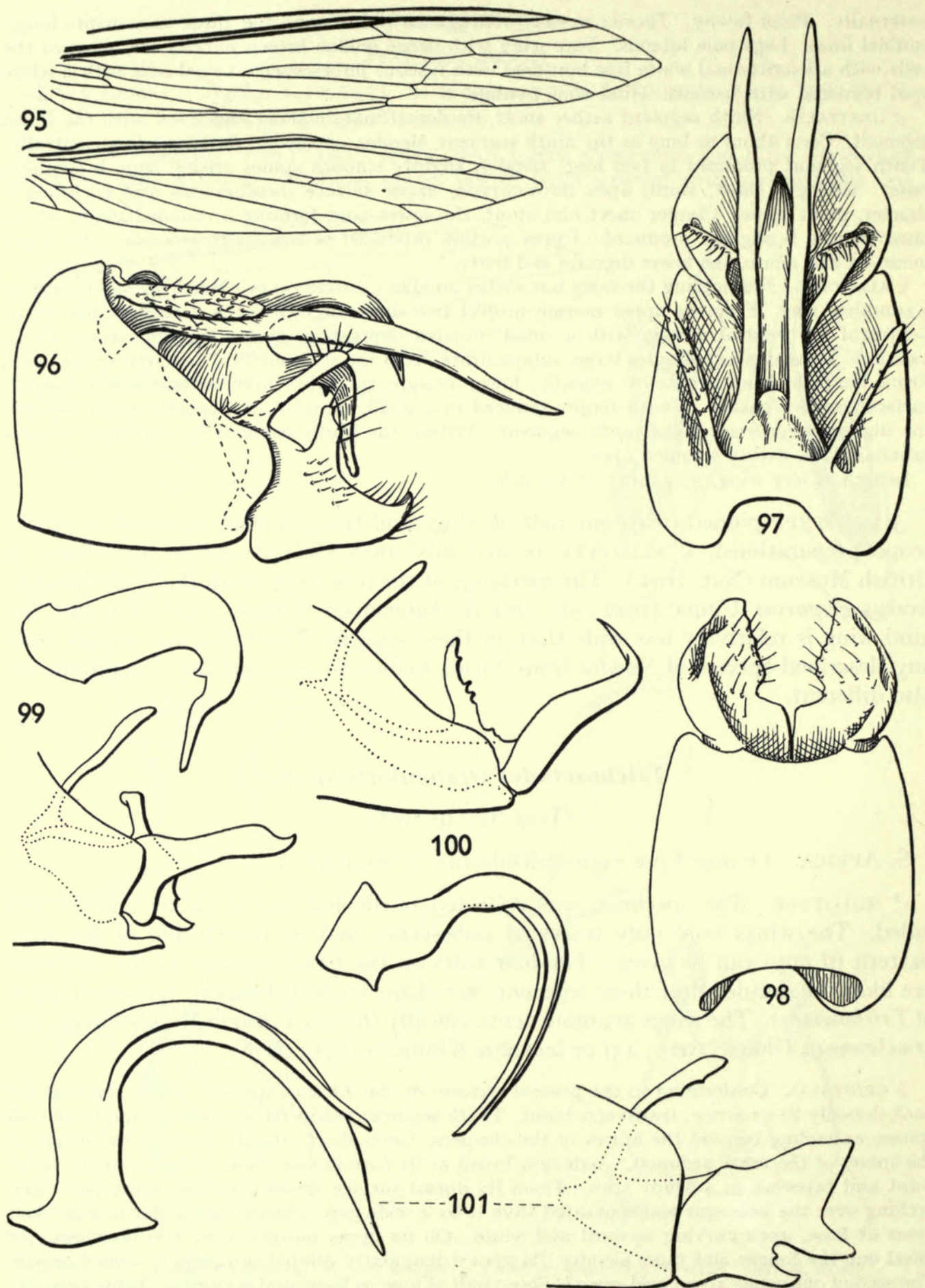
Trichosetodes triangularis sp. n.

(Text-figs. 95-101)

S. AFRICA: Orange Free State, Swinburne, 9.xii.1958, 1 ♂.

♂ HOLOTYPE. The specimen was collected in alcohol and is rather rubbed and faded. The wings bore only traces of pubescence and no description of the wing pattern (if any) can be given. The hair tufts on the basal segment of the antennae are likewise abraded, but these segments are of the typical elongate, cylindrical form of *Trichosetodes*. The wings are more acute apically than in *T. anysa* Mosely (1948: 39), *semibrunnea* Ulmer (1923: 13) or *lacustris* Kimmins (1953: 278).

♂ GENITALIA. Conforming to the general pattern of the African species. Ninth segment cut back dorsally to a narrow, transverse band. Tenth segment produced in a pair of simple, slender spines, extending beyond the apices of the claspers. Cerci short, about one-third the length of the spines of the tenth segment. Aedeagus broad at its base in side view, arched sharply downward and tapering to a blunt apex. From its dorsal surface arises a strong, acute paramere, arching over the aedeagus and separated from it by a wide gap. Clasper triangular in side view, stout at base, apex curving upward and acute. On its upper surface arise two processes, the basal one the longer and more slender, its apex triangularly dilated inwardly in dorsal aspect. The second one arises about mid-way, is about half as long as basal and is stouter. From beneath, the clasper is convex on its outer margin. Inner margin more or less straight, with a small



FIGS. 95-101. *Trichosetodes* spp. ♂. 95-98, *T. triangularis* sp. n. 95, wings; 96, genitalia, lateral; 97, dorsal; 98, claspers, ventral; 99, *T. lacustris* Kimmins, aedeagus and claspers, lateral; 100, *T. anysa* Mosely, the same aspect; 101, *T. semibrunnea* Ulmer, same aspect.

excision in its basal half. Ventral apical margin of ninth segment shallowly excised at its centre.

Length of fore wing, 7 mm.

♂ HOLOTYPE mounted as microscope preparations, in British Museum (Nat. Hist.). This species differs from the other described African species in its stout, triangular clasper and the wide separation of the paramere and aedeagus. This very noticeable feature led me to re-examine the preparations of the other species. Indications of a slender paramere occur in both *semibrunnea* and in *anysa*, but there is no evident paramere in *lacustris*. Figures are given of the lateral aspect of the aedeagus and clasper of the other three species for comparison.

Leptocerus inflatus sp. n.

(Text-figs. 102-107)

S. AFRICA: Transvaal, Vaal River, above Klip confluence, x.1957, 2 ♂, 1 ♀; Vaal Barrage, 1957, 2 ♂, 4 ♀.

♂ HOLOTYPE (collected in alcohol). Head brown, two basal segments of antenna pale brown, remaining segments pale luteous, annulated with piceous. Palpi dull brownish, with fuscous pubescence. Thorax brown. Legs very pale brownish. Fore wing with fuscous pubescence, with a patch of creamy white, broadened hairs on anterior margin near apex of *Sc*, extending triangularly as far as anterior margin of discoidal cell, and with iridescent scales extending to posterior margin of cell. There are traces of creamy white hairs just basad of the discoidal cell and a patch of iridescent scales between *Rs* and *Cu_{1a}* at the same level. A few scattered iridescent scales near base of wing. Wings narrow, acute, hind wing tapering more gradually than in *L. neavei* (Mosely, 1932a: 130).

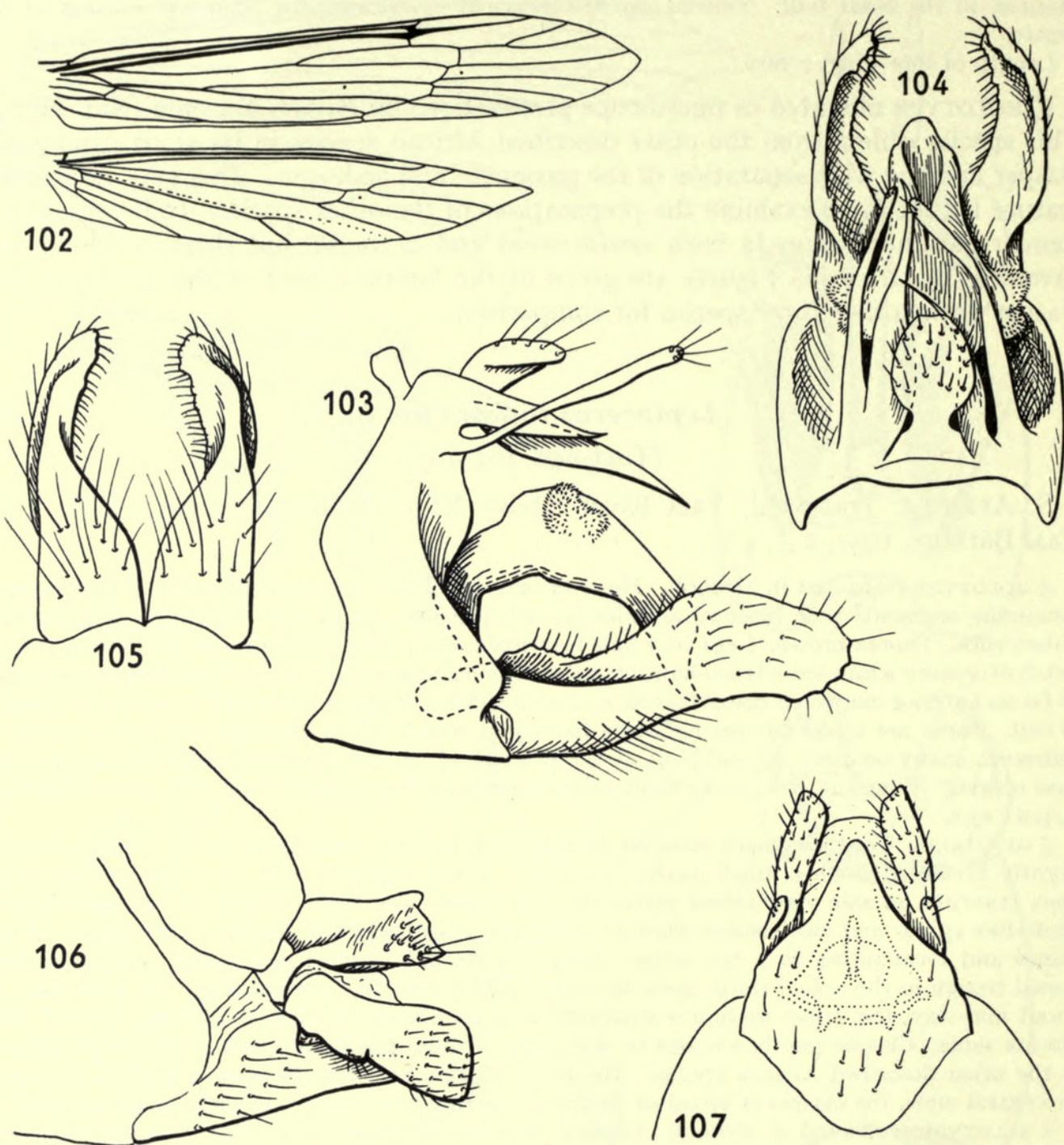
♂ GENITALIA. Ninth segment reduced dorsally to a narrow, transverse band. Ventral margin slightly produced, with a small median excision. Tenth segment with an ovate median lobe, apex truncate, in side view raised above the side lobes. The latter consist of two asymmetric blade-like spines and two slender digitate processes, about equal in length to the longer of the spines and terminating in a few setae. Aedeagus strongly arched downward, with a median dorsal trough in the apical third, apex narrowed and rounded in ventral view. On each side, at about mid-way, the upper margin is expanded in a membranous, bilobed process, covered with minute setae. Clasper gently sinuous in side view, without the basal ventral projection present in the other described African species. Its dorsal margin towards the base is slightly elevated. In ventral view, the clasper is broad at its base, tapering to a narrow, slightly incurved apex.

♀ ALLOTYPE (collected in alcohol). General appearance much as in male, but the iridescent scales on the fore wing are few, possibly denuded.

♀ GENITALIA. Eighth sternite produced in a more pigmented subgenital plate, its apical margin triangular, lateral margins slightly concave, apex rounded. Ninth and tenth tergites fused, the tenth more sclerotized and bearing patches of setae, apical margin rounded. Lateral gonapophyses extending beyond the apex of tenth segment, elongate, slightly dilated and obliquely truncate.

Length of fore wing, ♂, ♀, 7 mm.

♂ HOLOTYPE (mounted as microscope preparations), ♀ ALLOTYPE (in 2% formaldehyde solution) in British Museum (Nat. Hist.), ♂, ♀ paratypes in Dr. Scott's collection. This species is perhaps closest to *L. neavei* (Mosely) in male genital structure, but it differs from all the described African species of *Leptocerus* in the absence of the ventral projection at the base of the clasper.



FIGS. 102-107. *Leptocerus inflatus* sp. n. 102, ♂, wings; 103, ♂, genitalia, lateral; 104, ♂, dorsal; 105, ♂, claspers, ventral; 106, ♀, genitalia, lateral; 107, ♀, ventral.

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