

THE SPHEGIDAE OF SOUTH AFRICA

BY GEORGE ARNOLD, D.Sc., A.R.C.Sc., F.E.S.

Curator of the Rhodesia Museum, Bulawayo

PART VII

With 19 text-figures

THYREOPUS (olim CRABRO) Group

IT is a matter for regret that the Fabrician name for this genus, *Crabro*, which has been in use for a long time past, has to be superseded by that of *Thyreopus* Lep., since the former is a homonym of *Crabro* Geoff., which in its turn replaces the *Cimbex* of Olivier, a genus of sawflies. Unfortunate as such a change may be, it cannot be avoided if zoologists desire to attain to uniformity in nomenclature, and this can only be achieved by following absolutely the rules laid down in the International Code of Zoological Nomenclature*.

Kohl has brought forward most convincing arguments for including nearly two dozen so-called genera of various authors within the genus *Thyreopus* (*Crabro*), within which they rank mainly as species-groups, and certainly no higher than subgenera (see "Die Gattungen der Sphegiden" and "Die Crabronen der Paläarktischen Region," *Ann. K.K.N.H. Mus. Wien*, xxix, 1915). The majority of these groups need not be referred to in these pages, since they are not represented in our region, nor is it necessary to burden the treatment of the subfamily with the synonymy of its various components since such information may be obtained in the papers by Kohl which have been cited above.

The *Thyreopus* group comprises two subfamilies, both of which are represented in the Ethiopian region. One of these, the *Thyreopinae*, is but poorly represented in our region when compared with the numerous species belonging to it which are found in the Holarctic region.

In regard to the Ethiopian region, the group is made up of the following units:

Group	Subfamily	Genus	Subgenus	Species-group
THYREOPUS	THYREOPINAE	THYREOPUS Lep.	LINDENIUS Lep.	ENCOPOGNATHUS Kohl ENTOMOGNATHUS Dhlb.
			TRACHELIODES A. Mor.	TRACHELIODES A. Mor.
			RHOPALUM Kohl	RHOPALUM Kirby
			THYREOPUS† Lep.	DASYPROCTUS Lep. NEODASYPROCTUS Arn. CUPHOPTERUS A. Mor. CLYTOCHRYSA A. Mor.
	OXYBELINAE	{ OXYBELUS Latr. BELOMICRUS A. Costa		OXYBELOMORPHA Brauns BELOMICRUS A. Costa

* See papers by Morice and Durrant, *Ent. Soc. London*, 1914, pp. 339-436, and J. Chester Bradley, *ibid.* 1919, pp. 50-75.

† = *Crabro* Kohl s.l.

THYREOPUS Group

GENERAL CHARACTERS. The eyes reach the base of the mandibles, *i.e.* cheeks are absent. Ocelli normal, round and convex. Antennae inserted close to the posterior margin of the clypeus. The facets on the lower inner half of the eyes are usually much larger than those on the rest of the eyes. With very few exceptions, an epinemium is present on the mesothorax. Middle coxae widely separated; middle tibiae with one spur, rarely without. The pronotal tubercles do not extend back as far as the tegulae. A pygidial area is well defined in the ♀, and occasionally also in the ♂.

Forewing: radial cell usually appendiculate; only one cubital and one discoidal cell visible, which are separated from each other by a complete vein or a vena spuria. A second discoidal is sometimes indicated by traces of extinguished veins. The basal vein arises more or less behind the end of the submedial cell.

Hindwing: radial vein very short, forming an acute angle with the subcosta. Submedial cell very short, the cubitus arising from the submedial vein far beyond the end of the cell.

The prey of most of the species consists chiefly of Diptera.

Subfamily THYREOPINAE

GENERAL CHARACTERS*. Radial cell usually appendiculate, its accessory cell wide and usually open at the end; the radius often curved downwards towards its apex. The cubital cell is separated from the discoidal by a distinct vein. The angle formed by the junction of the transverse cubital vein with the cubitus is obtuse. Face more or less excavated in the middle. Middle tibiae with one spur, but in the ♂♂ of some species it is absent. A tarsal comb on the anterior tarsi is occasionally present in the ♀, but is usually absent in both sexes. A pygidial area present in the ♀, rarely in the ♂. Metanotum (postscutellum) without membranous lamellae (excepting some species of *Encopognathus*). Epinotum always without a mucro.

KEY TO THE GENERA AND SUBGENERA OF THE
THYREOPINAE

- (B) A. The tergites fold over abruptly at the sides, forming a sharp edge, the underfold covering the sternites to a large extent. Middle tibiae with one spur.
genus *Anacrabro* Packard†
- (A) B. Tergites without abrupt lateral folding. Middle tibiae with one spur, rarely absent in the ♂.
genus *Thyreopus* Lep.
- (4) 1. Mandibles simple at the apex. Ocelli always in a flat triangle, *i.e.* First joint of the flagellum not shorter than the second. Pygidial area present in both sexes, in the ♀ it is flat and triangular. Antennae 12-jointed in the ♀, 13-jointed in the ♂. Maxillary palpi 6-, labial palpi 4-jointed. A distinct epinemium is present on the mesopleurae in front. The opaque patches on the second sternite are obsolete or represented by sharply margined impressions. (Accessory cell of forewing open, the radius straight or curved only at its end.)
subgenus *Lindenius* Lep.
- (3) 2. Eyes hairy. The truncating vein of the radial cell forms an obtuse angle with the radius, *i.e.* it is not perpendicular to it (with one exception, *Entomognathus Schmiedeknechti*). The transverse cubital vein meets the radius at its middle. The recurrent vein meets the cubitus distinctly behind the middle of the

* This paragraph and the greater part of the key have been adopted from Kohl's "Die Hymenopteren-Gattung *Belomicrus* A. Costa," *Konowia*, 11, 1923, p. 102, and from "Die Gattungen der Sphegiden."

† This genus is confined to the Nearctic region. It resembles the genus *Belomicrus* of the Oxybelinae in having the tergites abruptly folded at the sides.

- cubital cell. Mesosternum without a sharp edge in front of the middle coxae. (Mandibles excised on the outer margin; the suture between the mesonotum and scutellum is dilated.) species-group **Entomognathus** Dahlbom
- (2) 3. Eyes naked. The recurrent vein meets the cubitus before or at about the middle of the cubital cell. The truncating vein of the radial cell is perpendicular to the radius. Mesosternum with a sharp transverse edge in front of the middle coxae. (Mandibles excised on the outer margin; abdomen usually with some yellow markings; sculpture usually very coarse.) species-group **Encopognathus** Kohl
- (1) 4. Mandibles bi- or tridentate at the apex, or bidentate in the ♂ (except *Tracheliodes senex*, ♂, in which they are acute) and blunt or obliquely truncated in the ♀; in the latter case the first joint of the flagellum is at least a little shorter than the second, and the ocelli are arranged in a less flat triangle. A pygidial area is seldom present in the ♂.
- (6) 5. The inner margins of the eyes converge but little below, so that the face is fairly wide there; the antennal sockets are nearer each other than they are to the eyes, from which they are fairly distant. Maxillary palpi 6-, labial palpi 3-jointed. Trochanters of the forelegs elongated. Mesosternum with a sharp edge in front of the middle coxae. Mandibles bidentate at the apex. The first joint of the flagellum is much shorter than the second, which is the longest joint of the whole. A distinct epicnemium is present on the mesothorax in front. Suture between the mesonotum and scutellum curved. Pygidial area in the ♀ small, excavated or nearly flat. The transverse cubital vein meets the cubital cell at about its middle. Basal lobe of hindwing extends a little beyond the submedial cell. The retinaculum arises a little beyond the origin of the radial vein. (Head usually with yellow markings, abdomen sometimes with such. Antennae 12-jointed in the ♀, 13-jointed in the ♂. The prey, as far as is known, consists of ants.) subgenus **Tracheliodes** A. Mor. (= **Brachymerus** Dhlb.)
- (5) 6. Face very narrow below, the inner margins of the eyes being strongly convergent there; the antennal sockets are close together and also almost touch the eyes. Anterior trochanters not elongated.
- (8) 7. Maxillary palpi 5-, labial palpi 3-jointed. No epicnemium present on the mesothorax. First segment of the abdomen elongated, forming a petiole slightly swollen behind and feebly constricted from the following segment. Abdomen much longer than the thorax, without yellow markings. Mesosternum without a sharp edge in front of the middle coxae. Posterior tibiae thickened apically. (Mandibles bidentate and oblique at the apex in both sexes. Epinotum usually smooth, a median area (area cordata) absent or only feebly defined. The transverse cubital vein usually meets the radius before its middle. Basal lobe of hindwing extending a little beyond the submedial cell. First joint of the flagellum longer or shorter than the second. Flagellum in some ♂♂ irregular (species-group *Corynopus* Lep., not African). Antennae 12-jointed in the ♀, 13-jointed in the ♂. Sculpture delicate.] subgenus **Rhopalum** Kirby
- (7) 8. Maxillary palpi 6-, labial palpi 4-jointed. Second joint of the flagellum usually longer than the first, rarely shorter or of equal length. Radius curved from the junction of the truncating vein to its apex.
- (10) 9. A distinct epicnemium is present on the mesopleurae in front, and a less distinct one is present also behind, to accommodate the middle pair of legs, in the formation of which the metapleurae take part to a slight extent. Head, mesothorax and tergites dull, owing to a microscopic sculpture which is not resolvable even with a magnification of 60 diameters. (Mandibles tridentate at the apex in the ♀, bidentate in the ♂. Antennae 12-jointed in the ♀, 13-jointed in the ♂. First abdominal segment petioliform. Pygidial area in the ♀ very small, excavated, margined more or less with short bristles. The transverse cubital vein meets the radius at about its middle. The recurrent vein meets the cubital cell distinctly beyond the middle of that cell. Basal lobe of hindwing somewhat shorter than the submedial cell.) species-group **Dasyproctus** Lep.
- (9) 10. An epicnemium is never present on the posterior part of the mesopleurae to accommodate the middle pair of legs. Tergites never, head and mesothorax seldom dull on account of a very microscopic sculpture.
- (14) 11. Antennae 12-jointed in the ♀, 13-jointed in the ♂. (Mandibles tridentate in the ♀, bidentate in the ♂, the outer upper margin in the ♂ sometimes dilated

in the middle. First segment of abdomen elongate, petioliform or nearly so. Basal lobe of hindwing shorter than the submedial cell.)

- (13) 12. The recurrent vein meets the cubital cell well beyond its middle. Epinotum without a defined median area, coarsely punctured. Ocelli disposed in a low isosceles triangle. Flagellum in the ♂ not fringed below with fine long hairs, distinctly bent between the second and third joints. (Habitus like that of *Dasyproctus*, but the integument is shining, with the head and thorax coarsely punctured.)
species-group *Neodasyproctus* Arn.
- (12) 13. The recurrent vein meets the cubital cell at, or only a little beyond, its middle. Epinotum shining, if sculptured only feebly so, usually with a well-defined median area. Ocelli disposed in an equilateral triangle, or nearly so. Flagellum in the ♂ usually fringed below with fine, long hairs.
species-group *Cuphopterus* A. Mor.
- (11) 14. Antennae 12-jointed in both sexes. Mesosternum with a distinct transverse carina in front of the middle coxae. Abdomen never petiolate. Flagellum very rarely fringed below with long hairs. (Ocelli arranged in a low isosceles triangle; sculpture of the epinotum and sides of the thorax very strong; mandibles in the ♀ with three teeth at the apex, the uppermost small and indistinct, in the ♂ with two apical teeth. The recurrent vein meets the cubital cell far beyond its middle.)
subgenus *Thyreopus* Lep. (=subgenus *Crabro* A. Mor. of Kohl),
including species-group *Clytochrysus* A. Mor.

Genus *THYREOPUS*, subgenus *LINDENIUS*, species-group
ENTOMOGNATHUS Dhlb.

Hymen. Eur. 1, p. 295. 1845.

Kohl, *Die Gattungen der Sphegiden*, p. 486. 1896.

KEY TO THE SPECIES

- (2) 1. Abdomen and legs yellowish to pale ferruginous; first two tergites coarsely but not closely punctured; wings fuscous.
rugosissimus Turner
- (1) 2. Abdomen and greater part of the legs black, only the pygidium sometimes with yellow colouring. Abdomen finely punctured; wings hyaline, or pale fusco-hyaline.
- (4) 3. Vertex, temples and anterior half or more of the mesonotum with many very large and deep punctures; posterior tibiae entirely black.
apiformis Arnold
- (3) 4. Vertex with small and shallow punctures, the temples impunctate; the mesonotum, apart from the fine and sparse puncturation, with only four large pit-like punctures, one on each side near the tegulae, and two in front; posterior tibiae flavous basally.
Stevensoni Arnold

The members of this group are fairly small insects, measuring from 3.5–8 mm. long, and are in greater part of a black colour. The face in its lower half is more or less deeply excavated, the excavation being concave from side to side, sharply marginate above, smooth and polished. The clypeus is short, densely pubescent, usually produced into a very short median lobe, with a tooth on each side of, and a little behind the lobe. The vertex and temples are well developed, the distance from the posterior ocelli to the hind margin of the head being not much shorter than their distance from the brow of the facial concavity. The occipital margin has a more or less distinct, short and reflexed border or collar. The dorsum of the epinotum is very short, and has a median area usually divided into three or more sectors by sharp up-standing ridges; similar ridges margin the lateral portions of the dorsum and are continued down the declivity, separating the latter sharply from the sides of the epinotum. The legs are stout, and the middle and hind tibiae are furnished with short spines at the apex; on the middle tibiae the single spur or calcar is not easily distinguishable from these spines. The puncturation in two of our species is exceedingly coarse.

T. (Entomognathus) rugosissimus Turner (figs. 2, 2 a and b). *Trans. Ent. Soc. London*, p. 83, ♀. 1917.

♀. 8-9 mm. long. Head and thorax black, mandibles dark ferruginous in the middle, tegulae flavo-testaceous; legs and abdomen varying from ochreous to pale ferruginous, the basal two-thirds of the anterior femora black, the third to fifth tergites sometimes more or less infuscated in the middle at the base. Wings fuscous, paler apically, the veins black. Clypeus and sides of face clothed with a dense silvery pubescence, the temples and mesopleurae with a similar but sparser pubescence. Vertex and dorsum of thorax with a very short, sparse, blackish and upright pubescence. Abdomen and legs with short yellow pubescence. Sides of face coriaceous; vertex from the brow of the facial concavity to the ocelli coarsely and closely pitted, each pit with a smaller puncture on its floor, behind the ocelli the pit-like punctures are even larger but not so close together; the temples more closely but less coarsely punctured. The posterior margin of the eye is bounded by a wide and transversely striated groove. The posterior ocelli are placed on the sides of rounded depressions which extend forwards and outwards as ovoid foveae towards the margins of the eyes (not very plainly apparent on account of the coarse sculpture surrounding them). Between the posterior ocelli the vertex is

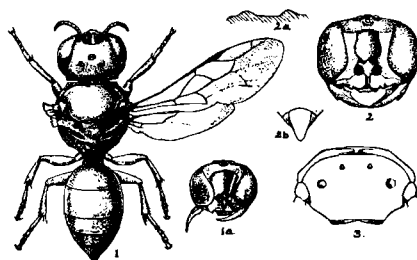


Fig. 1. *Entomognathus apiformis*, ♀; a, front view of head.

Fig. 2. *Entomognathus rugosissimus*, ♀; a, transverse section of mesonotum across the middle; b, pygidium.

Fig. 3. *Entomognathus Stevensoni*, ♀, pro-mesonotum.

swollen, the swelling divided by a short deep line. Pronotum shallowly and sparsely punctured. Mesonotum with very large pit-like punctures, each one of which has on its floor a smaller puncture; the mesonotum is depressed in the middle and at the sides, so that a transverse section at the level of the tegulae would be trisinuate. The scutellum and mesopleurae have smaller and fewer punctures than the mesonotum. The suture between the mesonotum and scutellum is deep, clathrate and dilated at the ends. Metanotum sparsely and comparatively finely punctured. Dorsum of epinotum very short, widely rounded at the apex, margined by a strong carina, the enclosed space divided up by seven longitudinal carinae. The declivity has a sharply margined groove medially and also lateral carinae between it and the sides of the epinotum; the latter have a row of large and deep punctures anteriorly. The surface of the head and thorax between the punctures and carinae is smooth and shining. Abdomen shining, the first two tergites strongly but not very closely punctured, the third and fourth tergites impunctate, the fifth with a few punctures near the apical margin. The pygidial area is dull, densely striato-punctate and covered with golden pubescence. Sternites smooth and shining, the second with a sparse and very shallow puncturation. Clypeus carinate in the middle, the carina ending abruptly before the depressed anterior

margin, which is feebly bisinuate. On each side of the median area there is a small blunt tooth. The smooth and shining facial concavity is wider below the middle than above it, in which character this species differs from our other two. The second joint of the flagellum is about as long as the first, but distinctly shorter than the third. The least distance between the eyes is at about the level of the antennal sockets, where it is a little more than half the interocular distance on the vertex. The posterior ocelli are about as far from each other as they are from the eyes. Collar of pronotum short but not linear, about as long as the first joint of the flagellum, and not much depressed below the level of the mesonotum. Thorax robust, not much longer than wide across the tegulae. Abdomen subtriangular, widest across the posterior margin of the first segment. The radius of the forewing is slightly curved at its end; the recurrent vein meets the cubitus at about three-quarters from the base of the cubital cell.

Nyasaland, Mlanje (S. A. Neave); Bulawayo (R. H. R. Stevenson), January.

I have to thank Dr Waterston for a re-examination of the type in the British Museum collection, whereby some slight inaccuracies in the original description may now be corrected. It is incorrect to describe the sculpture of the mesonotum as "coarsely punctured-rugose." There is no rugosity but only the two longitudinal swellings mentioned in my description. The clypeus has a blunt carina truncated at the apex, which cannot be described correctly as a "porrect tubercle." In the specimen from Bulawayo, the third joint of the flagellum is distinctly longer than the second, or nearly one-fourth.

T. (Entomognathus) apiformis n.sp. (figs. 1 and 1 a).

♀. 5-6 mm. long. Black; basal half or more of the scapes in front, the anterior tibiae in front and a narrow streak on the upper surface of the middle tibiae, pale yellow. Last four joints of the anterior tarsi reddish ochreous, the other tarsi dark brown. Tegulae fusco-testaceous; wings hyaline, their apical halves very faintly tinged with fuscous, the veins and stigma black. Clypeus with silvery pubescence, the rest of the body with a very fine, short, sparse and whitish pubescence. Vertex and upper third of the temples deeply, coarsely and not very closely punctured, shining between the punctures. The lower two-thirds of the temples slightly shining and impunctate. On the temples a wide clathrate groove margins the posterior orbits. Occipital margin carinate. Pronotal collar slanting forwards above, its anterior face smooth, the dorsal face feebly channelled transversely on each side. Mesonotum shining, with a fundamental sculpture of small, sparse punctures; in addition, there are a few much larger punctures, which are largest and deepest on the anterior third of the segment. Epicnemium smooth. Scutellum shining, very shallowly, finely and sparsely punctured, but with one large pit-like puncture on each side. Metanotum nearly dull, microscopically punctured. Mesopleurae and sides of epinotum shining, almost impunctate; the anterior border of the mesopleurae, the episternal suture and the meta-epinotal suture, clathrate. Dorsum of epinotum with a subcrescentic median field, sharply marginate, and divided into three sectors by longitudinal carinae; beyond this median area, and covering the brow of the declivity, is another area with longitudinal and transverse carinae. The declivity has a marginate median groove, rugose above, the rest of the declivity is very finely punctured and shining, and is separated from the sides of the epinotum by a longitudinal carina on each side. Abdomen moderately shining, very finely, evenly and fairly closely punctured. Pygidial area dull, closely punctured, triangular, the apex acute.

Median area of the clypeus produced in front into a short, shining and

rectangular lobe, on each side of which is a small tooth. The clypeus extends back in a short wedge between the antennal sockets. The least interocular distance across the clypeus is somewhat less than the distance between the posterior ocelli; the interocular distance on the vertex is about equal to the length of the flagellum. The posterior ocelli are one-third nearer to the eyes than they are to each other. The margins of the facial excavation are acute at the sides and above, the excavation is widest above and as long as the scapes. First joint of flagellum nearly twice as long as the second, the latter very nearly as long as the third. The head is not quite as broad as the thorax. Mesonotum one-third wider across the tegulae than long in the middle, as long as the rest of the thorax behind it. Dorsum of epinotum as long as the metanotum. Abdomen oblongo-ovate, widest in the middle. The recurrent vein of the forewing meets the cubital cell slightly beyond its middle; the radius is straight at its termination.

Vumbu Mts, near Umtali, S.R., ca. 5700 ft. above sea-level. Nesting in clay banks. In its flight and movements this insect resembles a small bee, such as *Allodape* or *Nomia*.

Type in R.M. coll. (R.M. and T.M. colls.).

T. (Entomognathus) Stevensoni n.sp. (fig. 3).

♀. 4 mm. long. Black; base of the mandibles, the scapes in front, pronotal tubercles, the tegulae in part, the fore and middle tibiae and basal third of the hind tibiae, pale yellow. Tarsi pale yellow, with the last two joints darker or dirty ochreous. Wings hyaline, the veins and stigma black. Last sternite brownish yellow. Clypeus and sides of the face with a dense silvery pubescence; temples, thorax, abdomen and legs with an exceedingly fine, sparse and whitish pubescence. Clypeus dull, the sculpture microscopic and obscured by the pubescence. Upper face and vertex fairly shining, shallowly, finely and not closely punctured. The ocelli lie in a slight depression; on each side of, and adjacent to the inner orbits there is a smooth ovoid fovea, which is discrete and does not merge into the depressions of the posterior ocelli, as it does in *rugosissimus*. Between the posterior ocelli is a short impressed line. Temples and occiput very finely and sparsely punctured, shining. Anterior face of the pronotal collar vertical, dull, microscopically punctured. Mesonotum and mesopleurae moderately shining, the former with a fine and scattered puncturation and also with four large pit-like punctures, a shallow and large one on each side near the tegulae, and a smaller and deeper one on each side of the middle in front. The puncturation of the mesopleurae is very sparse and finer than that of the mesonotum. Scutellum shining, punctured like the mesonotum. Metanotum shining, sparsely and microscopically punctured on the disc, its sides rather long and traversed by two or three rugae. Epinotum sculptured like that of *apiformis*, but its median field is shorter, the sides below are smooth and shining. Abdomen moderately shining, finely, evenly and not very closely punctured, the second sternite more strongly punctured and with a distinct fovea on each side; the pygidial area closely and strongly punctured, clothed with yellowish white hairs, triangular, as wide at the base as long in the middle, the apex narrowly rounded.

Clypeus like that of *apiformis* but relatively shorter and with the lateral teeth further away from the median lobe. The facial concavity resembles that of *apiformis* but is narrower, shallower and has the brow rounded. The least interocular distance across the clypeus is equal to a little less than the distance between the posterior ocelli. The latter are nearly twice as far from each other as they are from the eyes. The interocular distance on the vertex is equal to the length of the flagellum. The joints of the latter are like those

of *apiformis*. The occiput is more oblique than in our other two species, so that, seen from the side, the back of the head appears to be rounder. Mesonotum nearly twice as wide across the tegulae as long in the middle. Dorsum of epinotum very short, barely longer than the metanotum. Abdomen widest in the middle.

♂. 3.7 mm. long. Stigma and veins pale brown. First joint of the flagellum twice as long as the second, the latter and the third of about equal length, the two united about as long as the fourth joint. The last two tergites rather strongly punctured, the last widely truncate at the apex. Otherwise like the ♀.

Bulawayo, February, 2 ♀♀ and 1 ♂, taken running about on sandy soil (R. H. R. Stevenson); Lichtenburg, Transvaal, 1 ♀ (Dr H. Brauns). Type in R.M. coll.

Genus *THYREOPUS*, subgen. *LINDENIUS*, species-group *ENCOPOGNATHUS* Kohl.

"Die Gattungen der Sphegiden," *Ann. K.K.N.H. Mus. Wien*, XI, p. 486.

Of this group, confined apparently to the Ethiopian region, there are five species. They are all characterised by the exceedingly coarse sculpture of the dorsal surface of the thorax, and on the whole do not differ very greatly from *Entomognathus*, but the eyes are naked (for differences see Key to the Genera, etc.). The build is, however, diversified, one species, *Braueri* Kohl, being described as compact, almost like an *Oxybelus*, whereas *egregius* has the abdomen narrow and elongated. The latter and *granulatus* are also abnormal in having a membranous lamella surrounding the sides and posterior margin of the metanotal disc. Nothing is known about the nature of their prey.

KEY TO THE SPECIES

- (4) 1. Disc of metanotum margined at the sides and posteriorly by a membranous translucent lamella.
- (3) 2. First three tergites very coarsely rugoso-punctate, the fourth and fifth sparsely punctured; posterior lateral margins of the metanotum and its disc, yellow.
egregius Arnold
- (2) 3. First three tergites smooth, shining, microscopically rugulose, the fourth and fifth distinctly and not very closely granulate; disc of metanotum black, only its posterior lateral margins yellow.
granulatus Arnold
- (1) 4. Metanotal disc without a membranous lamella.
- (6) 5. Abdomen black, the first three tergites coarsely punctured.
Brownei Turner
- (5) 6. At least the first four tergites finely punctured, ferruginous or black with yellow markings.
- (8) 7. Abdomen ferruginous, translucent, the fifth tergite only slightly more strongly punctured than the preceding tergites.
rugosopunctatus Turner
- (7) 8. Abdomen black, with bands on the second and fourth tergites, spots on the third, the whole of the fifth and part of the sixth, yellow; the fifth tergite much more strongly and more closely punctured than the preceding.
Braueri Kohl

T. (Encopognathus) rugosopunctatus Turner. *Ann. Mag. N.H.* (9), LII, p. 419, ♀. 1912.

"♀. Nigra; rugosa; mandibulis basi, scapo subtus, callis humeralibus, tibiisque anticis supra pallide flavis; abdomine ferrugineo, perlucido; alis subhyalinis, venis testaceis. Long. 7 mm."

"♀. Mandibles excised on the outer margin; clypeus short, with a median carina. Eyes strongly convergent towards the clypeus, separated at the nearest point by a distance equal to three-quarters of the length of the scape. Cheeks (i.e. temples) narrow, a carina running along the outer margin of the eyes and continued on the posterior margin of the head. Ocelli in a wide

triangle, the posterior pair further from each other than from the eyes; a deep oval depression between the posterior ocelli and the eyes. Head coarsely rugose-punctate; thorax coarsely rugose; pronotum with a deep transverse groove between the raised margins. Postscutellum slightly rounded at the sides, longitudinally striate-rugose, median segment depressed below the level of the postscutellum, the well-defined basal area with four longitudinal carinae, very short, the posterior slope strongly margined and with low, irregular transverse striae, the sides of the segment almost smooth. Abdomen shining, very minutely punctured, translucent. Neuration as in Kohl's figure of *E. Braueri*. Recurrent nervure received at two-fifths from the base of the cubital cell; radial cell broadly truncate at the apex. Comb of the fore tarsi short, intermediate and hind tibiae with well-developed spines.

"*Hab.* Durban, Natal (F. Muir).

"The type of the genus *E. Braueri* Kohl, is from Senegambia. The colour is very different, but the structure does not differ much. In the present species the fifth and sixth dorsal segments are not coarsely punctured, the punctures are slightly larger on the fifth than on the fourth; the sixth is shining, with sparse and moderately large punctures."

T. (Encopognathus) Brownei Turner. *Ann. Mag. N.H.* (19), cix, p. 106, ♀. 1917.

"♀. Nigra, ubique dense rugose punctata; scapo, callis humeralibus, postscutello, femoribus apice extremo, tibiis tarsisque pallide flavis; tibiis intermediis posticisque infra fuscis; alis hyalinis, iridescentibus, venis fuscis, stigmate testaceo. Long. 5 mm."

"♀. Mandibles excised on the outer margin, acute at the apex. Clypeus subcarinate longitudinally, produced into two porrect teeth at the apex, with a smaller tooth on each side near the apical angles. Eyes not hairy, the facets in front larger than elsewhere, separated from each other at the base of the clypeus by a distance equal to about half the length of the scape; frontal groove smooth and shining. Posterior ocelli a little nearer to the eyes than to each other, the ocellar region and the vertex coarsely punctured-rugose, an oblique groove from the eyes to the posterior ocelli; the hind margin of the head slightly raised, subcarinate. Pronotum transverse, the anterior margin raised and sharply pointed at the angles; thorax very coarsely punctured, the mesopleurae coarsely rugose. Median segment short; with a distinct enclosed basal area, which is very finely rugulose, with five strong longitudinal carinae; the posterior slope rather indistinctly transversely striated; the sides of the segment very finely and closely punctured. Abdomen smooth and shining beneath, the three basal dorsal segments coarsely punctured, the three apical segments closely and finely punctured. Recurrent nervure received before the middle of the cubital cell; transverse cubital nervure received just beyond the middle of the radial cell.

"*Hab.* British East Africa, Tana River, 3000 ft., near Mt Kenia (G. Orde Brown). November."

T. (Encopognathus) Braueri Kohl. *Ann. K.K.N.H. Mus. Wien*, xi, p. 486, ♀ (?). 1896.

"6.5 mm. long. Shape compact, looking almost like an *Oxybelus*. Black; the following parts yellow—clypeus, scapes, the pronotal collar above, the pronotal tubercles, a spot on each side of the scutellum, the postscutellum, a band on the second and fourth tergites, a spot on each side of the third, the whole of the fifth, the pygidial area in part, the tibiae, tarsi and in part also the anterior femora. Knees piceous. The sternites are immaculate. Head behind

the eyes, compared with other Crabronine species, distinct only to a very moderate degree, less produced backwards even than in *Entomognathus*. The occiput and temples therefore appear only of small extent. The puncturation on the frons and vertex is very coarse, on the temples and occiput microscopically fine. The frontal foveae are sharply defined and very deep, extending to the posterior ocelli, but not reaching the inner margin of the eyes. The posterior margin of the eyes is bordered by a shallow and sharply marginate groove. The posterior ocelli are further from each other than they are from the eyes. The anterior margin of the median area of the clypeus, which in itself is feebly denticulate, has on each side two small teeth. Anterior face of pronotal collar almost vertical. The pronotal tubercles form small cones, directed outwards and forwards. Mesonotum and scutellum very coarsely punctured, longitudinally rugose between the punctures. Mesopleurae strongly prominent, very coarsely punctured and also somewhat rugose. Epinotum very short, with a broad and coarsely sculptured median field; the limits of the latter are, however, not clearly apparent. The sides of the epinotum are fairly smooth, rugose on their margins. Abdomen smooth, shining, sparsely and very finely punctured; the puncturation on the penultimate tergite is, however, much stronger and closer. The large, flat and triangular pygidial area is coarsely punctured. Legs robust. The metatarsus of the forelegs with a very fine and short comb. Middle and hind tibiae distinctly spinose. Senegambia."

T. (Encopognathus) egregius n.sp. (figs. 4, 4 a and b).

♀. 5.5 mm. long. Black; the scapes, pronotal tubercles, anterior half of the tegulae, the metanotal disc and the posterior lateral margins of the metanotum, tibiae and tarsi, pale yellow. The extreme apex of the anterior femora also yellow; the posterior tibiae somewhat brownish below. Mandibles dirty yellow basally, piceous apically. Wings clear hyaline, the stigma and veins dark brown. Clypeus, sides of the face, the pronotal collar and the mesopleurae sparingly clothed with a short silvery pubescence. A sharply defined transverse carina separates the occipital slope of the head from the vertex and is continued down the temples, the space between it and the posterior margin of the eyes being clathrate. The vertex, from the brow of the facial groove as far back as the transverse carina, is very coarsely and deeply pitted, the space between the pits being raised or subrugose. The area behind the transverse carina is slightly shining and almost impunctate. The lateral foveae on the frons are long and fairly deep, somewhat obscured by the exceedingly coarse sculpture around them, and almost reach the inner margin of the eyes in front and the posterior ocelli behind. The dorsal face of the pronotal collar is feebly and irregularly striate lengthwise, and its anterior and posterior margins are sharply raised, the anterior one ending acutely at each corner. Mesonotum and scutellum shining, as coarsely but not so closely pitted as the vertex. The mesopleurae and mesosternum are also coarsely punctured, but less closely and less deeply than the mesonotum. The metanotum on each side of the median disc has five or six longitudinal carinae; the disc, about three and a half times wider than long, is widely and superficially rugose, and is surrounded on the sides and posterior margin by a raised, translucent, wrinkled and membranous lamella. The dorsum of the epinotum has a median field divided by longitudinal carinae into seven sectors; beyond this a widely

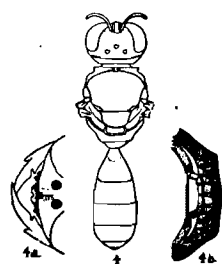


Fig. 4. *Encopognathus egregius*, ♀; a, clypeus; b, meta- and epinotum.

open reticulation of strong rugae extends as far as the declivity; the latter has a marginate median sulcus, widest above. The spaces between the carinae are dull and more or less finely rugoso-striate. The sides of the epinotum are fairly dull, transversely rugose over the posterior upper corners. First three tergites very coarsely punctured, fully as coarsely as the vertex but more distinctly rugose and shining between the punctures, their posterior margins distinctly raised or subcarinate. The fourth tergite is shining, sparsely and comparatively finely punctured, the fifth tergite more closely and more finely punctured than the fourth, the sixth or pygidial area shining, sparsely and coarsely punctured, triangular, with the apex truncate. Sternites 1-5 smooth and shining, the sixth dull and largely punctured, the fifth with a pre-apical row of large punctures. The foveae on the second sternite round and shallow. Anterior margin of the clypeus with a short and depressed median lobe which is narrowly emarginate in the middle, subcarinate longitudinally and armed with two teeth on each side. The facial groove is parallel-sided, shining, feebly transversely striate. Mandibles with elongate punctures, deeply excised on the outer margin, the inner margin with two teeth. The second joint of the flagellum is a little longer than the first, as long as the apical joint and half as long again as the third. Posterior ocelli half as far again from each other as they are from the eyes. Mesonotum about one and a half times wider across the tegulae than long in the middle. The dorsum of the epinotum is barely longer than the metanotum. Abdomen elongate, widest posteriorly, *i.e.* across the third tergite, two and a third times longer than wide. Metatarsi of the forelegs somewhat dilated, with a short comb composed of five yellow spines; middle and hind tibiae spinose. The recurrent vein meets the cubitus a little beyond the middle of the cubital cell; the transverse cubital vein meets the radial cell in its middle, the truncating vein of the radius is nearly perpendicular to the radius.

Sawmills, S.R. (Arnold); Rhodesdale, S.R. (R. H. R. Stevenson), nesting in sandy banks. Type in R.M. coll.

T. (Encopognathus) granulatus n.sp.

♀. 6 mm. long. Black; base of the mandibles, scapes, pronotal tubercles, anterior tibiae, apices of the anterior femora, middle tibiae and the first three joints of all the tarsi pale yellow, the last two joints of the tarsi brown. The posterior tibiae yellow above, brown below. Middle tibiae and femora, and the hind femora, brown. The posterior lateral margins of the metanotum yellow, the pygidium yellow at the base, ferruginous over the apical third. Tegulae dirty yellow. Wings hyaline, tinged with brownish yellow, the stigma and veins brown. Clypeus, temples and mesopleurae with silvery pubescence, very scanty on the mesopleurae, the rest of the body bare.

The sculpture of the head and thorax, excepting the epinotum, is very much like that of *egregius*, but the vertex is less closely pitted and the spaces between the pits are flatter; the upper part of the facial groove is a little more strongly striolate. On the dorsum of the epinotum the areas enclosed by the carinae are smoother and the median field is divided into only four sectors. The membranous lamella on the three sides of the metanotal disc is translucent, brownish yellow, and not so large as in *egregius*. The first three tergites are moderately shining, impunctate and almost smooth, but under a high magnification show a microscopic rugulosity. The fourth and fifth tergites are very shining, beset with oval warty granules, more densely near the apical margin than elsewhere. This sculpture is very distinctive and of very rare occurrence in the Sphegidae. The pygidial area is like that of *egregius*. The sternites are smooth and shining. The short median lobe of the clypeus is

feebly convex, its anterior margin sharply angular at the corners. The transverse carina at the back of the vertex is further forwards, the distance between it and the posterior margin of the eyes being only half as long as in *egregius*. The lateral foveae on the vertex are wider than in that species. Abdomen elongate-ovate; widest in the middle, convex transversely, not slightly flattened as in *egregius*. Otherwise like that species.

Pengo, Belgian Congo (J. Bequaert), 1 ♀. Type in the Congo Museum, Tervueren.

Genus *THYREOPUS*, subgenus *TRACHELIODES* A. Morawitz.

Bull. Acad. Sc. St Petersburg, IX, p. 249. 1866.

T. (Tracheliodes) perarmatus n.sp. (figs. 5 and 5 a-d).

♀. 5.3 mm. long. Black; the mandibles excepting their ferruginous apices, the antennae, anterior and middle trochanters, tibiae, tarsi and the pygidium, pale reddish ochreous. Middle and hind femora and tibiae brown, more or less brownish yellow behind and at the base and apex. Clypeus, lower surface of the head in front, pronotal tubercles, mesosternum, coxae and the lower half of the mesopleurae covered with a fine silvery pubescence, the rest of the

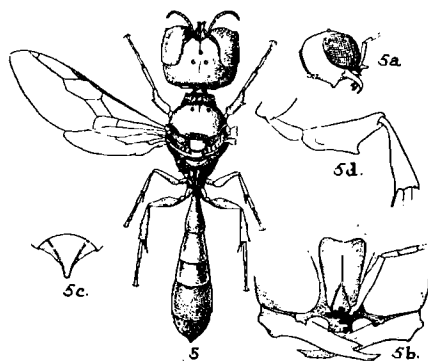


Fig. 5. *Tracheliodes perarmatus*, ♀; a, side view of head; b, lower half of head; c, pygidium; d, front leg. (Figs. 5 b-d magnified twice as much as 5 and 5 a.)

body bare. Wings hyaline, stigma and veins black. Facial groove dull, microscopically coriaceous. The rest of the head polished and shining, with a few small punctures on the vertex and temples. Anterior face of pronotal collar vertical, rugulose and dull; the dorsal face shining, with a few oblique and widely spaced rugae in the middle and several closer and shorter ones at the sides. Mesonotum smooth and shining, with two large punctures in front, one on each side of, and some distance from, the middle line. At the base, in front of the deep suture of the scutellum, the mesonotum has a row of deep punctures separated by short longitudinal ridges. Scutellum shining and impunctate. Metanotum longitudinally striate and dull on the disc, shining and sparsely costate at the sides. Mesopleurae and sides of epinotum nearly dull, closely, finely and transversely striate. The epicnemium in front is pubescent, narrow and not very distinct; the episternal suture is deeply clathrate. The dorsum of the epinotum has a more or less semicircular median field closely striated longitudinally, surrounded by a wide, fairly deep, shining and clathrate furrow. The furrow is continued into the median longitudinal furrow of the declivity. The latter is transversely striolate and sharply marginate laterally at its junction with the sides of the segment. Abdomen

smooth and shining, the fifth tergite very shallowly, sparsely and finely punctured. Head large, distinctly wider than the thorax, about one-fourth wider than long (measured from the occipital margin to the front of the eyes), fairly flat above, the posterior part strongly developed, so that seen from the side the temples are more than half the width of the eyes. The temples are produced inferiorly into a strong triangular tooth. The base of the mandibles is prominent, so that viewed direct from above, these bases are visible, just projecting beyond the contour of the eyes. The mandibles are long and narrow, slightly widened at the base and apex, bidentate, one tooth being formed by the obliquely truncate apex, the other and stronger tooth placed a little behind the apical. Clypeus very short, with a median subrectangular lobe, deeply emarginate on each side of the lobe, the emargination bounded outwardly by a short bidentate projection. Laterally the clypeus is so short that the eyes are very close to its anterior margin. The facial groove is rounded above, fairly shallow, widest above, carinate in the middle; this carina starts well below the brow and is continued below into a porrect, shining and more or less triangular plate, the anterior margin of which is deeply and arcuately excised. The antennal sockets are inserted close together beneath this projection. From the brow of the facial groove a narrow and sharply impressed line extends to the anterior ocellus. Ocelli arranged in an equilateral triangle, the posterior ocelli half as far again from the eyes as they are from each other. The distance from the occipital margin to the posterior ocelli is equal to the distance from the latter to the brow of the face. Flagellum slender, all the joints longer than wide, the first three joints subequal. Dorsal face of pronotal collar shorter in the middle than at the sides, its shoulders angular. Mesonotum fairly convex, wider than long. Dorsum of epinotum oblique, longer than the metanotum but hardly as long as the scutellum, the declivity also oblique.

Abdomen clavate, widest across the fourth tergite, the first tergite petioliform or subclavate, slightly more than twice as long as wide at the apex, about one-third longer than the second segment. Pygidial area triangular, marginate, deeply excavated, the apex very narrowly rounded. Anterior femora with a short tooth at the anterior third of their lower margin. The anterior trochanters are very distinctly elongated, being nearly half as long as the femora; the posterior femora have three small teeth at the middle of the outer margin. The truncating vein of the radial cell is perpendicular to the radius; the transverse cubital vein meets the radius at its basal third; the recurrent vein enters the cubital cell distinctly before its middle.

Moho, near Lesse, Belgian Congo, June, 1 ♀. Type in the Congo Museum, Tervueren.

This species is a very interesting and unexpected addition to the Ethiopian fauna, as hitherto the few known species of this subgenus have been recorded only from the Palaearctic region. Some species have been observed to provision their young with ants.

T. (Tracheliodes) senex n.sp. (figs. 6 and 6 a).

♂. 5.3 mm. long. Black; mandibles lemon yellow, ferruginous at the apex. Scapes pale ochreous, with a brownish streak in front, flagellum dark brown, the dilated second joint testaceous except above. Anterior legs including the trochanters, middle tibiae and tarsi, posterior femora and tibiae in front, pale ochreous. The middle femora pale ferruginous except the apex which is pale ochreous, the posterior femora on the under side blackish basally and becoming gradually ferruginous towards the apex, the posterior tibiae below and their tarsi fuscous. Tegulae flavo-testaceous. Wings hyaline, stigma and costa brownish, the veins ochreous. Apical sternite flavo-ferruginous. Clypeus,

facial concavity, temples, pronotum excepting the dorsal face of the collar, epicnemium, anterior corners of the mesonotum and lower half of the mesopleurae clothed with silvery pubescence. Under side of the head, anterior coxae and under side of the thorax densely clothed with whitish hairs, long, exserted and woolly on the head and coxae, shorter and decumbent on the sternum; the rest of the body bare, shining. The sculpture of the dorsal face of the pronotal collar and of the mesonotum is like that of *perarmatus*, but the base of the mesonotum has deep sulci, instead of punctures, separated by short longitudinal ridges, and the lateral margins of the segment are bounded by a narrow clathrate groove; the two large punctures present in the other species are absent. The scutellum is shining and almost smooth, in its front half there is a short median carina, and on the posterior half there is a faint trace of longitudinal striae; the lateral margins of the scutellum are sharply raised. Metanotum shining, longitudinally striate on the disc, costate at the sides. Mesopleurae in front of the episternal suture smooth and shining; below the middle a transverse suture extends from the episternal suture to the metapleurae. Below this transverse suture the mesopleurae are smooth and shining, above it sharply and obliquely striate. Metapleurae coarsely transversely striate. The sides of the epinotum are finely, closely and transversely striate. The shape and sculpture of the rest of the epinotum is very much like that of *perarmatus*, but the striation of the median area is oblique, and the furrow at its base is much broader and less closely clathrate. Abdomen

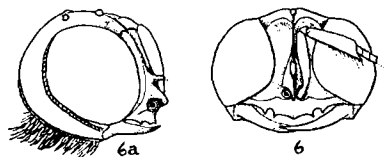


Fig. 6. *Tracheliodes senex*, ♂, front view of head; a, oblique lateral view of head.

shining, microscopically transversely rugulose. Mandibles not bidentate, the apex simple and acute. Anterior margin of the clypeus obtusely angular in the middle, with two teeth, separated by a deep excision, on each side half-way between the middle and the outer angles. The face differs from that of *perarmatus* in having two projections; the facial concavity is sharply carinate longitudinally from the brow downwards; this carina rises and widens below and is produced above the antennal sockets into a porrect, spatulate process, below which there is a sharply angular second projection which is compressed transversely in its lower half. This second projection lies between the antennal sockets. The latter are separated by a little space from the margins of the eyes. The antennae in the unique specimen are damaged, only the scapes and the first five joints of one flagellum being intact. The first joint of the flagellum is almost triangular, wider at the apex than long; the second joint is very long, fully as long as the scape, broadly dilated over its whole length, the lower margin fringed with fine, long hairs and having its lower angle much produced. The three following joints are subequal, normal and cylindrical. Seen from above, the brow of the face is concave on each side; a median and deeply impressed line extends from the brow to the anterior ocellus and is continued thence to a point a little behind the posterior ocelli. On each side of the impressed line in front of the anterior ocellus the vertex is distinctly tumid. The ocelli are set in an equilateral triangle, the distance between the posterior pair being equal to their distance from the eyes. The posterior orbits are margined by a deep and transversely striated groove. The inferior margin of

the occiput and temples is sharply raised, or carinate. The temples lack the triangular tooth which is present in *perarmatus*, and the outer angle of the base of the mandibles is not visible from above. Temples as wide as in *perarmatus*. The dorsal face of the pronotal collar has between the front and hind margins a transverse torus which is interrupted in the middle by the longitudinally carinate space; the anterior lateral angles of the front margin are more prominent than in *perarmatus*, almost dentate, and the transverse torus also projects a little beyond the sides. Abdomen shaped like that of *perarmatus*. Anterior trochanters elongated, about half as long as the femora; the latter are armed with an acute, transparent tooth at the basal third of the lower margin. Posterior coxae armed at the inner posterior angle with a sharp tooth. Seventh tergite widely rounded at the apex. Venation of the forewing like that of *perarmatus*, but the accessory cell of the radial is obsolete, as the radius ends at the truncation. The hind wings in the unique specimen have been lost. Posterior tibiae with only faint traces of spines on the outer margin. Maxillary palpi 6-, labial palpi 3-jointed, and of a yellow colour.

Helenvale, near Bulawayo, S.R., January, 1925. Bred out from burrows in a wooden post*.

Although the mandibles are simple at the apex, the other characters justify the inclusion of this species in the subgenus *Tracheliodes* s.l. Type in R.M. coll.

Genus *THYREOPUS*, subgenus *RHOPALUM* Kirby (Kohl).

Stephens, *Syst. Cat. British Insects*, p. 366. 1829.

T. (Rhopalum) ornatipes Turner. *Ann. Mag. N.H.* (9), 1, p. 92, ♀. 1918.

"♀. Nigra; mandibulis, apice excepto, clypeo, scapo, flagello dimidio basali subtus, pronoto, scutello, tegulis, pedibus anticis intermediisque, trochanteribus posticis, tibiis posticis dimidio basali, metatarsisque posticis flavis; alis hyalinis, iridescentibus, venis fuscis. Long. 4 mm."

"♀. Eyes separated at the base of the clypeus by a distance equal to about one-quarter of the length of the scape, the facets much larger in front than on the side; clypeus short and broad, clothed with delicate white pubescence. Head smooth and shining, an indistinct groove from the posterior ocelli not quite reaching the eyes; temples about half as broad as the eyes. Thorax smooth and shining; pronotum transverse; median segment almost smooth, with a well-marked median sulcus. First tergite very slightly longer than the second, not much swollen at the apex; second tergite broadened from the base, nearly half as long again as the third. Serration of the hind tibiae almost obsolete. Radial cell broadly truncate at the apex; recurrent nervure received close to two-thirds from the base of the cubital cell.

"*Hab.* Zungeru, N. Nigeria (J. W. Scott-Macfie), January—February."

T. (Rhopalum) riparium n.sp. (figs. 7 and 7 a).

♀. 4.5–5.5 mm. long. Black; scapes, first joint of the flagellum below, clypeus, pronotal collar above, a spot on the scutellum, a transverse band on the disc of the postscutellum, the trochanters, tibiae and tarsi of the forelegs, the coxae, trochanters, tibiae and tarsi of the middle pair of legs, the lower half of the coxae, basal third of the tibiae and the metatarsi of the hind pair of legs,

* The hymenopterous fauna of this wooden post was as interesting as it was varied. The tunnels, originally made by Bostrychid beetles, were tenanted by two species of Eriades (*E. ciliatus* Fr. and sp. ignot.), a *Mutilla*, a *Sapyga* n.sp., *Passaloecus Braunsi* Kohl, several Chrysids, and a hitherto undescribed *Ammoplanus*, *A. consobrinus* mihi; the latter will be described in another Appendix of this work later on.

pale yellow. The femora pale at the apex, the last four joints of the tarsi brown. Mandibles whitish, their apices ferruginous. Pronotal tubercles dull white. Wings clear hyaline, the apical margin faintly infuscated, the stigma and veins black. Clypeus, sides of the face, temples, mesopleurae and mesosternum covered sparingly with silvery pubescence. Facial groove smooth and shining. Vertex, mesonotum and scutellum shining, microscopically rugulose, very sparsely and finely punctured. Mesopleurae, metanotum, pronotal collar and sides of the epinotum shining and impunctate. Sides and neck of the pronotum reticulate-punctate, and with a few rugae. Epinotum smooth and shining, the base of the dorsum with a row of very short striae, the median field

nearly semicircular, its margins defined by a line of shallow punctures, the median groove of the rather oblique declivity submarginate and shallow. Abdomen shining, microscopically rugulose; the pygidial area shining, coarsely and very sparsely punctured, triangular, slightly longer than wide at the base, the apex rounded. Mandibles not excised on the outer margin, narrow, the apex acute. Clypeus feebly produced in the middle, the anterior margin of that portion hardly dentate, at the most only feebly bisinuate. Antennae inserted close together and adjacent to the eyes, the distance between the eyes at that point being about equal to the length of the second joint of the flagellum. Antennae slender, the second and third joints of the flagellum subequal, the first joint two-thirds the length of the second. Ocelli set in an equilateral triangle, the posterior pair nearly twice as far from the eyes as they are from each other. Collar of pronotum rounded above and at the corners, as long as the second joint of the flagellum. Dorsum of epinotum as long as the scutellum. First segment of the abdomen elongate, two-thirds longer than the second, three times as long as its apical width. Abdomen widest across the apex of the third segment. Middle tibiae with a few spines near the apex, the hind tibiae with two rows of whitish spines on the outer margin; the inner calcar nearly as long as the hind metatarsus. Anterior metatarsi with six short spines. The transverse cubital vein of the front wing meets the radius at a point a little before its first third, the recurrent vein meets the cubitus at the middle of the cubital cell.

Sawmills, S.R., July, nesting in sandy alluvium of the Umgusa River.

The area in which their tunnels were found is flooded every season by the river, so it is probable that the life cycle is completed within a few months, *i.e.* from July to November, since after the November rains the banks are under water.

(R.M. and T.M. colls., the type in the former.)

R. riparium, var. *nemoralis* n.v.

♀. 6 mm. long. Slightly longer and more robust than the type of the species, from which it differs by the absence of the yellow markings on the thorax, and by the darker middle and hind tibiae which are yellow only at the extreme base. The median area of the clypeus is blackish at the base, and its anterior margin ends in a distinct, short and wide tooth on each side, and has a trace of a tooth in the middle.

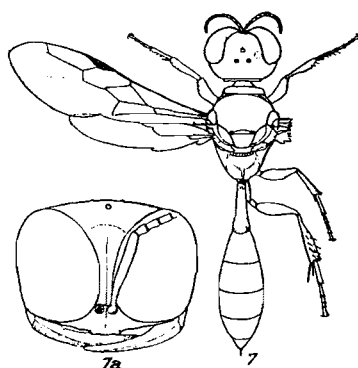


Fig. 7. *Rhopalum riparium*, ♀; a, front view of head.

Vumbu Mts., 6000 ft., near Umtali, S.R., February—April. This species nests in very moist clay banks, and preys on a small Homopterous insect of the family Psyllidae.

(R.M. and T.M. colls., the type in the former.)

Genus *THYREOPUS*, subgenus *THYREOPUS*, species-group
CUPHOPTERUS A. Morawitz (Kohl).

Bull. Acad. Sc. St Petersburg, IX, p. 252. 1866.

T. (Cuphopterus) ruwenzoriensis n.sp. (figs. 8 and 8 a-c).

♀. 10 mm. long. Black; scapes yellow in front, the first sternite and apical margins of the abdominal segments testaceous; pygidial area brownish yellow, the apex ferruginous. Tarsi dark brown. Wings pale fuscous, the stigma and veins black. Clypeus and lower temples with a dull silvery pubescence, the sides of the thorax with a short whitish pubescence, legs and abdomen (the latter chiefly at the sides) with a very fine, inconspicuous greyish pubescence; there are a few long black hairs on the apical margins of the sternites. Facial groove smooth and shining; the rest of the head almost dull, shallowly, closely and very finely punctured, the punctures behind the ocelli a little further apart and larger. No distinct lateral foveae present, but on each side an oblique slightly shining area extends from the posterior ocelli towards the margins of the eyes. A short raised line lies between the posterior ocelli.

Pronotal collar faintly shining, the mesonotum dull. Pro-mesonotum closely, evenly and very finely punctured, the mesopleurae shining, microscopically and sparsely punctured. Scutellum almost dull, fairly sparsely and finely punctured, but the punctures are a good deal larger than those of the mesonotum. Metanotum dull, striolate at the sides of the disc. Dorsum of epinotum with a large, semicircular, marginate median field, slightly shining, the base with a few short rugae which do not extend beyond the middle, traversed by a median longitudinal sulcus which is continued into the sulcus of the declivity. The latter is deep and narrow and ends a little before the junction with the abdomen in a short curved mucro which is barely free at its apex and can be seen clearly only when viewed from the side. The declivity and sides of the epinotum are slightly shining, irregularly striolate from above to below. First tergite smooth and shining, the second and third dull, the fourth and fifth shining, the sculpture microscopic. Pygidial area elongate-triangular, longer than wide at the base, sparsely and sharply punctured, with a trace of a longitudinal carina down the middle. Sternites smooth and shining. Mandibles not excised on the outer margin, the inner margin edentate, the apex transverse and ending in three short teeth. Clypeus very short at the sides, the eyes almost reaching its anterior margin, slightly produced in the middle which is feebly carinate longitudinally, the anterior margin straight, with one or two large punctures behind it. The facial concavity is shallow, and is continued above into a deep impressed line which reaches the anterior ocellus. The ocelli are placed in a triangle which is almost equilateral, the distance between the posterior ocelli is a little less than their distance from the eyes.

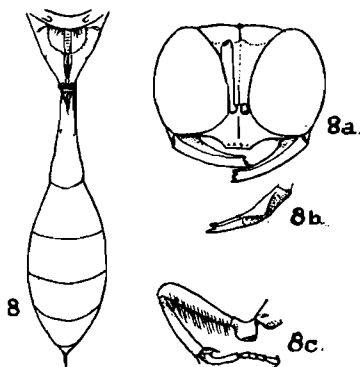


Fig. 8. *Cuphopterus ruwenzoriensis*, ♀, abdomen; a, ♀, head; b, ♂, mandible; c, ♂, left foreleg.

The interocular distance on the vertex is equal to the length of the first five joints of the flagellum. The first joint of the flagellum is a little longer than wide, the second three times longer than wide at the apex and twice as long as the first, and a little more than one-third longer than the following joint. The temples, seen from the side, are two-thirds the width of the eyes. Head not wider than the thorax. Pronotal collar rounded from front to back and at the shoulders, with a deep transverse impression behind. Mesonotum two and a third times longer than the scutellum. Dorsum of epinotum fairly oblique, sloping gradually into the declivity, the median field as long in the middle as the scutellum. Abdomen narrow and elongate, the first segment petioliform, nearly three times longer than its apical width, and twice as long as the second; the abdomen is widest across the apex of the third segment. The calcar of the middle tibiae is large, and the outer calcar of the hind tibiae is half as long as the metatarsus. The radius of the forewing is curved downwards at its apex; the transverse cubital vein meets the radial cell before its middle, and the recurrent vein meets the cubital cell a little beyond its middle. The basal lobe of the hindwing is only half as long as the submedial cell.

♂. 9 mm. long. Black; scapes in front and at the base behind, the pronotal collar except in the middle, the pronotal tubercles, a round spot on each side of the first tergite near its apical margin, a slightly larger spot on each side of the third tergite at about its middle, a broad pre-apical band on the sixth tergite not reaching the lateral margins, the pygidium except at its extreme base, and the greater part of the first sternite, chrome yellow.

Basal half of the flagellum with a fringe of fine outstanding hairs. Anterior femora with a dense, long and exerted pilosity; the anterior trochanters compressed above, thicker below and of a subquadrate shape; the anterior metatarsus deeply and arcuately excised below. Temples produced below into a broad triangular tooth. Mandibles bidentate at the apex, the upper outer margin angularly dilated not far from the middle. Clypeus slightly more produced in the middle than in the ♀. Mesonotum slightly shining, more strongly and less closely punctured than in the ♀. First abdominal segment shorter than in the ♀, only a little more than half as long again as the second segment. Pygidium trapezoidal, flat, dull, closely and finely punctured. The inner calcar of the hind tibiae is thickened, lanceolate, and without a comb. Otherwise like the ♀.

Mt Ruwenzori (J. Bequaert), June, 1 ♀, 1 ♂. Types in the Congo Museum, Tervueren.

T. (Cuphopterus) glabricornis n.sp. (figs. 9, 9 a and b).

♂. 9 mm. long. Black; scapes black behind, dirty yellow in front, the first seven joints of the flagellum reddish brown, the remaining joints darker. A spot on each side of the clypeus, just below the antennal sockets, dirty white. A transverse streak on the metanotum in front, the first sternite and an oblong spot on each side of the third tergite, pale yellow. The yellow colour on the first sternite is angularly extended posteriorly over the sides of the segment, and is therefore just visible from above. The fourth tergite has a very small dull white spot on each side and on the fifth tergite posteriorly there is a transverse band of the same colour, dilated at the sides. The apical margins of the fifth and sixth tergites are brownish black, and the seventh is dark ferruginous. Mandibles, tegulae, pronotal tubercles, fore tibiae and tarsi, and the middle and hind tibiae ferruginous; the hind tibiae are brownish above, the middle and hind tarsi reddish brown. Wings hyaline, faintly tinged with fuscous, the stigma and veins blackish. Clypeus, face and temples with sparse silvery pubescence, thorax and abdomen with whitish pubescence, very short on the

mesonotum and scutellum, absent from the median area of the epinotum, longer and more abundant on the sides of the thorax than elsewhere. On the abdomen the pubescence is denser but very short and inconspicuous. Mandibles bidentate at the apex, the inner margin with a low tooth before its middle, the outer upper margin slightly prominent, but not angularly dilated as in *ruwenzoriensis*. Clypeus closely, finely punctured and dull, the median area produced, the anterior margin of the median area subrectangular on each side and convex between. Face, vertex and temples slightly shining, the face and temples very finely punctured, the vertex more strongly punctured, but nevertheless shallowly and not very closely. Pronotal collar nearly smooth. Mesonotum and scutellum moderately shining, finely and shallowly punctured, but more strongly and more closely than the vertex, the punctures closer and smaller in front and at the sides; there is a faint suggestion of striation between the punctures in front of the posterior margins. Metanotum smooth and shining. There is a well-defined anterior epicnemium which is finely punctured. Mesopleurae shining, sparsely and microscopically punctured.

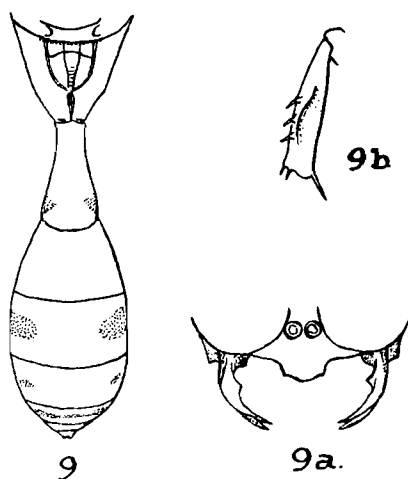


Fig. 9. *Cuphopterus glabricornis*, ♂, abdomen (dotted areas represent yellow or white markings); a, clypeus; b, middle right tibia.

Sides of epinotum shining, finely shagreened in front, smooth behind. The dorsum of the epinotum has a well-defined, smooth and shining median area, shaped like that of *ruwenzoriensis*, but without the striae at the base which are present in that species; on the other hand, a very distinct transverse carina extends across it at about the basal third; the median and transversely striated groove is narrowed apically and merges into the deep sulcus of the declivity. There is, however, no mucro at the bottom of the latter as in the other species. The area of the dorsum outside the median area is feebly rugose-punctate and moderately shining, the declivity shining, finely and sparsely punctured. Abdomen smooth and shining, the seventh sternite with two longitudinal low swellings near the middle. The anterior coxae end behind in an acute angle, and the anterior trochanters have their outer margins trenchant. The anterior femora are flattened below. Labial palpi 4-, maxillary palpi 6-jointed. Ocelli arranged in an equilateral triangle. The temples end below in a broad sharp angle, but are not produced into a spine. The brow of the face is shallowly impressed longitudinally in the middle. Interocular

distance on the vertex equal to the length of the first five joints of the flagellum. The flagellum is fairly long and slender, and the joints are not fringed below with hairs; the first joint is half as long again as wide, the second joint is three and a half times longer than its apical width and half as long as the third, which is a trifle longer than the first; the first six and the apical joint are longer than wide. The posterior ocelli are half as far again from the eyes as they are from each other. Temples narrow. Pronotal collar strongly convex from front to back, higher in front than behind, the lateral angles rounded. Epinotum shaped like that of *ruwenzoriensis*. First segment of abdomen petioliform, relatively shorter and wider than in *ruwenzoriensis*, only twice as long as its greatest width, about as long as the second segment plus half of the third. Anterior metatarsus like that of *ruwenzoriensis* ♂. The middle tibiae on their outer surface have a short, curved carina extending over the middle third. Wings as in *ruwenzoriensis*.

Mossel Bay, C.P., July, 1 ♂ (R. E. Turner). Type in British Mus. coll.

This species, in spite of the glabrous flagellum, should be placed in the species-group *Cuphopterus*, with which it agrees in all other characters.

Genus THYREOPUS, species-group DASYPROCTUS Lep.

Ann. Soc. Ent. France, III, p. 801. 1834.

All the species of this group may be easily recognised by the peculiar fundamental sculpture of the head, pro-mesothorax and abdomen, which is so fine that it is not resolvable even under a considerable magnification, and gives a dull, matt surface to the integument of these insects. The stronger sculpture, which may be superimposed, is rarely very noticeable and consists usually of a fine puncturation, confined chiefly to the mesonotum and the anterior part of the vertex. The scutellum is often striate posteriorly, and the metanotum finely rugose or coriaceous. The dorsum of the epinotum is nearly always more or less striated or rugose, and also more or less reticulate; the sculpture of this part is generally stronger in the ♂ than in the ♀. In addition, the shape of the abdomen is distinctive, the first segment being petioliform and moderately swollen apically, the rest of the abdomen forming a globose complex, so that the abdomen appears abruptly widened after the first segment, although less so in the ♂ than in the ♀. The ocelli are arranged in a wide isosceles triangle. The middle and hind tibiae are spinose at the apex, and the hind tibiae have also a few small spines on the basal half of the outer surface; the last joint of all the tarsi is moderately swollen, and in both sexes the inner calcar of the hind tibiae is thickened, blunt, and without a comb. The pygidial area in the ♀ is very narrow, more or less Y-shaped and deeply excavated; in the ♂ there is no pygidial area, the apical segment being merely flat and rounded at its free margin. The clypeus is short, slightly and narrowly produced in the middle. The antennal sockets are contiguous and also touch the inner margin of the eyes. The latter, as is usually the case in the genus, have the facets in front much larger than elsewhere. The scapes are distinctly triangular in cross-section, the edge which is directed forwards being raised and trenchant. The pronotal collar is nearly level with the mesonotum and always has a narrow notch in the middle of the anterior margin and a transverse groove adjacent to the hind margin. The dorsum of the epinotum is marginate laterally, sharply marking off that region from the sides; these raised margins are continued downwards and in the same way separate the sides of the segment from its declivity.

For the differentiation of the species in this rather difficult group the most important characters are (1) the structure of the clypeus, (2) the length of the

first three joints of the flagellum, (3) the shape of the petiole. The shape of the clypeus is obscured by the dense pubescence, and it will be found necessary as a rule to scratch off this pubescence with a needle from at least one-half of the clypeus. An examination of nearly 550 specimens distributed over our seven species and two subspecies has led me to the conclusion that the three characters mentioned are the only reliable ones for the separation of these species. On the other hand, the width of the temples, the arrangement of the ocelli and the distance separating the posterior pair from the eyes, and the venation are so constant that they fail to provide diagnostic characters of any value. The colouring is very uniform within the group, most of the species having the scapes, pronotal collar above, two spots on the second tergite and a transverse band on the fifth, pale yellow. Within the species itself, however, the coloration is subject to variation, and often some of these yellow markings are much reduced or absent.

The species nest in living aloe-flower stalks, brambles, etc., and for that reason are commonest in Rhodesia during the winter months. They do not nest in dry stems, probably because a certain amount of moisture is necessary to prevent desiccation of the food provided for the larvae, which consists of various kinds of Diptera. The contents of even a single cell may often include several different species of flies. The tunnels in the stems are separated into several cells by plugs of triturated pith; usually there are not more than six cells in each tunnel, and frequently less.

KEY TO THE SPECIES OF *DASYPROCTUS* ♀♀

- (2) 1. Petiole short, only two-thirds longer than its greatest width; pygidium and apical third of fifth tergite ferruginous; 10.5–13 mm. long.
ruficaudis Arnold
- (1) 2. Petiole longer.
- (8) 3. Second joint of flagellum nearly three times longer than its apical width, or more.
- (5) 4. Median area of the clypeus carinate longitudinally, the carina ending before the anterior margin in a prominent tubercle, the anterior margin below it strongly bidentate; pronotal collar narrowed from back to front so that the front margin is much narrower than the hind one; second joint of the flagellum three and a quarter times longer than its apical width.
angusticollis Arnold
- (4) 5. Median area of clypeus differently formed; pronotal collar not narrowed, about as wide in front as behind.
- (7) 6. Anterior margin of the median area of the clypeus with a strong blunt tooth on each side, angularly excised in the middle; from the apex of the excision a carina extends back as far as the antennal sockets; vertex without short black pubescence, the mesonotum without shallow puncturation; petiole finely punctate on the basal third of the dorsal surface.
dubiosus Arnold
- (6) 7. Anterior margin of the median area of the clypeus straight or feebly concave, without a distinct tooth on each side; the median carina very feeble; vertex with minute blackish pubescence underlying the longer hairs; mesonotum with a sparse and shallow puncturation; petiole striolate-punctate over the upper basal third.
Braunsi Kohl
- (3) 8. Second joint of the flagellum less than twice as long as its apical width.
- (10) 9. Petiole four times longer than its greatest width; median area of the clypeus feebly carinate, the carina ending in a short tooth on the anterior margin.
Stevensoni Arnold
- (9) 10. Petiole shorter.
- (12) 11. Anterior margin of the clypeus distinctly bidentate in the middle and angularly excised between the teeth.
Westermanni Dahlbom
- (11) 12. Anterior margin of the median area of the clypeus transverse and without teeth.

- (14) 13. Wings hyaline or nearly so; pronotal tubercles yellow.
 (a) Petiole from three and a quarter to three and a half times longer than its greatest width. **bipunctatus** Lep.
 (b) Petiole three and three-quarter times longer than its greatest width. **bipunctatus**, race **lichtenburgensis** Arnold
- (13) 14. Wings pale fuscous; pronotal tubercles ferruginous; (fourth tergite with a transverse band of yellow, the yellow markings everywhere darker than in the type; pubescence of clypeus pale golden; petiole nearly three times longer than its greatest width). **bipunctatus**, race **jucundus** Arnold

KEY TO THE SPECIES OF *DASYPROCTUS* ♂♂

- (2) 1. Flagellum subserrate, the third to eleventh joints being obtusely angularly dilated below near the middle; (the second joint twice as long as its apical width). **Braunsi** Kohl
- (1) 2. Flagellum not subserrate.
- (4) 3. Second joint of the flagellum three times longer than wide at the apex and distinctly flattened on the under side. **dubiosus** Arnold
- (3) 4. Second joint of flagellum shorter, not flattened below.
- (8) 5. Fifth joint of flagellum not dilated apically; anterior and middle femora without fimbriae on the lower surface.
- (7) 6. Petiole a little more than three times longer than its greatest width; median lobe of clypeus angularly emarginate; (mesonotum and scutellum sparsely but fairly strongly punctured). **Westermanni** Dahlbom
- (6) 7. Petiole four times longer than its greatest width; median lobe of clypeus subrostrate, the apex transverse. **Stevensoni** Arnold
- (5) 8. Fifth joint of flagellum dilated below near the apex; anterior and middle femora with fimbriae of long hairs below; anterior margin of clypeus transverse; (mesonotum and scutellum finely punctured).
- (12) 9. Pronotal tubercles yellow; wings hyaline.
- (11) 10. Petiole four times longer than its greatest width. **bipunctatus** Lep.
- (10) 11. Petiole five times longer than its greatest width. **bipunctatus**, race **lichtenburgensis** Arnold
- (9) 12. Pronotal tubercles ferruginous or fusco-ferruginous; wings fusco-hyaline.
- (14) 13. Scutellum and fourth tergite immaculate. **bipunctatus**, race **funereus** Arnold
- (13) 14. Scutellum and fourth tergite with chrome yellow markings. **bipunctatus**, race **jucundus** Arnold

T. (Dasyproctus) ruficaudis n.sp. (figs. 10 and 10 a).

♀. 10.5–13 mm. long. Black; apical margins of the sternites rufo-testaceous, apical third of the fifth tergite and the whole of the sixth segment ferruginous. Scapes, a band on the collar of the pronotum narrowly interrupted in the middle, the pronotal tubercles, a round spot on each side of the scutellum, a spot on each side of the petiole near the apical margin, a short transverse streak on each side of the second tergite before its middle, a longer and narrower streak on each side of the third tergite at its base, and a transverse band across the fifth tergite, pale lemon yellow. Tegulae and mandibles ferruginous, the latter black at the tip. Femora, middle and hind tibiae blackish above, more or less ferruginous below, the anterior tibiae ferruginous. On the middle femora below and on the front tibiae outwardly there are longitudinal streaks of lemon yellow; these may be more or less reduced or entirely absent. Tarsi dark brownish red. Wings hyaline, costa and veins brownish red. Clypeus and face with a dense silvery pubescence, that of the face slightly golden. Temples with a sparse silvery pubescence. Vertex and thorax with a longer and outstanding pubescence, fairly sparse

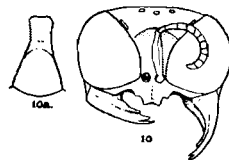


Fig. 10. *Dasyproctus ruficaudis*, ♀, head; a, petiole.

except on the epinotum, greyish on the head, white elsewhere. Tergites with a very fine greyish and inconspicuous pubescence. Apical half of the fifth tergite and the sides of the sixth with reddish yellow setae. Brow of facial concavity arcuate, the vertex just behind it with a fine sparse puncturation which does not extend beyond the level of the middle of the lateral foveae; the latter are four times longer than wide. Mesonotum with a sparse, very fine and shallow puncturation. Neck and sides of pronotum irregularly rugose. Anterior epicnemium slightly shining, closely and microscopically punctured; the posterior epicnemium sharply marginate in front, slightly shining, finely and not very closely punctured. Scutellum with a greasy lustre, its posterior half closely punctured with large elongate punctures; the postscutellum as shining as the scutellum, finely and closely punctured. Metapleurae transversely striate, punctured between the striae. Median area of the epinotal dorsum triangular, margined at the base and sides by wide grooves which are transversely and widely striate, the striae strongest on the basal groove; the median area is closely and finely reticulate, with a longitudinal groove which is finely rugose, widest at the base, and merges into the median groove of the declivity. The latter is rugose-reticulate and dull. The sides of the epinotum have a slight greasy lustre and are finely and closely striate. Basal third of first tergite shining, sparsely and coarsely punctured. Sternites shining, finely punctured at the sides, the second with a few larger punctures in the middle, the apical sternite, except at its base, more strongly punctured. Pygidial area narrow, shining, the sides sharply marginate. Clypeus subcarinate in the middle, produced into a short lobe which is rectangular at the anterior angles, with its anterior margin very shallowly and angularly emarginate; on each side of the lobe is a small blunt angle. Second joint of flagellum two-thirds longer than the first, about half as long again as the third. The posterior ocelli are further from the occipital margin of the head than they are from the brow of the face; seen from the side, the temples are about one-third wider than the eyes. First segment of the abdomen not strongly petiolate, nodose, the node forming a little more than half of the segment; seen from above, the segment is only two-thirds longer than its apical width.

Algoa Bay, George and Sunday River, C.P. (Dr H. Brauns); Wartburg, Natal (C. B. Hardenburg); Mlanje, Nyasaland (S. A. Neave, in B.M. coll.), August—December. Type from George, C.P., in coll. Brauns.

This is our largest species and easily recognised by the red apical segment and the coarse reddish setae surrounding the pygidial area.

T. (Dasyproctus) Braunsi Kohl (figs. 11 and 11 a-e). *Ann. K.K.N.H. Mus. Wien*, ix, p. 281, ♂. 1894.

♀ (hitherto undescribed). 9-10.5 mm. long. Black; the scapes, a streak on the pronotal collar interrupted in the middle, the pronotal tubercles, a small spot on each side of the scutellum (often absent), a small oblong spot on each side of the node of the petiole, an oblong and transverse spot on each side of the second tergite in its basal half, and a very small spot on each side at the base of the third tergite (sometimes absent), chrome yellow. Tegulae ferruginous. Mandibles ferruginous, blackish at the apex, the base often yellowish on the outer side. Tibiae and tarsi ferruginous, the posterior pair somewhat darker. Anterior femora more or less ferruginous above and at the apex below, elsewhere black; the middle femora ferruginous in front and above, black behind, the posterior femora black. The middle femora and the posterior tibiae sometimes have a streak of yellow, but this is absent more often than not. Apical half of the pygidium ferruginous, the apical margins of the second to fifth sternites narrowly testaceous. Clypeus, face and temples

with silvery pubescence, long and dense on the clypeus. Vertex and mesonotum with a very short, sparse whitish pubescence, that on the thorax hardly visible except when viewed from the sides. The anterior part of the vertex has fine punctures bearing very short black and decumbent hairs, hardly visible with a magnification of less than 25 diameters. Mesopleurae, epinotum and basal third of the petiole with a sparse whitish pilosity. Abdomen with very fine yellowish grey pubescence, fairly scanty but denser on the fourth and following segments. Femora with a few long hairs intermixed with the pubescence, but not fringed below. The hairs on the pygidium are yellowish. Sides and neck of the pronotum coarsely rugose-striate, the striae curving inwards and becoming finer over the anterior face of the collar. The mesonotum has a very shallow, fine and sparse puncturation, barely visible under a magnification of less than 25 diameters. Anterior epinemium slightly shining, pubescent, shallowly punctured; the posterior epinemium also slightly shining, obliquely striate and feebly punctate. Metapleurae and sides

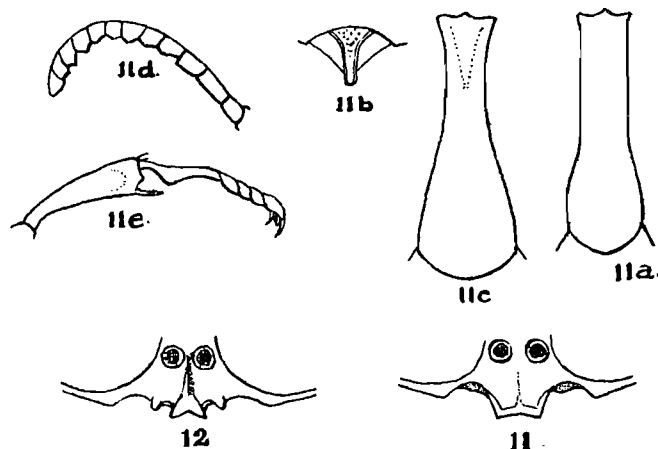


Fig. 11. *Dasyproctus Braunsi*, ♀, clypeus; a, ♀, petiole; b, ♀, pygidium; c, ♂, petiole; d, ♂, flagellum; e, ♂, tibia and tarsus of foreleg.

Fig. 12. *Dasyproctus dubiosus*, ♀, clypeus.

of epinotum nearly dull, transversely striate, the striae strongest on the metapleurae, gradually thinning on the sides of the epinotum. Scutellum with a few shallow punctures, and short striae at the extreme base. Metanotum finely and closely reticulate-rugose. Dorsum and declivity of the epinotum strongly striate, the striae oblique and diverging outwardly on each side from the middle, the surface between them slightly shining and traversed by finer striae. The median area of the dorsum is feebly defined by a very shallow groove on each side, and the median sulci of the dorsum and declivity are narrow and transversely striated. Sternites shining, the second with a few punctures on the basal half, the sixth sparsely and finely punctured all over. The median lobe of the clypeus is like that of *ruficaudis*, but less produced forwards, the anterior margin less angularly emarginate or almost straight; the carina is nearly obsolete. First joint of the flagellum two-thirds longer than wide and a little longer than the third joint, the second joint three times as long as its apical width and three-fourths longer than the third. Anterior margin of the vertex shallowly arcuate. Petiole from two and a half to two and two-third times longer than its apical width, nearly twice as long as the second segment, the node extending over a little less than half its length. Pygidial area Y-shaped,

shining, sparsely punctured at the base, the apex rounded. Wings pale fusco-hyaline, the veins blackish. Calcaria pale yellow.

♂. 8.5–10.5 mm. long. Back of the scapes blackish, the mandibles rarely with yellow at the base, the legs somewhat darker, otherwise coloured like the ♀. In some specimens from the Victoria Falls, the fore and middle femora and tibiae have streaks of yellow on their upper surfaces. In the type, and in a few ♀ examples, there is a round spot of yellow on each side of the scutellum near the anterior angles. The vertex in front is much more strongly punctured than in the ♀, the punctures being clearly visible with a magnification of 8 diameters. The fine pubescent punctures of the mesonotum are also more distinct, and as usual in the genus, the sculpture of the meta- and epinotum is much coarser than in the ♀, although essentially of the same character.

The facial concavity is glabrous and shining, not finely pubescent as in the ♀. The lobe of the clypeus is narrower and more produced, and its anterior margin is straight. The flagellum is subserrate, owing to the joints 3–11 being obtusely angularly dilated beneath, a little beyond their middle. The second joint is twice as long as its apical width and half as long again as the third; the first and third joints are of equal length. The metatarsi of the front legs are angularly dilated near the base. The petiole is narrower and relatively longer than in the ♀, fully three times longer than its greatest width, and the remaining abdominal segments form a much less globose complex than in most species of the genus, being oblongo-ovate and twice as long as wide in the middle, and two-thirds longer than the petiole. The apical tergite is rounded. The posterior tibiae are very distinctly spinose on the outside.

Gaboon, type of ♂ in coll. Brauns; George, Sunday River, Algoa Bay and Willowmore (Dr H. Brauns); Durban (C. N. Barker); Bulawayo and Victoria Falls (G. Arnold).

T. (Dasyproctus) dubiosus n.sp. (figs. 12, 13, 13 a and b).

♀. 7.5–10 mm. long. Colour in greater part like that of *Braunsi* ♀, but differing as follows. First joint of the flagellum yellow, at least on the under side, the remaining joints fusco-ferruginous. There are two small yellow spots on the extreme anterior angles of the scutellum, often much reduced and only rarely entirely absent, never situated on the sides of the scutellar disc as in *Braunsi*. The petiole is almost invariably immaculate, only one example out of a total of 40 having a small yellow spot on each side of the node. The second tergite has a streak of lemon yellow on each side, extending over the outer third, more or less elongate triangular in shape, the apex directed inwards. The third tergite has a more or less round yellow spot on each side near the outer margin, and the fourth tergite has an elongate triangular spot on each side, smaller than that of the second. The apical margins of the sternites are widely flavo-testaceous. The legs are in greater part ferruginous, including the trochanters, but with the following parts whitish yellow: the apical half of the fore tibiae above, the apical third and extreme base of the middle tibiae and the whole of the middle metatarsi, a streak on the upper side of the hind tibiae, and the whole of the hind metatarsi. Some of the pale yellow marks may be replaced more or less with ferruginous, but the metatarsi of the middle and hind legs, and at least a spot on the apex of the middle

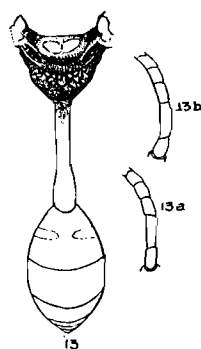


Fig. 13. *Dasyproctus dubiosus*, ♂, posterior half of thorax and abdomen; a, ♀, first five joints of flagellum; b, ♂, first five joints of flagellum.

tibiae are invariably pale yellow. The hind femora are fusco-ferruginous, or very dark brown in those examples which lack the longitudinal yellow streak on the upper surface. Wings clear hyaline, veins and stigma brown. The anterior portion of the vertex lacks the microscopic black hairs which are present in *Braunsi*; on the other hand, that part has a few short silvery hairs intermixed with longer, upright and white ones. The pubescence of the clypeus and face is silvery, not yellowish silvery as in *Braunsi* ♀.

The mesonotum lacks entirely the sparse and shallow puncturation present in *Braunsi*. The epinotum is sculptured very much as in that species, but the oblique rugae are thinner, closer together and the spaces between them are aciculate-striolate; the sides of the epinotum are more closely and more finely striate. The petiole is a little thicker than in *Braunsi*, especially the node, which is higher dorso-ventrally; the slightly shining basal third or more of the petiole is finely punctate, whereas in *Braunsi* it is striolate. The clypeus in this species is quite differently formed. The median lobe is narrower than in *Braunsi*, ending in a triangular shining area of which the anterior margin is angularly excised; a median longitudinal carina extends from the triangular area to the level of the antennal sockets. On each side of the median lobe there is a strong blunt tooth, and beyond these teeth towards the base of the mandibles the anterior margin is less deeply concave than in *Braunsi*. The first joint of the flagellum is a little longer than the third, and the second joint is a little more than twice as long as the third. The anterior margin of the vertex is a trifle more angular than in *Braunsi*. Otherwise like that species.

♂. 8 mm. long. A considerably more slender insect than the ♀, but with the same elongate second joint of the flagellum and substantially the same colouring. The legs sometimes lack the pale marks on the tibiae which, when present, are darker, yellow instead of yellowish white; the posterior tibiae are always entirely brown, and the anterior femora are sometimes yellowish below, and on the apical third above. Scapes more or less black behind near the base. The pale marks on the thorax are of a deeper yellow than in the ♀, and the scutellum, in addition to the two small spots on its anterior angles, has two large oblong spots of yellow which cover the greater part of its surface. Vertex and mesonotum sparsely, finely and sharply punctured, the punctures bearing long whitish hairs; a fine underlying pubescence is absent. The dorsum and declivity of the epinotum have a different sculpture from that of the ♀, being coarsely reticulate-rugose, the rugae sharp and prominent. The petiole is distinctly more slender than in the ♀, being five times longer than its greatest width, the node being narrow and forming about two-fifths of the whole segment; the petiole is fully as long as the three succeeding segments united. The remaining abdominal segments form an oval complex, half as long again as wide. The median area of the clypeus resembles that of *bipunctatus* ♂, but it is narrower and more produced; the apex is transverse, not angularly emarginate as in the ♀, and there are no lateral teeth. The first and third joints of the flagellum are of about equal length, both about half as long again as wide; the second joint is three times longer than wide and almost twice as long as the first joint, and its under surface is distinctly flattened. Otherwise like the ♀.

Bulawayo and Khami, S.R.; Palapye Road, Bechuanaland; Mossel Bay, C.P., July—October. Types in R.M. coll. (R.M. and T.M. colls.)

T. (Dasyproctus) angusticollis n.sp. (figs. 14, 14 a and b)

♀. 12 mm. long. Black; the following parts pale chrome yellow: the scapes excepting a black streak in the middle behind, an oblong spot on each side of the pronotal collar reaching neither the middle nor the outer angles, the

pronotal tubercles posteriorly, a spot on the extreme anterior angles of the scutellum and a smaller and darker spot behind it, a small elongate spot on each side of the node of the petiole near the apical margin, a transverse spot, widest outwardly, on each side of the second tergite and covering not more than the outer fourth of the segment, and the upper surface of all the tibiae. Mandibles ferruginous at the apex, black at the base and below, lemon yellow at the base above. Coxae, trochanters, femora and tibiae black below, the extreme apices of all the femora and the apical fourth of the posterior tibiae below, ferruginous; tarsi yellowish red, the metatarsi with a streak of yellow on the upper surface. Tegulae ferruginous; wings pale fusco-hyaline, the veins and stigma blackish. Face and clypeus with silvery pubescence. Mandibles shining, long and narrow, with a few long yellowish hairs, and at the base with a deep transverse groove on the upper surface. Vertex and mesonotum with a sparse, very fine, erect and greyish pilosity, intermixed on the mesonotum and anterior half of the vertex with a decumbent, black and very short pubescence. Temples with a sparse silvery pubescence. Sides of thorax, epinotum and base of petiole with a thin, outstanding and white pilosity. Tergites with a very fine pubescence, brownish yellow on the second to fourth, greyish and longer on the last two tergites. The femora sparsely pilose and pubescent.

Clypeus carinate in the middle, the carina ending before the anterior margin in a strong tubercle, plainly visible from above. Below the tubercle the anterior margin is depressed, shining and strongly bidentate; to the side of, and somewhat behind, these teeth there is a raised edge ending outwardly



Fig. 14. *Dasyproctus angusticollis*, ♀, pronotum; a, petiole; b, clypeus.

in an angle. The clypeus is slightly shining and finely punctured, but these features cannot be seen unless the pubescence is removed. The brow of the facial concavity forms an obtuse angle, and behind it the anterior margin of the vertex is shallowly and fairly closely punctured. First joint of the flagellum a little shorter than the third, the second joint three and a quarter times as long as its apical width, and twice as long as the third joint. Sides of pronotum strongly rugose, the mesonotum impunctate. The epicnemial are slightly shining, feebly punctured and pubescent. Scutellum with a few shallow punctures and some short striae on the posterior margin. Metanotum punctate and striolate. Metapleurae and sides of epinotum evenly and transversely striate, the former coarsely, the latter closely and finely so. Dorsum of epinotum closely and obliquely striato-rugose, becoming more or less reticulate-punctate towards the apex of the ill-defined triangular area, the declivity striato-punctate, the median sulcus narrow and shallow. Basal half or less of the petiole shining, feebly striolate. Sternites smooth and shining, each with a pre-apical row of large setigerous punctures, the second sternite also with a few punctures behind, and the sixth sternite finely, sparsely punctured. Pygidial area smooth and shining, shaped like that of *Braunsi* but longer. Ocelli black (in the majority of our species they are hyaline). Lateral foveae on the vertex wide and shallow. Pronotal collar

considerably narrowed anteriorly, so that the anterior margin is hardly two-thirds as wide as the posterior. Petiole slender, three and a quarter times longer than its greatest width, its node fairly low. The rest of the segments form an oblongo-ovate complex, two-thirds longer than wide. Calcaria ochreous, the posterior tibiae with a row of four spines on the outer margin, and with five short ferruginous spines at the apex.

Umtali, S.R. (G. Arnold), February. Type in R.M. coll. A species easily recognised by its large size and by the narrowed pronotal collar and by the shape of the clypeus.

T. (Dasyproctus) bipunctatus Lep. (figs. 15 and 15 a-d). *Ann. Soc. Ent. France*, III, p. 802, ♀. 1834.

Crabro similinus Smith. *Cat. Hymen. B.M.* IV, p. 393, ♀, ♂. 1856.

D. rabiosus Kohl. *Ann. K.K.N.H. Mus. Wien*, IX, p. 283, ♂. 1894.

♀. 7-11 mm. long. Black; scapes, a transverse bar, usually broken in the middle, across the pronotal collar, the pronotal tubercles, a large transverse spot on the scutellum often divided into two, an elongate spot widest outwardly

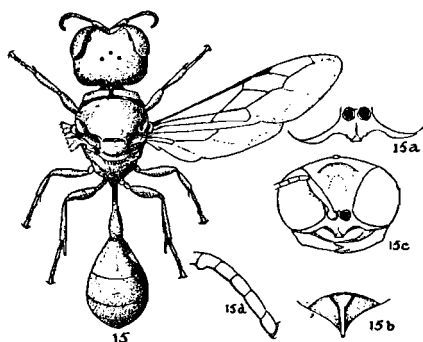


Fig. 15. *Dasyproctus bipunctatus*, ♀; a, ♀, clypeus; b, ♀, pygidium; c, ♂, head; d, ♂, first five joints of flagellum.

on each side of the second tergite, and the basal half of the fifth tergite excepting its sides, pale lemon yellow. Tegulae ferruginous; wings hyaline or very pale fusco-hyaline, the veins and stigma black. Legs ferruginous, the anterior and middle femora at the base and the whole of the posterior femora except the apex, blackish; posterior tarsi dark brown.

Clypeus with a dense silvery pubescence, the temples with a much sparser pubescence of the same colour. Head and thorax with a very fine, long, sparse and greyish pilosity, whiter and denser on the epinotum, basal third of the petiole and on the femora, on the latter intermixed with whitish pubescence. Underlying the pilosity, there is on the vertex and mesonotum a sparse pubescence composed of very short, stiff, black hairs, each one inserted in a shallow puncture (plainly visible with a magnification of 15 diameters). The tergites have a short, inconspicuous and greyish pubescence, and the pygidium a few stiff yellowish white hairs. Clypeus slightly shining, finely punctured, the apex in the middle smooth and shining. The median portion of the clypeus is subcarinate longitudinally, the carina ending in front in a smooth triangular area, the anterior margin of which is straight; a little behind the anterior margin on each side is a small tubercle. Sides of pronotum rugose; epicnemial finely punctured and slightly glossy. Temples and mesopleurae sparsely, feebly punctured. Metapleurae strongly transversely striate, the sides of the

epinotum very closely, finely and transversely striate and nearly dull. Scutellum with a few shallow punctures near the base; postscutellum longitudinally striate and shining between the striae. Dorsum of epinotum with a deep basal transverse groove, which is traversed by about ten short carinae or striae; these are branched posteriorly into several low rugae, diverging outwardly, which form the sculpture of the rest of the dorsum and of the declivity. The dorsum has no distinct median sulcus, nor is a triangular area clearly defined; the median groove of the declivity is narrow and transversely striate. Basal third of the petiole on the upper side glossy, finely punctate and striate. Second joint of the flagellum hardly twice as long as its apical width, a trifle longer than the third joint, the latter as long as the first. Petiole from three and a quarter to three and a half times longer than its greatest width, as long as the two following segments united, plus half of the fourth segment. Sides of the last tergite sparsely and strongly punctured, the pygidial area Y-shaped, slightly shining, not deeply excavated, the apical part very narrow and ending acutely.

♂. 7-9 mm. long. Colour as in the ♀, but the yellow marks on the scutellum are usually absent. The puncturation of the vertex and mesonotum is sparser but much sharper than in the ♀, and the sculpture of the epinotum is stronger, the rugae being wider apart and more prominent. The brow of the facial concavity is finely marginate and distinctly angular in the middle, not arcuate. The clypeus is like that of the ♀, but narrower apically, and the lateral tubercles are obsolete or nearly so. The fore and middle femora are fringed below with long white hairs. The petiole is slightly narrower than in the ♀, fully four times longer than its greatest width, and not quite as long as the two following segments united. The most distinctive character in the ♂ of this species lies in the structure of the flagellum; the apical half of the fifth joint is angularly dilated; the first joint is as long as the third, and the second is one-fourth longer than the first, and barely more than twice as long as its own apical width.

A widely distributed species; I have seen numerous specimens from S. Rhodesia, Transvaal and Cape Province. It also occurs in West Africa and the Belgian Congo. (R.M. and T.M. colls.)*

The forms described hereunder are, in my opinion, only races of *bipunctatus*. The differences are chiefly of colour, slightly so of the sculpture and of the shape of the petiole. The structure of the clypeus and of the antennal joints is essentially the same. The most extreme forms, probably approaching specific distinction, are race *funereus* and race *jucundus*.

bipunctatus Lep., race *funereus* n.r.

♂. 8-10.5 mm. long. Mandibles black, only a very narrow band behind the apex reddish black. Pronotal tubercles dark brownish red; the yellow on the pronotal collar reduced to two small brownish yellow spots. Scutellum immaculate. Fifth tergite immaculate or with only a narrow transverse band of yellow at about its middle. Wings pale fuscous, stigma and veins black. The anterior half of the vertex is much more strongly and more closely

* I wish to thank Dr S. Bengtsson, Curator of the Entomological Museum of the University, Lund, Sweden, for his kind services in settling the synonymy of this species and of *D. Westermanni*. Specimens, compared with the type of *rabiosus* Kohl in coll. H. Brauns, together with specimens of *D. Schönlandi* Cam., were sent to him for comparison with the Dahlbomian types in his charge. As a result of a most careful examination, including measurements of the petiole and flagellum, he has conclusively established the identity of *rabiosus* with *bipunctatus* Lep. Similarly, *D. Schönlandi* Cameron must be placed in synonymy with *D. Westermanni* Dhlb.

punctured than in *bipunctatus*, and the mesonotum and scutellum are also more abundantly punctured. The sculpture of the dorsum of the epinotum is also coarser; the carinae traversing the basal groove are stronger and divide into fewer branches beyond the groove, but, on the other hand, the spaces between them are sharply reticulate-rugose. The metanotum is reticulate-rugose and separated from the scutellum by a wide and deep clathrate groove, much larger than in the type of the species. Across the vertex the head is wider, and the petiole is relatively a little thicker. The structure of the flagellum is the same as in the type of the species, but the clypeus differs appreciably. The median portion is longer and more abruptly narrowed before the apex, so that in some specimens it is produced into a distinct lobe. The abdomen behind the petiole is subovate rather than globose, or one and two-thirds as long as wide. Otherwise like *bipunctatus*, with the femora fringed below with long hairs as in that species.

Vumbu Mts, near Umtali, S.R., ca. 6000 ft. On brambles, in the stems of which it probably nests; February (G. Arnold). Type in R.M. coll. (R.M. and T.M. colls.)

bipunctatus Lep., race *jucundus* n.r.

♀. 10.5 mm. long. This differs from the type of the species as follows. Yellow marks darker, of a chrome rather than a lemon yellow. Pronotal tubercles ferruginous. Yellow marks on the second and fifth tergites as in the type of the species, but in addition the fourth tergite has a transverse band of yellow on each side, covering the outer thirds of the segment. Wings distinctly darker. Punctuation stronger, especially on the vertex in front of the ocelli and on the scutellum, temples and mesopleurae. The basal groove of the epinotum is shallower, with finer transverse carinae. Pubescence of the clypeus pale golden instead of silvery, the apical third of the mandibles bright ferruginous. Petiole relatively shorter, and considerably wider across the node, not longer than the two following segments united and not quite three times as long as its greatest width; the rest of the abdomen subovate as in *funereus*.

♂. 9 mm. long. Sixth tergite with a narrow yellow streak across the middle, otherwise like the ♀ in colour. Hind femora, as well as the fore and middle ones, fringed below with long white hairs, the middle pair much more densely so than in the type of the species. The middle tibiae are also fringed with white hairs on the under side. The punctuation is very much stronger on the head and thorax; on the vertex the punctuation is not so dense behind the ocelli as in front of them, but nevertheless it is more so than in the type of the species. As in the ♀, the petiole is thicker and shorter than in the ♂ of the type of the species, and the remaining segments form an ovate complex.

George, C.P., February; Algoa Bay, February—March (H. Brauns); Ceres and Camps Bay, C.P. (R. E. Turner, B.M. coll.). Type in coll. Brauns. (R.M. coll.)

bipunctatus Lep., race *lichtenburgensis* n.r.

♀, 8 mm. long; ♂, 7 mm. long. This race is very much like the type of the species in nearly all characters except the petiole, which is longer in both sexes. In the ♀ it is three and three-quarter times as long at its greatest width and as long as the two following segments united; in the ♂ it is unusually slender, being nearly five times as long as its greatest width and nearly as long as the three following segments united. The sculpture of the epinotum in the ♀ is relatively finer than in the type of the species.

Lichtenburg, Transvaal, January (H. Brauns). Types in coll. Brauns.

T. (Dasyproctus) Westermanni Dahlbom (figs. 16 and 16 a-c). *Hymen. Eur.* 1, pp. 295 and 511, ♀. 1845.

D. Schönlandi Cameron. *Trans. S.A. Phil. Soc.* p. 226, ♀. 1905.

♀. 8 mm. long. In general appearance this species is very much like *bipunctatus* Lep. but can easily be distinguished therefrom by the structure of the clypeus. The colour pattern is the same except on the scutellum, which usually has a small round spot of yellow near the anterior angles, whereas in *bipunctatus* that colour, if present, is in the form of a transverse bar, often broken into two, across the middle of the segment. The fine black pubescence underlying the longer hairs, which is present on the vertex and mesonotum in *bipunctatus*, is almost wanting in this species, and the puncturation of those parts is larger, sparser and shallow. The dorsum of the epinotum is less oblique, forming with the declivity a subvertical plane. The petiole is three times longer than its greatest width, shorter and stouter than in *bipunctatus*, and is not quite as long as the second and third segments united (by measurement of the type of *Schönlandi*, which I have examined; Cameron erroneously says it is as long as the three succeeding segments united). The median area of the clypeus is longitudinally carinate in the middle, and its anterior margin is excised, with a tooth on each side of the excision; the depth and width of the latter is somewhat variable, but the teeth are always distinct and sometimes quite acute. The pygidial area is Y-shaped, narrower in its basal part than in *bipunctatus*, the stem of the Y being also longer and narrower.

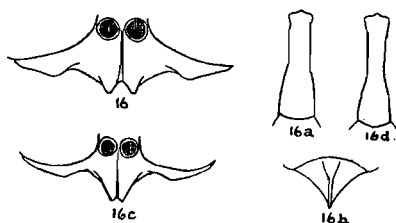


Fig. 16. *Dasyproctus Westermanni*, ♀, clypeus; a, ♀, petiole; b, ♀, pygidium; c, ♂, clypeus; d, race *rhodesiensis*, ♀, petiole.

♂. 7 mm. long. Fifth and sixth tergites with transverse bars of yellow on each side, which almost meet in the middle; the scutellum is entirely black, perhaps not always so, otherwise coloured like the ♀. The puncturation of the head and thorax is much stronger than in *bipunctatus* ♂. The vertex is sparsely punctured behind the ocelli and fairly closely in front of them, where the punctures are large, fairly deep and separated by spaces about three times the diameter of a puncture. These are clearly visible under a magnification of 10 diameters or less. The mesonotum and scutellum are more coarsely punctured than the vertex, the punctures being larger and deeper in front than behind, and on the scutellum somewhat elongated. The transverse sulcus between the scutellum and postscutellum is much wider than in *bipunctatus*. Mesopleurae sparsely but strongly punctured. The dorsum of the epinotum is sculptured very much as in *bipunctatus* ♂, but the sides are striato-rugose and somewhat coriaceous between the striae. The posterior epicnemium is rugose and punctate. The pilosity on the epinotum is shorter than in *bipunctatus*, and the femora lack the fringe of long hairs below.

The clypeus is more concave on each side of the middle than in the ♀, so that the middle area appears to be produced further forwards; it is longitudinally carinate as in the ♀, but the apex is only angularly emarginate, without forming distinct apical teeth. The fifth joint of the flagellum is simple, not

dilated as in *bipunctatus* ♂; the first three joints of the flagellum are of about equal length, the second perhaps a trifle longer than the other two.

Petiole narrower than in the ♀, but shorter and wider than in *bipunctatus* ♂, with the node lower than in that species; it is three and one-fifth times longer than its greatest width and as long as the second and third segments united.

Grahamstown; Willowmore and Algoa Bay (H. Brauns). (R.M. coll.)

The Rhodesian examples of this species should perhaps be separated as a distinct race, race *rhodesiensis* (fig. 16 d), as there is a constant difference in the length of the petiole, which is longer and narrower than in the type of the species. In the ♀ of this race it is three and three-quarter times longer than its greatest width and slightly longer than the two following segments united, and in the ♂ it is fully four times longer than its greatest width and as long as the three succeeding segments united.

S. Rhodesia, a common species. (R.M. and T.M. colls.)

T. (Dasyproctus) Stevensoni n.sp. (figs. 17 and 17 a-d).

♀. 6 mm. long. Black; scapes, an elongate mark on each side of the pronotal collar, pronotal tubercles, a transverse mark on each side of the second tergite and a transverse bar on the fifth tergite, yellow. Tarsi fusco-ferruginous,

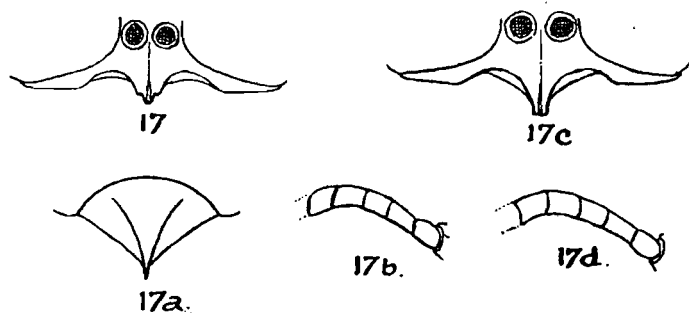


Fig. 17. *Dasyproctus Stevensoni*, ♀, clypeus; a, ♀, pygidium; b, ♀, first five joints of flagellum; c, ♂, clypeus; d, ♂, first five joints of flagellum.

the posterior pair darker, the rest of the legs black with the upper surface of the fore and middle tibiae yellow, and their apices pale ferruginous. Mandibles black, fusco-ferruginous near the apex. Wings hyaline, faintly tinged with fuscous, the stigma and veins brown. Pubescence as in *Westermanni*, the pilosity on the head and thorax short and scanty. Vertex and mesonotum with the same sort of black pubescence which is present in *bipunctatus*, and the sculpture also as in that species. Clypeus feebly carinate in the middle, the carina ending in a short and blunt tooth on the anterior margin. The brow of the facial concavity is feebly marginate and obtusely angular in the middle. First and third joints of the flagellum subequal, the second joint very little longer than the third. Petiole four times longer than its greatest width, and as long as the three following segments united; the rest of the abdomen subglobose, about one-third longer than wide. Pygidial area V-shaped.

♂. 6 mm. long. The vertex in front of the ocelli is sparsely punctured. Epinotum coarsely reticulate-rugose. Median area of the clypeus more strongly produced than in the ♀, subrostrate, the apex transversely truncate. Fifth joint of flagellum simple, the second to fourth slightly flattened below. Otherwise like the ♀.

Bulawayo, July—August, 2 ♀♀, 1 ♂ (R. H. Stevenson). Types in R.M. coll.

T. (Dasyproctus) aurovestitus Turner. *Trans. Ent. Soc. London*, p. 749, ♀. 1912.

"♀. Nigra, opaca; scapo subtus, pronoto angustissime antice, petioleque macula utrinque apicali pallide flavis; pedibus nigris fusco-ferrugineo variegatis; abdomine dense auro-piloso; alis hyalinis, costa anguste infuscata, venis nigris; tegulis fusco-ferrugineis. Long. 12 mm."

"♀. Clypeus with a median carina. Head large, the eyes on the front separated by a distance not quite equal to half the length of the scape; second joint of the flagellum twice as long as the first and fully half as long again as the third. Cheeks as broad as the eyes; posterior ocelli much further from each other than from the anterior ocellus, as far from the eyes as from each other, and more than half as far again from the posterior margin of the head as from each other; the whole head minutely punctured and clothed with fine brownish gold pubescence, a deep sulcus on the inner margin of the eyes near the summit. Pronotum deeply transversely grooved, the anterior margin higher and broader than the posterior. Median segment with a deep median sulcus, the basal triangular area strongly obliquely striated, with fine punctures between the striae; the posterior slope of the segment finely rugulose. Abdomen petiolate, the first segment a little shorter than the second and third combined, as long as the posterior femur and trochanter combined, the apex not nodose, the apical breadth equal to about two-fifths of the length of the segment; the remainder of the abdomen densely clothed with short brownish gold pubescence."

"*Hab.* Uganda, Entebbe (C. C. Gowdey), August. Type in B.M."

"Easily distinguished from other African species by the golden brown pubescence and the almost complete absence of yellow markings on the abdomen. The sculpture of the median segment differs from *kibonotensis* Cam., in which there are no yellow markings, and in that species the pubescence is whitish."

T. (Dasyproctus) frater Dahlbom. *Hymen. Eur.* 1, pp. 295 and 511, ♀. 1845.

The description of this species is totally inadequate, since the author merely says that it is very similar to *Westermanni* and distinguishable by its smaller size and by being entirely black.

Dr S. Bengtsson has informed me that the type does not agree with any of the species sent to him by me for comparison (*i.e.* *Braunsi*, *dubiosus*, "*rabiosus* and *Schönlandi*") and adds, "1 ♀ in the collection, length 5.5 mm.; the second joint of the flagellum very little longer than the third joint; the median lobe of the clypeus is slightly emarginated in the anterior border, something like *Braunsi* but more narrow; petiole three and a half times longer than the greatest width."

The type was taken at the Cape. Out of a very large number of specimens I have seen none which agrees with this species.

T. (Dasyproctus) immitis Saussure. Grandidier, *Hist. Madagasc.* xx, p. 581, ♀. 1892.

"Validus, niger; frontis foveola haud marginate; vitta mandibularum, scapo toto, pronoti maculis transversis 2 maculaque laterali, abdominis 2¹ segmenti maculis 2 calcaribusque tibiarum, sulfureis; tegulis, tibiis et tarsis rufis; tibiis posticis nigris, supra sulfureis; metathorace strigato; petiolo pronoto paulo brevior. ♀. Long. 10 mm.; wing, 7.3 mm."

"♀. Scares black, reddish below. Mandibles ferruginous, black at the base, with a yellow streak above. Epinotum not very strongly striated; the sides of the same densely striated. Petiole mediocre, like that of *D. crudelis*."

The inner face of the femora, the tibiae of the first two pairs of legs and all the tarsi, ferruginous. Calcaria yellow. Posterior tibiae black above, with a band of yellow, widened outwardly, near the apex.

"Central Africa. This species approaches *bipunctatus* Lep. by its size, but is separated therefrom by its coloration."

It is impossible to identify this species by the description. The last line of the Latin diagnosis, "petiolo pronoto paulo brevior," would seem to be due to a slip of the pen, as such a character cannot apply to any member of this genus.

The four following species described by Cameron are unknown to me in nature. *C. erythrotoma* has apparently been seen by Dr H. Brauns, as he refers the species to the *Dasyproctus* group in his "Notes on the Hymenoptera in the Collection of the Transvaal Museum" (*Ann. Trans. Mus.* vol. v, No. 4, 1917); the type, however, has been mislaid, as it is no longer in the collection of the Albany Museum.

T. (Dasyproctus) erythrotoma Cameron. Crabro, *Records Albany Museum*, 1, No. 4, p. 259, ♀. 1905.

"Black, the basal five joints of the flagellum, pronotum broadly behind, tubercles, tegulae, mandibles except at the apex and apical segment of the abdomen, red; the antennal scape, postscutellum, a mark on the first abdominal segment commencing near the middle, dilated more broadly inwardly at the apex, a large mark, three times broader than long, on the third, and the apical half of the fifth, yellow. Two front legs red, their coxae black; middle legs red, the coxae, base of trochanters, femora to near the apex above and the tarsi black, the trochanters yellow below; hind legs black, the tibiae dark red, the trochanters yellow below. Wings hyaline, the nervures and stigma black. ♀. 10 mm. long. Face and clypeus thickly covered with silvery pubescence, apex of clypeus bluntly, shortly trituberculate in the middle. Mandibles bidentate, the upper tooth longer, sharper and not so broad as the lower. Front and vertex closely punctured, the former covered with golden pubescence. Mesonotum opaque, alutaceous, the scutellum more shining, closely, but not strongly punctured. Metanotal area shining, aciculated, the centre with two keels; the space between with transverse keels, all clearly separated; the rest is minutely punctured, and thickly covered with white hair. Pleurae smooth. Basal segment of abdomen about three times longer than it is wide at the apex, nearly as long as the second and third segments united. Apical segment sparsely, but distinctly, punctured above and at the sides, the top clearly margined laterally. Radial cellule short, reaching half-way between the stigma and the apex; the apical abscissa of radius straight, not oblique, transverse cubital nervure received in the middle of the radial cellule; the transverse discoidal shortly, but clearly beyond the middle."

T. (Dasyproctus) kibonotensis Cameron. *Sjöstedt's Kilimandjaro-Meru Exp.* 8, p. 280, ♀, ♂. 1910.

"Black, the hind spurs fulvous yellow, wings hyaline, the nervures black; the recurrent nervure received near the base of the apical fourth of the cellule; metanotal area clearly defined by furrows, the middle closely rugosely punctured, the sides obliquely striated, the rest of the metanotum finely, irregularly obliquely striated; the outer edge bounded by a stout keel, inside of which is a more or less crenulated furrow. Abdominal petiole not much longer than the following two segments united, its apex not nodose, the base aciculated, covered with long white hair. Clypeus keeled down the middle to near the apex, where it is followed by a smooth shining space, which

becomes gradually widened towards the apex. Mandibles with a dark rufous band near the middle. Palpi dark testaceous. ♀ and ♂. Length 7–8 mm.

“Kilimandjaro, Kibonoto, 1300–1900 m. 10 examples.

“The wings have the apical half slightly, but distinctly, tinged with violaceous. Pleural furrows narrow, weakly crenulated. The pubescence on the cheeks, pleurae and sternum is dense and white.”

T. (Dasyproctus) massaicus Cameron. *Loc. cit.* p. 280, ♀.

“Black, a short line on either side of the pronotal furrow, a transverse spot, dilated on the outer side at the base and narrowed on the inner side on the second, a broad band on the fifth abdominal segment, and the hind spurs, pale yellow; wings hyaline, nervures black; the recurrent nervure is received near the base of the apical third of the cellule. Ocelli in a curve, the hinder separated from each other by the same distance as they are from the eyes. Metanotum bordered laterally by a keel; the area is not defined clearly, there is a furrow down its middle, and it is obscurely, finely striated; the apex has a wide furrow; on the inner side of the apex of the lateral keel are a few transverse striae. Abdominal petiole slightly longer than the following two segments united, the apex not dilated, the base with a smooth oval depression in the centre, coarsely aciculated, densely covered with long white hair, the sides bordered by a fine keel. ♀. Length 6 mm.

“Kilimandjaro, Kibonoto, 1000–1200 m.

“Apex of clypeus broadly rounded, not keeled, the extreme apex smooth and shining, with a smooth central spot. Mandibles rufous near the apex. A fine smooth furrow runs from the tegulae to the middle coxae. The inner spur of the hind tibiae is half the length of the metatarsus; its apical half is obliquely narrowed.”

T. (Dasyproctus) Sjöstedi Cameron. *Loc. cit.* p. 281, ♀.

“Black, the antennal scape, an interrupted line on the pronotum, tubercles, a small spot on either side of the scutellum, an oblique spot, roundly narrowed behind, on the sides of the second abdominal segment, a smaller, curved one on the sides of the third, the hind calcaria, and the middle tibiae in front, except at the base, pale lemon yellow; the mandibles, except the teeth, the apex of the fore femora and the fore tibiae and tarsi rufous; wings hyaline, the nervures black; metanotal area smooth at the base, the middle with a stout longitudinal keel, a shorter one on either side of this and two still shorter ones, close to each other, on the outer side; following the central keel is a furrow; the apical part is transversely rugosely reticulated punctured; the sides and apex of the segment coarsely rugosely punctured and densely covered with long white hair. Ocelli in a curve, the hinder pair separated from each other by the same distance as they are from the eyes. Abdominal petiole a little longer than the following two segments united, the apex not nodose, not much dilated. ♀. Length 10 mm.

“Kilimandjaro, Kibonoto, 1300–1900 m.

“Face, clypeus and cheeks densely covered with silvery pubescence; there is a narrow keel between and below the antennae; the clypeus becomes gradually narrowed to a blunt transverse point. The middle joints of the antennae are roundly dilated below. A crenulated furrow runs from below the tegulae to the middle coxae. There are five thin pale spines on the apical half of the hind tibiae; the longer spur of the hind tibiae is half the length of the metatarsus, is broad, knife-like, with the apex roundly narrowed.”

The remarks in this and the preceding description about the “furrow” from the tegulae to the middle coxae, which can only be the meso-metapleural

suture, and the shape of the spurs, are merely confusing, since they are generic characters. The scheduling of generic characters as if they were specific is a fault all too frequent in this author's descriptions, which if stripped of these redundancies, are often found to be quite insufficient for the recognition of the species he attempts to describe.

Genus *THYREOPUS*, species-group *NEODASYPROCTUS*.

CHARACTERS. Whole body shining, head and thorax closely coarsely punctured. Posterior epicnemium entirely obsolete. Pygidial area wide V-shaped, shallow or nearly flat, only feebly marginate at the sides. Petiole stout, feebly clavate. Scapes not carinate longitudinally in front. Brow of the facial concavity not sharply delimited from the vertex. Otherwise like *Dasyproctus*.

Although so much like *Dasyproctus* in general structure, the shining integument and abundant coarse puncturation would alone suffice to separate this species-group from that of *Dasyproctus*.

T. (Neodasyproctus) Kohli Brauns (fig. 18 a-e).

Dasyproctus Kohli Brauns (*nom. in litt.*).

♀. 9 mm. long. Black; a streak across the pronotal collar interrupted in the middle, a small spot on each side of the node of the petiole near the apical

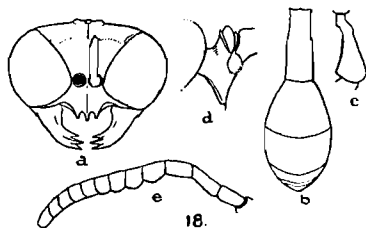


Fig. 18. *Neodasyproctus Kohli*; a, head of ♀; b, abdomen of ♀; c, lateral view of petiole of ♀; d, lateral view of pronotum of ♂; e, flagellum of ♂. (a and d magnified twice as much as b and c; e magnified about $3\frac{1}{2}$ times as much.)

margin, an oblong mark, widest outwardly, on each side of the second tergite beyond the middle, a transverse streak across the middle of the fourth, a broader streak across the middle of the fifth tergite, and the upper surface of the fore and middle tibiae, pale yellow. Wings pale fusco-hyaline, the veins and stigma blackish. Mandibles dirty yellow on the basal half outwardly. Calcaria pale ochreous.

Clypeus and sides of the face with silvery pubescence. The vertex, temples and upper surface of the thorax clothed with a long, fairly abundant, brownish pilosity, the pleurae, sternum and base of the petiole with whitish pilosity. The second to sixth tergites with a sparse and fine greyish pubescence, the legs with similar pubescence and also some longer hairs on the femora.

Clypeus closely and finely punctured; facial concavity smooth and shining, the rest of the head strongly punctured and shining between the punctures. The puncturation on the vertex is dense in front, larger and sparser behind, especially between the ocelli and the eyes. At the base of the temples the puncturation is somewhat sparse. Neck and sides of the pronotum reticulate-punctate and dull, the collar shining and impunctate above. Mesonotum, scutellum and mesopleurae closely and deeply punctured, the punctures smaller and closer together on the anterior half of the mesonotum, where the sculpture is almost reticulate-punctate. Metanotum more finely punctured

than the scutellum. Dorsum of epinotum closely and strongly punctured, shining, almost vertical, very short and merging rapidly into the declivity. At its base there is a transverse and clathrate groove, and medially from the base to the bottom of the declivity there is a deep, narrow and transversely striated sulcus. The metapleurae and sides of the epinotum are transversely striated, the former coarsely, the latter finely and closely. Abdomen very shining, sparsely and microscopically punctured above. Mandibles tridentate at the apex, the inner margin edentate. Anterior margin of the clypeus strongly tridentate in the middle. Facial concavity shallow, its brow not marginate, and seen from above, only feebly concave. Vertex depressed on each side of the posterior ocelli. The distance between the posterior ocelli somewhat less than their distance from the eyes. Scapes without a longitudinal carina in front. First joint of the flagellum a trifle longer than the third, the second joint twice as long as wide at the apex and about one-fourth longer than the first. The median portion of the pronotal collar, between the carinae forming the anterior and posterior margins, is compressed and distinctly elevated, not flat as in *Dasyproctus* s.str. Petiole distinctly different from the form exhibited in *Dasyproctus* s.str. It is feebly clavate, the apical two-thirds almost parallel-sided or only very slightly amplified towards the apex, and not much wider than the basal third. The node is therefore not apparent when the petiole is seen from above, but seen from the side it is high, its depth being equal to half the length of the segment. The petiole is only two and a half times as long as its greatest width and about one-fourth longer than the second segment. The second and following segments form an oval complex, about two-thirds longer than wide. Pygidial area widely V-shaped, finely punctured and shining, the sides of the pygidium with a few large punctures. Posterior tibiae with a row of three minute spines on the outer margin.

♂. 8 mm. long. The yellow maculae on the first two abdominal segments much reduced, the remaining segments immaculate. Otherwise in colour, sculpture and pubescence like the ♀. Mandibles bidentate at the apex, the inner margin edentate. The teeth of the clypeus shorter than in the ♀. Flagellum distinctly bent between the second and third joints and slightly so between the first and second. The first joint is half as long again as wide at the apex, the second is two and a half times as long as wide and a quarter longer than the first; the third joint is as long as the first and the fourth, fifth and sixth joints are convexly enlarged below. The abdomen beyond the petiole is more elongate than in the ♀. Otherwise like that sex.

Willowmore, C.P., November, nesting in hollow stems (H. Brauns). Types in coll. Brauns.

The species about to be described hereunder, *Thyreopus Slateri*, falls within the section "Subgen. *Crabro* A. Morawitz" in Kohl's key in his work on "Die Crabronen der paläarktischen Region" (1915, p. 20, par. 6). In the absence of the ♂ sex it is not possible to say with any certainty to which of the two major species-groups, *Ceratocolus* and *Crabro* Kohl, it should belong. However, if one may judge by the shallow foveae on the vertex, the coarse sculpture of the thorax, especially of the mesopleurae, and the presence of the lateral carinae on the first tergite, I should be inclined to place it in *Crabro* Kohl, and in the subdivision *Clytochrysus* A. Morawitz. The shape of the clypeus is very much like that of the European *C. cavifrons* Thoms.

T. (Clytochrysus?) Slateri n.sp. (fig. 19 a-d).

This insect is larger than any other Thyreopid hitherto described from our region, and is quite distinct from all of them also on account of the colour and sculpture.

♀. 14 mm. long. Mandibles, clypeus and the temples below dark ferruginous or castaneous, the apical teeth and inferior outer margin of the mandibles black. Face, vertex and occiput very dark fusco-ferruginous, almost black. Neck of pronotum black; the collar, tegulae, mesothorax, metapleurae and the junction of the sides and dorsum of the epinotum dark ferruginous, the rest of the thorax darker or almost black, but with a tinge of ferruginous when viewed in some lights. Abdomen black, the apical margins of the segments narrowly fusco-testaceous, the pygidium piceous, the first tergite diffusely fusco-ferruginous at the middle of the lateral margins. Coxae and trochanters black, the legs ferruginous, with the anterior femora more or less blackish below. The anterior and middle femora are compressed from back to front, the anterior pair with the outer face distinctly marginate above and below, the middle femora obtusely angulated and widest a little beyond the base. The outer face of all the femora is coarsely scabrous, and of the posterior femora also spinose. Scapes and first joint of the flagellum ferruginous, the remaining joints black. Wings pale flavo-hyaline, the apical half moderately fuscous, the veins brownish yellow. Clypeus and sides of the face with a dense

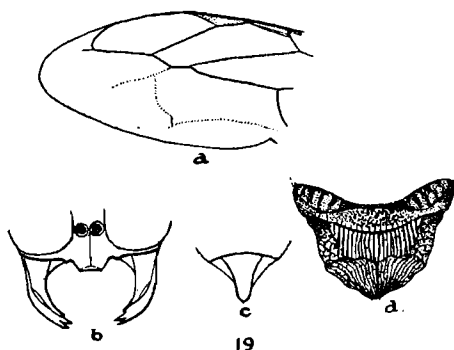


Fig. 19. *Thyreopus Slateri*, ♀; a, apical half of forewing; b, clypeus; c, pygidium; d, metanotum and epinotum.

silvery pubescence, the rest of the head with only a microscopic and sparse pubescence. The facial concavity is smooth and shining, and is continued backwards as a shallow impression almost as far as the anterior ocellus. The vertex is dull, very closely and exceedingly finely punctured, the puncturation on the lateral foveae somewhat larger. The temples are dull and almost smooth, at least only microscopically punctured. The thorax, except the scutellum and mesonotum posteriorly, is glabrous and dull, and all the sutures are very sharply defined. Neck and sides of pronotum strongly and obliquely striate, the anterior face of the collar smooth, the dorsum of the collar finely punctured. The pronotum resembles that of the *Dasyproctini*; its dorsum is deeply and narrowly impressed longitudinally in the middle, and the anterior edge is sharply marginate. The mesonotum at the sides and in front is deeply and closely reticulate-punctate, the reticulations large and irregular; posteriorly and in the middle, like the scutellum, the reticulation is obliterated, the punctures becoming larger and further apart, with the smooth spaces between them shining. The disc of the metanotum is more finely sculptured than the scutellum; its sculpture consists of a distinct puncturation which becomes smaller and somewhat reticulate posteriorly, with short, longitudinal and evenly spaced striae on the posterior margin. The lateral portions of the metanotum are strongly and widely clathrate. Sides of thorax very sharply and transversely, in part diagonally, striato-rugose; the rugae are very regular,

widest apart on the metapleurae. On the mesopleurae anteriorly the rugae become somewhat reticulate, and below, near the sternal surface, they are intermixed with large elongate punctures. Mesosternum smooth and shining, coarsely and sparsely punctured. Epicnemium finely punctured and somewhat shining. Dorsum of epinotum longitudinally and sharply rugose (about 20 rugae), the declivity more closely and also longitudinally rugose, the rugae diverging fanwise from the bottom upwards; the upper portion of the sides and declivity, at their junction with the dorsum, coarsely and widely reticulate-rugose. Abdomen ovoid, the first five segments much wider than long. Tergites 1-5 dull, covered with a very fine, adpressed, dense and grey pubescence, closely and fairly finely punctured, the punctures decreasing in size on each successive tergite, their apical margins more finely punctured than the rest of the segment. First tergite with a distinct carina on each side, from base to apical margin, separating the dorsal portion from the lateral pieces folded underneath. Pygidial area widely V-shaped, shining, sparsely and coarsely punctured, only shallowly excavated, the apex widely rounded, the sides sharply marginate. Second sternite dull, closely and finely punctured at the sides, the middle strongly and sparsely punctured and shining. Sternites 3-5 shining, microscopically rugulose, with a row of pre-apical punctures and a few scattered punctures at the sides. Sixth sternite shining at the base, the apical half strongly and closely punctured. Mandibles tridentate at the apex, the uppermost tooth small and inconspicuous; the outer face of the mandibles is coarsely striato-punctate at the base. Median area of clypeus subcarinate longitudinally and produced into a short lobe with the anterior margin transverse. First joint of flagellum two-thirds as long as the second, the second and third subequal and longer than wide, the fourth as long as wide, the fifth to tenth wider than long, the apical joint a little longer than wide. The brow of the face is rounded; the lateral foveae on the vertex are shallow and extend back to the level of the posterior margin of the ocelli. The latter are arranged in a low isosceles triangle, and the posterior pair are very slightly nearer to each other than they are to the eyes. Seen from the side, the temples are wider than the eyes, and their inferior margins are feebly carinate. The eyes do not quite reach the base of the mandibles, so that a very short cheek is present. Dorsum of the epinotum shorter than the scutellum, oblique. The declivity has a very narrow median longitudinal sulcus. Radial cell of forewing rounded at the apex, without an accessory cell; the transverse cubital vein meets the radius at about its middle. The recurrent vein meets the cubitus well beyond its middle, so that the first abscissa of the cubitus is four and a half times longer than the second. Basal lobe of hindwing small, only a little longer than half the submedial cell.

Palm Grove, Victoria Falls, December (G. Arnold). 1 ♀, type in R.M. I have pleasure in naming this striking species in honour of Mr Slater, my host during a short visit to the Falls.