# TRANSVAAL MUSEUM 

# THE SPHEGIDAE OF SOUTH AFRICA 

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Part V<br>With 2 plates and 42 text-figures

## PISON Group

General characters. Eyes reniform, their inner margins deeply sinuate; ocelli normal. Outer margins of the mandibles barely excised (distinctly excised in the American Pisonopsis Fox). Maxillary palpi six-, labial palpi four-jointed. Pronotum with a distinct collar, the pronotal tubercles do not extend back to the tegulae. No epicnemium present. Dorsum of epinotum simple, if with a median field, the latter is not distinctly marginate. Middle tibiae with only one spur. Middle coxae not contiguous. No tarsal comb present.

This group comprises four genera, Pison, Trypoxylon, Aulacophilus and Pisonopsis, of which only the first two are African.

Pison Jurine<br>in Spinola, Ins. Ligur. spec. nov. II, p. 255. 1808.

Characters. Inner margins of the eyes slightly convergent above. Temples moderately wide. Pronotal collar as high as the mesonotum. Episternal suture distinct. Dorsum of epinotum rounded posteriorly, without a median field, usually with a deep median longitudinal impression. Apical margins of the tergites usually strongly impressed. No pygidial area present.

Fore wing: radial cell lanceolate and entire. Three cubital cells present, or (subgenus Pisonoides Smith) only two; in the former case the second is very small and stalked on the radius, and in the latter case, the true second cubital cell has been obliterated. Two discoidal cells and two recurrent veins present; the first recurrent enters the first cubital cell and the second enters the third cubital, or the second in those cases where the true second cubital cell has disappeared.

Hind wing: the retinaculum (the row of small hooks which attach the hind wing to the fore wing) is not continuous, but broken into two parts;
the cubital vein arises beyond the end of the submedial cell; the basal lobe is small and elliptical. Legs very feebly spinose.

Distribution. Both hemispheres.
These wasps nest in hollow twigs, old beetle-holes in timber and in similar situations, or build clay cells attached to stems of plants. The nests in hollow twigs etc. have the cells separated by clay walls. The young are provisioned with spiders.

## KEY TO THE SPECIES OF PISON.

(4) I. Apical half or more of the abdomen in the $q$ red or brownish yellow.
(3) 2. Only two cubital cells present; apical half of abdomen brownish yellow.
testaceipes Turner
(2) 3. Three cubital cells present; last two or three abdominal segments red. xanthopus Brullé
(1) 4. Whole body black, or at least only the apical margins of the abdominal segments narrowly testaceous (except carinatum ${ }^{\circ}$ in which segments 4-7 are ferruginous).
(6) 5. Only two cubital cells present, the true second either entirely obliterated or represented by a short stump of the transverse cubital cell. ${ }^{\circ}, 5 \mathrm{~mm}$. long.
denticeps Cameron
(5) 6. Three cubital cells present, the second stalked on the radius.
(16) 7. Head and thorax dull, finely and closely punctured.
(9) 8. $\uparrow$, epinotal dorsum very strongly striated longitudinally.
multistrigatum Turner
(8) 9. Dorsum of epinotum not longitudinally striated.
(15) 10. + , clypeus without a carina on its basal half, or with only a low swelling.
(i2) if. ${ }^{\circ}$, anterior margin of clypeus gradually narrowed towards the middle, which ends in a minute triangular tooth.
clypeatum Cameron
12. Clypeus differently formed.
(14) 13 . $\circ$, anterior margin of clypeus with the sides oblique, the middle distinctly angular; second sternite more finely punctured than the third.
strigulosum Turner
(13) 14. ㅇ, clypeus with a low swelling at the base, the anterior margin convex; second sternite not more finely punctured than the third; $\delta$, anterior margin of the clypeus concave on each side, the middle produced into a triangular point. (The distance between the posterior ocelli and the eyes is equal to one-third of the diameter of the ocellus in the $q$, and to one half in the $\sigma^{t}$.)
transvaalensis Cameron
(10) 15. ㅇ, clypeus with a low carina on its basal half, the anterior margin subtruncate at the apex; $\delta$, the anterior margin as in the $q$ but more produced; abdominal segments 4-7 ferruginous. carinatum Turner
(7) 16. Head and thorax strongly punctured, the thorax more or less shining between the punctures.
(22) 17. $\rho$ and $d^{\prime}$, posterior ocelli separated from the eyes by a distance exceeding the diameter of an ocellus.
(19) 18. ${ }^{\text {on }}$, second cubital cell very minute or obliterated (median groove on the dorsum of the epinotum distinctly forked at the base).
inequale Turner
(18) 19. $\circ$ and ${ }^{\gamma}$, second cubital cell present, not very small.
(21) 20. Median groove of the epinotum barely forked at the base, or not at all; pilosity and pubescence whitish.
allonymum Schultz
21. Median groove distinctly forked at the base; pilosity and pubescence yellowish.
allonymum, race karrooensis Arnold
22. 와 and $\delta$, posterior ocelli separated from the eyes by a distance not greater than the diameter of an ocellus.
montanum Cameron
P. allonymum Schultz (fig. 1). Spolia Hymen. p. 213. 1906.
P. rhodesianum Bischoff. Archiv f. Naturg. p. 75, ㅇ. 1913.
P. iridipennis Cameron (nec Smith). Rec. Albany Mus. p. 261, ठ. 1905.

ㅇ. 8-9 mm. long. Black, the tarsi dark brown. Head, thorax, first tergite and base of second tergite with a fairly long, outstanding, whitish or silvery pilosity, more dense on the face and temples than elsewhere; second and following abdominal segments with a fine decumbent pubescence of the same colour, fairly dense on the sides and apical margins where it forms transverse fasciae. Legs with a fine adjacent pubescence.

Head dull, clypeus punctate-rugulose, face irregularly and closely punctured, the punctures smallest in the neighbourhood of the antennal sockets and ocelli. Vertex, occiput, thorax and first tergite shining,


Fig. i. Pison allonymum, 9 , head. , 2. ", clypeatum, $\delta$, head. ", 3. ", montanum, 유, head. deeply and fairly coarsely punctured, the punctures about half as wide as the spaces between them. Second tergite shining, more finely punctured than the first, but still fairly strongly so, the remaining tergites becoming progressively duller and more finely and closely punctured. Sternites shining, finely punctured, the second more strongly punctured than the rest. Apical margins of the first and second tergites impressed in the middle. Dorsum of epinotum with a shallow median longitudinal impression, widest at the base, transversely striate and ending at the brow of the declivity; the latter has a narrow median sulcus. Clypeus wider than long, feebly convex, the anterior margin obtusely angular in the middle. Inner margins of the mandibles without teeth. The face is moderately hollowed out on each side of the antennal sockets, and the emargination of the eyes is about as deep as wide. The distance between the posterior ocelli and the eyes is fully one and a half times the diameter of the ocellus. Interocular distance on the vertex equal to the length of the second, third and fourth joints of the flagellum. The first joint of the latter is as long as wide, not quite half as long as the second, the latter a little longer than the third and twice as long as wide at the apex. Temples at their widest about two-thirds as wide as the eyes, seen from the side. Pronotal collar short, slightly tumid in the middle, rounded at the sides, its anterior face vertical. The petiole of the second cubital cell is longer than that cell is high. Apical margin of the wings moderately infuscated.
$\delta$. 8 mm . long. Second joint of the flagellum barely twice as long as the first, the latter a trifle wider than long. The interocular distance on the vertex is equal to the length of the first four joints of the flagellum plus half of the fifth joint. The distance between the posterior ocelli and the eyes is equal to twice the diameter of one ocellus. Seventh sternite arcuately emarginate, the lateral angles dentiform. Otherwise like the $\%$.

## P. allonymum, race karrooensis n.r.

ㅇ. Slightly larger and stouter than the type of the species. The puncturation is deeper, especially on the dorsum of the epinotum where most of the punctures are elongate; the median sulcus is distinctly forked at the base and much more strongly striated than in allonymum. The pubescence and pilosity are markedly different, being of a yellowish tinge. The clypeus is
longer or more produced in front and the apical angle of the anterior margin is more acute. The distance between the posterior ocelli and the eyes is greater, being equal to twice the diameter of one ocellus. Abdomen stouter, the second and third segments wider, two and a third times wider than long (not more than one and three-quarter times wider than long in the type of the species).
$\sigma^{\circ} .8 \mathrm{~mm}$. long. The clypeus is much more abruptly produced than in the $q$ or than in the $\delta^{*}$ of the type of the species, so that the anterior margin is acutely toothed in the middle. The distance between the posterior ocelli and the eyes is equal to two and a half times the diameter of one ocellus. Otherwise like the type of the species.

Willowmore, C.P., i $\uparrow$, 1 t. Types in coll. Brauns.
P. montanum Cameron (fig. 3). Sjöstedt's Kilimandjaro-Meru Exp. p. 289, ot. 1910.

ㅇ. 7. $5^{-9} \mathrm{~mm}$. long. Closely allied to allonymum from which it differs as follows.

Pilosity a little less abundant and shorter. Sculpture of the face stronger, consisting of a reticulate-puncturation. Vertex not more coarsely punctured than the face. Puncturation of the thorax closer, less shining between the punctures. The dorsum of the epinotum, in addition to the puncturation, has a superficial and oblique striation, and the median groove has a carinula which almost reaches the apex of the dorsum. The abdomen is relatively more finely punctured, and the apical impressions of the tergites are shallower. Although the lengths of the joints of the flagellum are in the same proportion as in allonymum, yet the antennae as a whole are longer and more slender. The distance between the posterior ocelli and the eyes is not greater than the diameter of an ocellus, and the interocular distance on the vertex is hardly equal to the length of the first three joints of the flagellum. The pygidium is less acute than in allonymum. The pronotal collar is longer, and is not shorter at the sides than in the middle, distinctly shorter and more rounded off in the other species. The apical margin of the wings is less infuscated. Otherwise like allonymum.

ठ. $7^{-8} \mathrm{~mm}$. long. This differs from the ${ }^{t}$ of allonymum in the same characters as in the other sex.

Bulawayo, Matopos and Victoria Falls, S.R., October to June; Willowmore, C.P. (Brauns); Kibonoto, 2000 metres, Kilimandjaro.

The type is a $\sigma$ and not a $q$ as stated in Cameron's description.
"Black; covered with silvery pubescence; the apical three or four joints of the tarsi rufo-testaceous; the tegulae fuscous; wings hyaline; the stigma and nervures black; the pedicle of the second cubital cellule shorter than the nervures, which are roundly curved, the first a little longer than the second; the cellule is moderately large and is longer along the transverse cubitals than along the cubitus; the first recurrent nervure is received very shortly before the transverse cubital; the second is interstitial and broadly, roundly curved; the first abscissa of the radius is twice the length of the second; base of metanotum (i.e. epinotum) with a straight central and four or five irregular stout oblique striae; the central furrow is about four times longer than wide and is aciculated; the basal part of the metanotum is strongly aciculated, and the metapleurae strongly, closely, obliquely striated; pro- and mesonotum finely, closely punctured; their pleurae much more strongly punctured; the longitudinal furrow on the mesopleurae wide, slightly curved, closely punc-
tured; there is a narrower furrow at its base, extending above and below it; base of abdomen very finely, minutely punctured. Length 7 mm . Warmberg, Zoutpansberg District. Oct. Clypeus in the centre gradually narrowed to a sharp point; the sides broadly, roundly curved inwardly; mandibles broadly red in the middle; the third joint of the antennae is fully one-fourth longer than the fourth."

The type of this species is in the Transvaal Mus. coll. The following additional notes have been drawn up from an examination of the type.

Mesonotum much more finely punctured than in allonymum, and a shade finer than in transvaalensis Cameron, and, unlike the latter, it is slightly shining between the close set punctures. Epinotum nitidulous, finely and sparsely punctured, with a deep median longitudinal groove, much wider than in the two species mentioned above, traversed in its basal half by a carina from which radiate oblique and strong striae which extend beyond the groove almost as far as the lateral margins of the dorsum; the apical half of the groove has two or three transverse striae. The declivity is transversely and strongly striate, much stronger than in transvaalensis. Sides of epinotum shining, finely punctured.
P. inaequale Turner. Proc. Zool. Soc. London, iv, p. 623, ô. 1916.
" ${ }^{\text {or }}$. Niger; mandibulis apice fusco-ferrugineis; tegulis calcariisque brunneis; alis hyalinis, apice late infuscatis, iridescentibus, venis nigris; cellula cubitali secunda minutissima aut obliterata. Long. 7 mm ."
" $\%$. Clypeus broad, produced into a short spine in the middle of the apical margin; clothed with silver pubescence, which extends on the front as high as the emargination of the eyes. Second joint of the flagellum very slightly longer than the third; eyes separated on the clypeus by a distance half as great again as that separating them on the vertex; posterior ocelli as far from the eyes as from each other, separated from the eyes by a distance exceeding the diameter of an ocellus. Front closely punctured-rugose, the frontal sulcus obsolete, except just below the anterior ocellus, the vertex closely and rather coarsely punctured. Pronotum short, as in P. ater; mesonotum and scutellum coarsely punctured, but less closely than the vertex, more coarsely than in $P$. ater; pleurae very closely punctured, but more finely than in $P$. ater. Median segment with a deep median sulcus which is very widely forked close to the base, enclosing a very small basal area, the branches of the sulcus obliquely striated, the main sulcus extending to the apex of the segment, with a strong median carina not quite reaching the apex; on each side of the sulcus the segment is very closely and finely punctured, with numerous, fine irregular striae; the apical slope coarsely punctured-rugose, with a deep median sulcus. Abdomen finely punctured, the segments moderately depressed at the apex, the apical bands of white pubescence well defined laterally, but not distinct in the middle, the basal segment more sparsely and strongly punctured than the second, the apical segments very closely and minutely punctured; the ventral segments more sparsely but evenly punctured; apical ventral segment very shallowly emarginate, the angles not produced into points. Second abscissa of the radius very short, second cubital cell obliterated on the left side, very minute on the right, second recurrent nervure on the right side interstitial with the second transverse cubital nervure, the first received before the apex of the first cubital cell. Basal and transverse median nervures interstitial.

Hab. Mlanje, Nyasaland (S. A. Neave), 2300 ft., October.
Very near ater and rhodesianus ( $=$ allonymum Schultz), but differs in the sculpture, especially on the thorax and median segment; also in the
reduction of the second cubital cell. It also differs in these characters from montanus. There is no impressed line behind the posterior ocelli."

## P. strigulosum Turner. Ann. Mag. N.H. xix, No. 109, p. 110, 9.1917.

" $ᄋ$. Nigra; fronte argenteo-pubescente; mandibulis, femoribus apice, tibiis tarsisque ferrugineis; tegulis testaceis; alis hyalinis, iridescentibus, venis nigris, segmento mediano basi oblique, apice transverse striato. Long. 8 mm ."
"ㅇ. Clypeus without a carina, broad, the apical margin slightly oblique on the sides and forming a distinct angle in the middle. Head opaque, a distinct frontal sulcus reaching the anterior ocellus. Front broad, the eyes at the base of the clypeus more than half as far again from each other as on the vertex. Posterior ocelli nearer to the eyes than to each other; second joint of the flagellum distinctly longer than the third. Thorax minutely and closely punctured, the pronotum and mesopleurae clothed with short silver pubescence. Median segment obliquely striated at the base, the striae becoming rather finer and more transverse towards the apex, the apical slope coarsely transversely striated; at the base of the segment is a very small triangular space enclosed by sulci; from the apex of the triangle a longitudinal transversely striated groove runs to the apex of the segment, and is continued after a narrow interruption on the apical slope. Abdomen finely punctured, somewhat pubescent, the three basal segments shallowly depressed on the apical margin; second ventral segment microscopically punctured, more finely than the third; second to fourth ventral and third to fifth dorsal segments very narrowly pale testaceous at the apex. The third cubital cell as long on the radius as the petiole of the second cubital cell; recurrent nervures received just before the first and second transverse cubital nervures.

Hab. Gold Coast, Tamale (Dr C. E. S. Watson).
This belongs to the group of P. xanthopus Brullé, but may be distinguished by the less oblique striation of the median segment, the colour of the pubescence on the front, and the shape of the clypeus."
P. transvaalensis Cameron (figs. 4, 5). Ann. Transvaal Mus. 11, p. 152, ठ'. 1910.
9. $6-7.5 \mathrm{~mm}$. long. Black; clypeus and lower half of face with silver pubescence. The pronotal collar and sides of epinotum with similar pubescence. The first four tergites with narrow apical bands of silvery pubescence. A long pilosity is entirely absent. Head and thorax, excepting the epinotum, dull, very closely, minutely and evenly punctured, the spaces between the punctures aciculate, the mesopleurae below also finely rugoso-punctate. The sculpture is most minute on the clypeus and metanotum, strongest on the mesonotum. Dorsum of epinotum with a median longitudinal and carinate furrow, forked close to the base, the lateral branches strongly striate. The dorsum on each side of the median furrow is obliquely striate, the spaces between the striae punctate, the declivity transversely and strongly striate, and the sides obliquely striolate but almost smooth and feebly punctured at their middle. Abdomen nearly dull above, slightly shining below, closely, evenly and finely punctured, the punctures becoming progressively smaller towards the apical segment. Clypeus with a low swelling in the middle, not reaching the convex apical margin. Face distinctly tumid above the antennal sockets. Interocular distance on the vertex equal to the length of the first two joints of the flagellum. The distance between the eyes and posterior ocelli is not more than one-third of the diameter of one ocellus. First joint of the flagellum longer than wide, two-thirds the length of the second, the
latter a little shorter than the third. Temples fairly narrow. Pronotal collar convex in front, hardly longer in the middle than at the sides. Dorsum of epinotum twice as wide at the base as long in the middle. Abdomen ovatelanceolate, the segments only feebly impressed at the apical margins. Wings hyaline, the veins black, the apical margin very narrowly infuscate.
$\delta .7 \mathrm{~mm}$. long. Anterior margin of the clypeus concave on each side of the middle which is produced into a narrow and acute triangle. Interocular distance on the vertex equal to a little more than the length of the second and third joints of the flagellum. The distance between the posterior ocelli


Fig. 4. Pison transvaalensis, of.


Fig. 5. Pison transvaalensis, ${ }^{*}$, 우.
and the eyes greater than in the 9 , equal to half the diameter of an ocellus. Eighth sternite arcuately emarginate, the lateral angles prominent. Otherwise like the 9 .

Bulawayo, Khami and Lonely Mine, S.R., November to March; Pretoria.
I have no doubt that I have correctly identified Cameron's species, having seen a specimen from the Trans. Mus. coll., bearing a label "var. of transvaalensis type." There is a $q$ specimen in the B.M. coll. also labelled as the type. It is evident that Cameron wrongly indicated the sex of the type as male, since it is only in the female that the anterior margin of the clypeus is convex. The close puncturation suffices to separate this species from the other two South African members of the genus.
P. carinatum Turner. Ann. Mag. N.H. xix, No. 109, p. 111, \&, ó. 1917.
" $q$. Nigra; mandibulis in medio fusco-ferrugineis; calcaribus pallide testaceis; alis hyalinis, margine apicali leviter infuscatis; fronte argenteosericeo, abdomine segmentis dorsalibus 1-3 margine apicali albido pubescentibus.

ठ. Feminae similis; tarsis rufescentibus; segmentis abdominalibus 4-7 rufis; segmento dorsali septimo lato, deflexo, apice subtruncato. Long., ㅇ, 7, ot $^{\prime}, 6 \mathrm{~mm}$."
" $q$. Clypeus with a low longitudinal carina on the basal half, broadly subtruncate at the apex. Head opaque, with a delicate longitudinal sulcus on the front half reaching to the anterior ocellus. Eyes more than half as far again from each other at the base of the clypeus as on the vertex; posterior ocelli a little nearer to each other than to the anterior ocellus, further from each other than from the eyes; second joint of the flagellum a little shorter than the third. Thorax closely and minutely punctured, more strongly on the mesopleurae than on the mesonotum; median segment finely obliquely striated, depressed longitudinally in the middle, with a distinct longitudinal carina, the apical slope transversely striated, the sides of the segment finely and closely punctured. Abdomen on both surfaces closely and microscopically punctured; sixth dorsal segment broadly triangular, convex, subcarinate longitudinally in the middle. The position of the recurrent nervures and also the length of the third cubital cell on the radius show much variation in this species.

The male has the clypeus more produced in the middle than in the female, but has the carina at the base; the eyes are a little further apart on the vertex, the second joint of the flagellum is fully as long as the third. The broad form of the seventh dorsal segment is remarkable.

Hab. Ashanti, Obuasi, April, February; Uganda, September and March; Egypt and Sierra Leone.
...The present species may possibly be obscurus Shuck., but the type of that species is lost and the description gives the pubescence of the front as golden, as in xanthopus."
P. multistrigatum Turner. Loc.cit. p. 109, ㅇ.
"ㅇ. Nigra; palpis testaceis; calcaribus unguiculisque ferrugineis; alis hyalinis, apice leviter infumatis, venis fuscis; segmento mediano fortiter longitudinaliter striato. Long. 9 mm ."
"오. Clypeus broadly truncate at the apex, clothed with silver pubescence. Head opaque, finely punctured; eyes separated at the base of the clypeus by a distance about equal to three times the length of the scape, but by only about half that distance on the vertex; second joint of the flagellum distinctly longer than the third and about twice as long as the first; posterior ocelli about twice as far from each other as from the eyes. Thorax subopaque, finely and closely punctured; the pronotum transverse, a little depressed on the posterior margin. Median segment very coarsely longitudinally striated; the sides of the segment finely horizontally striated, with fine punctures between the striae; posterior slope transversely striated, with a deep median sulcus. Abdomen shining, very finely punctured, the segments rather feebly depressed at the apex; second ventral segment more sparsely punctured in the middle than on the sides; the apical angles of the dorsal segments with a little white pubescence. First recurrent nervure received close to the apex of the first cubital cell, second at the apex of the second cubital cell, almost interstitial with the second transverse cubital nervure. Third cubital cell shorter on the radius than the petiole of the second cubital cell.

Hab. Nyasaland, Mlanje (S. A. Neave), February.
Differs from all other species known to me by the very strong longitudinal striation of the median segment."

## P. xanthopus Brullé. (Nephridia xanthopus.) Ann. Soc. Ent. France, II, p.408,

 ㅇ. 1833 .I have not seen examples of this tropical African species. Turner in his paper on the genus (Proc.Zool.Soc.London, p. 621, 1916) makes the following observations on the species.

A widely ranging African species in which the median segment is strongly obliquely striated, the three or four apical abdominal segments in the male more or less red; the clypeus in the male is somewhat angular in the middle of the apical margin, but not produced into a tooth, that of the female very broadly rounded or subtruncate; the posterior ocelli further from each other than from the eyes, separated from the eyes by less than the diameter of an ocellus. The position of the second recurrent nervure is variable.

Hab. Egypt, Uganda, Ashanti and Sierra Leone.
P. denticeps Cameron. Ann. Transvaal Mus. in, p. 153, ô. 1910.
"Black; covered with silvery pubescence; the apex of the clypeus with a distinct triangular tooth in the middle; wings hyaline, the nervures black; the first transverse cubital nervure roundly oblique; the short second either entirely obliterated or indicated by a stump in front; the first recurrent nervure received in the apex of the first cubital cellule; the second interstitial broadly, roundly curved; the second abscissa of the radius about one-fourth of the length of the first; the metanotum has on either side of the base a strongly crenulated furrow, narrowed outwardly; the longitudinal furrow is wide, longish triangular, finely, closely, obliquely striated, and with a fine keel down the middle; the apical slope is more strongly, transversely striated; the sides bordering the basal furrow are finely, closely, rugosely punctured and irregularly striated, especially on the basal half; metapleurae finely, closely striated, the striae rounded at the base; head, pro- and mesothorax finely, closely punctured; the base of the abdomen is finely, closely punctured.

Male. Length 5 mm . Transvaal.
The third and fourth joints of the antennae are equal in length; the spurs are fuscous, at least at the base."

Of this species Turner remarks, "This species may be distinguished from xanthopus by the finer striation of the median segment, the less constricted abdominal segments, the apical ventral segment is produced into two points as is usual in the genus, not into one only as in xanthopus; the clypeus also has a distinct spine at the apex, and the front is more distinctly convex. This species is remarkable as showing a transition in neuration from Pison to Pisonoides, the second transverse cubital nervure being sometimes entirely absent, but sometimes represented by a stump.' It would seem from these remarks that Turner had several examples of this species before him. It certainly cannot be the male of transvaalensis as he suggests in another part of the same paper.
P. testaceipes Turner. Proc. Zool. Soc. London, Iv, p. 618, ơ. 1916.
" $\delta$. Niger; mandibulis, palpis, scapo, tegulis, tibiis anticis tarsisque rufo-testaceis; segmento abdominali quarto dimidio apicali, quinto, sexto, septimoque brunneo-testaceis; alis hyalinis, iridescentibus, margine apicali late infuscatis, venis nigris." Long. 7 mm .


#### Abstract

" $\delta$. Clypeus broadly truncate at the apex; antennae rather slender at the base, slightly thickened towards the apex, the second joint of the flagellum only a little longer than the third, about twice as long as the first. Posterior ocelli separated both from each other and from the eyes by a distance about equal to the diameter of one ocellus, further from the anterior ocellus than from each other. Clypeus and front as high as the emargination of the eyes clothed with silver pubescence, the frontal sulcus indistinct, front opaque, finely punctured-rugulose, vertex finely punctured. Eyes half as far again from each other on the clypeus as on the vertex. Pronotum short, much shorter than in P. xanthopus; mesonotum and scutellum finely and closely, but distinctly punctured; mesopleurae more finely punctured, with a fovea in the middle. Median segment closely punctured, with a distinct triangular dorsal area which is obliquely striated at the extreme base, the median sulcus strongly marked, the carina only visible at the base, the sides of the segment outside the triangular area finely and irregularly striated; the posterior slope more distinctly transversely striated, with a rather indistinct median sulcus. Abdomen microscopically punctured, without fasciae of pubescence; the first segment rather strongly depressed at the apex, the ventral surface evenly and much more distinctly punctured; the seventh ventral segment very shallowly emarginate at the apex. Second cubital cell almost pointed on the radius, first transverse cubital nervure a little nearer to the first than to the second recurrent nervure, transverse median nervure received before the basal nervure.

Hab. Zungeru, N. Nigeria (J. W. Scott-Macfie), November. This is very distinct from xanthopus in the sculpture of the median segment as well as in the neuration, also in the structure of the apical ventral segments."


## Trypoxylon Latr.

Préc. car. géner. Insect. p. 121.1796.

Characters. Eyes large, reaching the base of the mandibles, the inner orbits deeply sinuate. Apical joint of flagellum more acute in the of than in the 9 . The structure of the face is of three kinds: (1) the upper face is raised in the middle, the raised area ending just above the antennae somewhat abruptly either as a transverse and rounded truncation or in one or two tubercles; (2) the upper face has two divergent carinae which meet above the antennal sockets, and (3) the face has a more or less shield-shaped area completely enclosed by sharp and raised carinae, and sometimes furnished with lateral carinae which extend from the margins of the shield into the sinuses of the inner orbits. Pronotal collar usually well developed, as high as the mesonotum. The dorsum of the epinotum in many species has a $V$ or U -shaped area at the base, bounded by ill-defined grooves on each side and often shallowly furrowed longitudinally in the middle. This area is generally raised a little above the level of the rest of the dorsum, but is not bounded by carinae. First and second abdominal segments elongate, the first forming a petiole, the whole abdomen clavate. Pygidium in the $q$ conical, truncate in the d. The first abdominal segment sometimes with a narrow impressed line at the base above.

Fore wing; radial cell lanceolate and acute. One cubital and one discoidal cell present, but the faint outline of the obsolescent veins bounding the second cubital and second discoidal cells is often visible. The basal vein originates some distance beyond the end of the inner submedial cell.

Hind wing: as in Pison, the retinaculum is broken by a distinct gap into two parts. The cubital vein arises at a considerable distance beyond the end of the submedial cell. Basal lobe small and oval, the basal sinus deep.

Distribution. In both hemispheres, the greatest number of species being found in the Neo-tropic Region.

All the species known to me may be divided into three groups according to the structure of the face. In the separation of the species the structural characters to be observed are, in the order of their importance, the followingthe shape of the eighth ventral plate and of the genitalia in the male, the shape of the apical joint of the flagellum and its length in relation to the joints immediately preceding it, more especially in the male; in both sexes the degree of convergence of the eyes above and below, the shape of the facial shield or carinae, the length of the petiole, the distance between the eyes and the posterior ocelli, and the sculpture, chiefly of the epinotum. Too much reliance must not be placed on the last character since it is liable to vary within fairly wide limits, although in looking over a large series of one species, a certain pattern of sculpture pertaining to the species may be recognised. The length and shape of the apical joint of the flagellum is a fairly constant character, but an examination of a large series of three species, cognatum, Stroudi and Kohli (determined on the structure of the genitalia and eighth ventral plate), shows that even that part is liable to a little variation. The venation is of no value in the diagnosis of species in this genus, nor does the shape of the clypeus vary sufficiently in the majority of the species to afford striking distinctions. It should be noted that in some species the petiole is relatively longer in the $\sigma^{t}$ than in the 9 . Most of the species are black, rarely brownish red or yellowish in part.

I have not succeeded in identifying the several species published by Cameron, owing to the involved manner in which he described the structure and sculpture of the epinotum, the segment which is persistently mistermed the "metanotum" in his diagnoses, and also to his neglect of the structure of the genitalia and joints of the flagellum. It is to be observed that in his description of $T$. capense, of which the type appears to have been lost, no mention is made of the sex or length of the insect described.

## KEY TO THE SPECIES OF TRYPOXYLON.

Group $A$. Median area of the face more or less tumid, sometimes ending in a short prominent angle above the antennal sockets, but without carinae margining a $V$-shaped or a shield-shaped area (fig. 6).
(6) I. of, fifth joint of the flagellum more or less abruptly dilated beyond the middle. $O$, puncturation of the mesonotum sparse, not very coarse nor very fine and dull.
2. $\delta^{2}$, eighth ventral plate semicircularly emarginate on the apical margin (PI. I, fig. 7 a), the apical angles produced into short acute teeth; petiole as long as the three following segments united. of, petiole as long as the 2nd and 3 rd segments plus a quarter of the fourth united. cataractae Arnold
(2) 3. ${ }^{*}$, eighth ventral plate differently formed, and/or the petiole shorter than the three following segments united.
(5) 4. ${ }^{\hat{A}}$, petiole six times longer than its greatest width; apical joint of the flagellum as long as the three preceding joints united (eighth ventral plate similar to that of T.cognatum, PI. I, fig. 2 a). leptogaster Kohl
5. ${ }^{t}$, petiole four and a half times longer than its greatest width; apical joint of flagellum shorter than the three preceding joints united. ㅇ, apical joint of the flagellum as long as the two preceding joints united, the latter each a little longer than wido.
algoensis Arnold

(I) 6. $\delta^{7}$, fifth joint of the flagellum simple; puncturation of the mesonotum not sparse (in both sexes).
(8) 7. $\overline{3}$, third joint of the flagellum arcuately emarginate below. $\delta$ and 9 , interocular distance on the vertex nearly twice as great as the interocular distance across the base of the clypeus; face, pro- and mesonotum with large, deep and close puncturation. brevipenne Saussure
8. $\sigma^{2}$, third joint of flagellum simple. $\delta^{7}$ and 9 , interocular distance on the vertex less than half as great again as, or shorter than, the distance across the base of the clypeus; puncturation of face and pro-mesonotum very fine.
9. Mesonotum slightly shining, dorsum of epinotum reticulate rugose. $\delta^{7}$, anterior tibiae and tarsi, middle and hind tarsi and metatarsi more or less flavo-testaceous; apical joint of flagellum fully as long as the two preceding united. 9 , tibiae and tarsi more or less testaceous; petiole twice as long as the 2nd segment.
testaceipes Arnold
10. Mesonotum dull, dorsum of epinotum evenly and longitudinally striate, with regular transverse anastomoses. Legs black, the tarsi blackish brown. $\delta$, apical joint of the flagellum not longer than the penultimate joint. $\&$, petiole one and a half times as long as the 2nd segment.

Stevensoni Arnold
I have not seen the following species, but to judge by the descriptions, they would seem to belong to Group A: T. capense Cameron, T. elongatum Smith.
Group B. Face with two oblique carinae which converge inwards below and meet in the middle above the antennal sockets (figs. 8 and II).
I. Petiole as long as the 2nd segment plus half of the third; facial carinae straight (fig. II).
patruelis Arnold
2. Petiole as long as the 2nd and 3rd segments; facial carinae curved (fig. 8). confrater Kohl
T. frontale Smith may belong to this group, but its position cannot be fixed with certainty since the type in the B.M. coll. is defective, the head having been lost.
Group C. Face with a more or less pentagonal or shield-shaped area margined by sharply raised carinae (figs. 9, 10, 12 ).
(2) I. Facial shield incomplete, the carina bounding it being interrupted on each side a little below the level of the anterior ocellus, the inferior broken margin incurved and thickened (fig. 12); mesonotum strongly and closely punctured.
punctatissimum Arnold
(1) 2. Facial shield complete; puncturation of the mesonotum usually fairly sparse and shallow.
4. $\mathbf{\delta}^{\prime \prime}$, apical joint of flagellum a little more than twice as long as its basal width; eighth ventral plate deeply and angularly emarginate on each side, its apical margin nearly straight, the apical angles produced into short, straight, obtuse and narrow teeth (Pl. 1, fig. 2 a). $\circ$, median area of epinotal dorsum rugoso-reticulate.
cognatum Arnold
(4) $5 . \delta$, apical joint of flagellum nearly four times longer than its basal width; eighth ventral plate irregularly bisinuate on each side, its apical margin with a semi-elliptical excision in the middle (PI. I, fig. 8 a). i, median area of epinotal dorsum closely, evenly and longitudinally (obliquely) striate.

Braunsi Arnold
(3) 6. ${ }^{\prime}$, apical joint of the flagellum not longer than the three preceding joints united. of and 9 , median area of the epinotal dorsum transversely or obliquely and not closely striate.
(10) 7. ${ }^{t}$, apical joint of the flagellum shorter than the two preceding joints united.
10. $\hat{\delta}$, apical joint of flagellum longer than the two preceding joints united, or at least fully as long.
11. ${ }^{*}$, eighth ventral plate similar to that of T. cognatum, but less deeply emarginate at the sides. tristis Arnold
12. ${ }^{*}$, eighth ventral plate elongate, the apical margin with a semi-elliptical emargination in the middle, the lateral arms formed by the emargination being wider than long (Pl. I, fig. I $a$ ).
abditum Arnold
The following species, which I have not seen, appear to belong to this group, to judge by the descriptions: T. massaicum Cameron, T. marginifrons Cameron, T. foveatum Cameron, T. Magretti Gribodo and T. senegambicum Kohl.

## T. cataractae n.sp. (fig. 6).

${ }^{\text {on}}$. 13 mm . long. Black, mandibles yellowish brown. Wings pale fuscohyaline, the veins black. Clypeus and lower half of the face with silvery pubescence. Abdomen with a fine, decumbent, sparse and whitish pubescence, thorax and temples with a short whitish pilosity. Face and vertex dull, exceedingly finely and closely punctate and coriaceous; temples and lobe of clypeus shining and impunctate, the rest of the clypeus dull, its microscopic sculpture obscured by the pubescence. Thorax, excepting the epinotum, shining, finely, shallowly and irregularly punctured, the punctures much smaller than the spaces between them. Dorsum of epinotum moderately shining, sinuously and transversely striate, the striae strongest on the median area, the base of the latter on each side with three or four oblique striae curved outwards; the declivity dull, without striae on its upper half; the sides of the epinotum slightly shining, finely and vertically striate. Abdomen moderately shining, impunctate. Median area of clypeus produced into a short lobe, the anterior margin of which is almost straight. Inner face of the scape not emarginate. First joint of the flagellum as wide as long, the second joint two and a half times longer than the first and a quarter longer than the third, the fifth joint deeply excised on its basal half, the apical joint only a little longer than the penultimate. Interocular distance on the vertex equal to about the length of the first two joints of the flagellum, very little longer than the distance between the eyes across the base of the clypeus. Face with a median, rounded and low protuberance behind the antennal sockets. Above this the face is moderately tumid, with a shallow median impression reaching from the anterior ocellus to the median protuberance. The emargination of the inner orbits is deeper than it is wide. Posterior ocelli separated from the eyes by a distance barely equal to half the diameter of one of the ocelli. Collar of pronotum rounded at the shoulders, nearly straight between them. Petiole as long as the three following abdominal segments united; seen from the side, the tergite of the petiole is less than half as long as its sternite, and is not longer than the third segment. Calcaria brown.

ㅇ. 13 mm . long. On the tumid area of the face there is a sparse and shallow puncturation superimposed on the fundamental sculpture. The
median protuberance behind the antennal sockets is wedge-shaped and more acute than in the $\delta^{\prime}$, the transverse lamella below it more prominent. The clypeus is only feebly produced in the middle. Fifth joint of the flagellum simple. Mesonotum and scutellum have larger and deeper punctures than in the $\delta$, and the striae on the epinotum are fewer and stronger. The petiole is as long as the second and third segments plus a quarter of the fourth united. The tergite of the petiole, seen from the side, is longer than in the $\delta^{\prime}$, being two-thirds as long as the whole sternite. The petiole is less clavate apically than in the $\delta$, the greatest width being less than the interocular distance on the vertex, whereas it is fully equal to it in the $\delta$.


Fig. 6. Head of Trypoxylon cataractae, ${ }^{5}$.


Antennae shorter than in the $\delta^{3}$, but the lengths of the various joints are in the same proportion. Otherwise like the ${ }^{\circ}$.

Cloudlands, Vumbu Mts, S.R., ơ; Victoria Falls, , (type of $q$ ); Salisbury, S.R., ㅇ. Typ.es in R.M. coll.

Although taken from such widely separated localities, I do not think that there can be much doubt that these $0 \%$ belong to this species.
T. leptogaster Koh1. Ann. K.K.N.H. Mus. Wien, 1x, p. 291 , © 1894 (fig. 19).
${ }^{t}$. 9.5 mm . long. Mandibles, anterior tibiae and tarsi, and the calcaria ochreous. Antennae dark brown. Clypeus and lower face with silvery pubescence, the pilosity on the head and thorax whitish and scanty. Face
dull, coriaceous-rugose, the emarginate areas of the orbits almost smooth. Occiput and temples slightly shining, finely and very superficially punctured. Thorax moderately shining; mesonotum sparsely punctured with large and shallow punctures, mesopleurae and scutellum nearly impunctate, the mesonotum with an irregularly striate small fovea in the middle at its base. Median area of the epinotal dorsum longer than wide, widely grooved in the middle, bounded by a narrower and more distinct groove on each side. The whole dorsum and declivity are strongly, distantly and transversely rugose, the rugae somewhat oblique on the median area, the sides of the epinotum almost smooth. Anterior margin of clypeus convex. Median area of the face raised and not marginate, ending above the antennae in a narrow cuneiform prominence which at its base in front joins a transverse and convex lamella overlying the antennal sockets. Interocular distance across the base of the clypeus less than across the vertex by twice the diameter of a posterior ocellus. Fifth joint of the flagellum abruptly widened in its apical half; last joint as long as the three preceding joints united. The petiole is thin and only slightly and gradually widened towards the apex; it is as long as the second and third segments plus a quarter of the fourth. The second segment is as long as the third, and nearly twice as long as its apical width. Wings feebly fuscohyaline, with a darker apical border. Eighth ventral plate shaped like that of T. cognatum, but the apical margin has a row of strong short bristles, and there is a larger bristle on each side arising behind and external to the apical teeth. The inner paramera of the genitalia are much longer than in cognatum.

Eloby, West Africa. Type in coll. Brauns.
T. algoensis n.sp. (fig. 17).
$\delta$. 11 mm . long. Allied to leptogaster, but a stouter insect with a more strongly clavate abdomen and a shorter petiole, and differing also in the following characters.

Legs and antennae entirely black, mandibles black with the apices ferruginous. Median area of clypeus slightly produced, much less than in T. cataractae, the margin on each side feebly concave. Face microscopically


Fig. 13. Antenna of Trypoxylon brevipenne, $\bar{\sigma}$.

| " | 14. | " | " | abditum, ${ }^{\text {a }}$ (apical joints only). |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| " | 15. | " | " |  |  |  |
| " | 16. | , | " | tristis, ô | " | " |
| " | 17. | " | " | algoensis, ${ }^{\text {or. }}$ |  |  |
| " | 18. | " | " | cognatum, ठ |  |  |
| " | 19. | ,. | , | leptogaster, |  |  |
| " | 20. | " | " | Stroudi, ${ }^{\text {of. }}$ |  |  |

reticulate-punctate, with a larger and superficial reticulation superimposed; a wide and shallow depression extends from the anterior ocellus to within a short distance from the antennal sockets. The apical prominence of the tumid area of the face is less pronounced than in leptogaster. The interocular distance on the vertex is the same as in that species, but the posterior ocelli are further apart, and their distance from the eyes is also greater, being equal to the diameter of one ocellus. The fifth joint of the flagellum is dilated as in the other species, but the apical joint is relatively shorter and more acuminate, and is shorter than the three preceding joints united. The penultimate joint is longer, less than twice as wide as long. Mesonotum, scutellum and mesopleurae shining, sparsely and irregularly punctured, the puncturation on the mesonotum fairly large and deep. Median area of the epinotal dorsum low, widely and shallowly grooved lengthwise in the middle, bounded by a wide groove on each side. The surface is shining, transversely, closely and regularly striate, the smaller striae not extending over the lateral grooves, the latter bounded outwardly by a dull and coriaceous area, the declivity deeply channelled longitudinally (much deeper than in leptogaster) and traversed by five strong ridges. The sides of the epinotum are closely and obliquely striate, the extreme anterior margin smooth and shining. The petiole is about four and a half times as long as its greatest width (fully six times in leptogaster) and a little longer than the second and third segments united. From the base of the second segment the abdomen is more strongly ampliated than in the other species. The second segment is only one-fourth longer than wide at the apex and a little longer than the third, the latter a little wider at the apex than long.

ㅇ. ir mm. long. Anterior margin of clypeus almost evenly convex, the median area hardly produced. Antennae simple, the fifth joint not suddenly dilated; the apical joint about as long as the two preceding united, the latter are each a little longer than wide. The face lacks the superimposed reticulation present in the $\delta$. Petiole less attenuate than in the $\begin{gathered}\text { d, and more strongly }\end{gathered}$ swollen dorso-ventrally at the apex. Apical tergite acute, but not produced into a spinc. Otherwise like the $\delta$.

Algoa Bay, I $\AA$, November; r 9
T. brevipenne Saussure (fig. 13). Reise der Novara, Zool. 11, p. 85, 9.1867.
i. 7 mm . long. Black; clypeus, lower half of face and the temples with silvery pubescence. The thorax with a scanty whitish pubescence, chiefly at the sides, elsewhere the pubescence is microscopic. Vertex, collar of pronotum, mesonotum and scutellum with large, deep and round punctures which are larger than the spaces between them, at least in the middle of the mesonotum. The tumid area of the face has a similar sculpture but the punctures are smaller and closer; a narrow area round the posterior ocelli is smooth. Clypeus sparsely and shallowly punctured, the emarginate area of the eyes dull and coriaceous. The dorsum of the epinotum has the median area feebly grooved longitudinally and is transversely and feebly striatorugose, the lateral areas and the declivity are coarsely rugose and coriaceous between the rugae; the sides of the epinotum are dull and finely reticulate. Head and thorax fairly dull. Abdomen nitidulous and smooth. Clypeus almost triangular, the anterior margin feebly angular in the middle. The eyes are closely approximated below, the distance between them across the base of the clypeus being equal to the length of the second joint of the flagellum, and on the vertex equal to the first and second united. The emargination of the eyes is barely deeper than wide. Posterior ocelli touching the eyes. First joint of the flagellum subglobose, a little longer than wide, two-
thirds as long as the second, which is one-fourth longer than the third. The pronotum is about as long as the scutellum, the latter separated from the mesonotum and metanotum by deep and clathrate sutures. Mesonotum one-fourth wider than long, as long as the whole epinotum. The petiole is only feebly clavate, not quite as long as the second and third segments united, its tergite as long as the sternite. Wings hyaline, the veins black. Posterior calcaria brownish yellow.
$\delta .7 \mathrm{~mm}$. long. The puncturation of the head and thorax larger and closer than in the + . First joint of the flagellum only a trifle shorter than the second, the latter a little shorter than the third, which is arcuately emarginate below; the fourth and fifth as long as wide, the remaining joints wider than long, the apical joint oblique and subconical, shorter than the penultimate. First segment of the abdomen more clavate and shorter than in the $q$, as long as the second segment plus two-thirds of the third.

Sawmills and Bulawayo, January to February, not common. (R.M. coll.)

## T. Stevensoni n.sp. (Pl. I, fig. 6, text-fig. 7).

ㅇ. $5 \cdot 5-7 \mathrm{~mm}$. long. Black; tarsi dark brown, calcaria black, mandibles castaneous at the apex. Wings pale fusco-hyaline, the veins black. Clypeus and face below the antennae covered with silver pubescence, the sides of the thorax with a thin whitish pubescence, elsewhere the pubescence is sparse and microscopic. Collar of pronotum and apical segments of the abdomen with a slight gloss, the mesopleurae shining, the rest of the body dull. Face and vertex microscopically reticulate-punctate and dull, the emarginate area of the orbits almost smooth and slightly shining. Pronotum and mesopleurae very finely and sparsely punctured. Mesonotum closely and finely punctured, the scutellum and metanotum more finely but less closely. Dorsum of epinotum without a median area margined by grooves; it is flat and oblique and merges gradually into the declivity, regularly and longitudinally striated, the striae connected by transverse striae, the spaces between microscopically reticulate, the sides of the epinotum finely and longitudinally striate. Abdomen microscopically and closely punctate. Anterior margin of the clypeus obtusely angular in the middle. Face moderately convex above the antennae, without a distinct median longitudinal impression, furnished with two small rounded tubercles above the antennal sockets, not connected by a transverse lamella. The interocular distance near the base of the clypeus is greater than across


Fig. 7. Trypoxylon Stevensonti, + the vertex by a length equal to the diameter of an ocellus; on the vertex it is equal to the length of the second and third joints of the flagellum united. Posterior ocelli separated from the eyes by a distance less than their own diameter. Emargination of the inner orbits as wide as deep. First joint of the flagellum as long as wide, half as long as the second, the latter barely longer than the third. Collar of pronotum a little shorter in the middle than at the sides, the anterior face subvertical. Mesonotum as long as the whole epinotum. First segment of the abdomen short, about half as long again as the second, hardly more than three times longer than its greatest width, with a longitudinal impressed line above, which extends as
far as the nodose apical portion. First joint of posterior tarsi one-third longer than the second.
$\delta^{7} .5-7 \mathrm{~mm}$. long. Interocular distance on the vertex equal to the same across the base of the clypeus. Dorsum of epinotum with fewer and less regular longitudinal striae than in the $\%$. Apical joint of flagellum not longer than the penultimate. First segment of abdomen wider in its basal portion and therefore less nodose apically than in the 9 , three times longer than its greatest width, as long as the second and third segments united. Eighth ventral plate wide, its apical margin feebly convex. Otherwise like the ㅇ.

Bulawayo, Matopos and Umgusa River valley, S.R., January to June, not scarce. Types in R.M. coll. (R.M. and T.M. colls.)
T. testaceipes n.sp. (Pl. I, fig. 5).

ㅇ. 6-7 ${ }^{6}$. long. Very similar to T. Stevensoni, from which it differs as follows.

Tarsi brown, the basal joint of the anterior tarsi ochreous towards the base; anterior tibiae and apices of anterior femora, a streak on the inner face of the middle and hind tibiae, and the calcaria, brownish ochreous. Puncturation of the face and pro-mesothorax much finer than in T. Stevensoni, that of the face microscopic, and of the mesonotum very shallow. Dorsum of epinotum closely reticulate-rugose, with a feebly defined median area on which the sculpture is a little stronger. Least distance between the eyes near the base of the clypeus hardly shorter than the interocular distance across the vertex. The face lacks the discrete tubercles above the antennal sockets which are present in Stevensoni, in place of which there is a sloping and transverse plate. The pronotum is shorter and less rounded at the sides. The first segment of the abdomen is twice as long as the second. The apical joint of the flagellum is nearly two-thirds longer than the penultimate joint (about as long as that joint in Stevensoni). Tarsi longer, the basal joint twice as long as the second joint.

0 . $4.5-6.5 \mathrm{~mm}$. long. Colour and sculpture as in the 9 , but the yellow on the legs is brighter. It differs from the of Stevensoni in having the apical joint of the flagellum more than twice as long as the penultimate, and fully as long as the two preceding joints united. The abdomen is distinctly more slender than in Stevensoni, especially the first segment, which is four and a half times longer than its greatest width. Otherwise like the $q$.

Bulawayo, March to April. Types in R.M. coll. (R.M. and T.M. colls.)
T. capense Cameron. Rec. Albany Mus. vol. I, Pt. rv, p. 260 (sex?). 1905.
"Black, the mandibles rufous, the palpi pale testaceous; wings hyaline, the apex narrowly clouded, the stigma and nervures black. Face, clypeus and pleurae thickly covered with silvery pubescence. Front opaque, obscurely striated; from the upper part of the eye incision it becomes gradually narrowed to a point at the apex, but is not keeled; in the centre is a furrow which is more distinct above than below. Eyes slightly converging below. Hind ocelli separated from each other by a less distance than they are from the anterior. Above, the eyes are separated by slightly more than the length of the third antennal joint. Last antennal joint slightly shorter than the preceding two united. Thorax almost smooth. Median segment with a wide central, bordered by equally wide curved lateral furrows; the central is closely striated, except at the top and bottom; the lateral have irregular striae; apical slope irregularly striated and thickly covered with silvery pubescence. Petiole slightly longer than the thorax and (or than?) the following three segments united. Radial cellule long and narrow; the apical abscissa of radius fully
three times longer than the basal. Fore legs brownish in front; the last joint of the fore tarsi and the four front calcaria pale testaceous, the hind calcaria black. The second abdominal segment is more than double, the third and fourth not double so long as wide at the apex. Third antennal joint distinctly longer than the fourth, more than twice the length of the pedicle.

Comes near to leptogaster Kohl. It may be known from the Cape T. foveatum Cam. by the front and vertex being without an area bordered by keels."
T. elongatum Smith. Cat. Hymen. Brit. Mus. iv, p. 378, © ${ }^{\text {T. }} 1856$.
" $\delta$. Length 3 lines. Black; head rugose, the clypeus with silvery pubescence; the tips of the mandibles and the palpi pale testaceous. The mesothorax and scutellum shining; the metathorax (epinotum) transversely rugose, with a deep central longitudinal channel and two oblique ones at the base which unite with the central one and form an enclosed space; the wings hyaline, with their apical margins clouded; the anterior tarsi and apical joints of the intermediate and posterior pairs testaceous. Abdomen elongate, smooth and shining; the basal segment as long as the thorax."

## Hab. Sierra Leone.

In the Brit. Mus. coll. leptogaster Kohl has been wrongly synonymised with this species, from which it is quite distinct. In that collection, three larger specimens from the Gold Coast (leg. Lowe, 191I) have been placed with elongatum. They are however quite distinct, having the first abdominal segment longer than the second and third combined, whereas in the type of elongatum it is barely as long. Moreover, like leptogaster, they differ from elongatum in having a small central cuneiform prominence above the antennae.

## T. lissonotum Cameron. Ann. Trans. Mus. II, p. 152, ¢. 1910.

ㅇ. Io mm. long. Very much like algoensis $\circ$ from which it differs as follows.

The interocular distance on the vertex is greater than the interocular distance across the base of the clypeus by less than the diameter of one of the posterior ocelli. The latter are separated from the eyes by a distance equal to about half the diameter of one ocellus. The sides of the epinotum are obliquely and very finely striate, almost aciculate, the striae very close together and not extending to the anterior margin. The petiole is much longer than in algoensis $q$ and forms the main distinction between the two species. It is fully five times longer than its greatest width, and very nearly as long as the three following segments united; the second segment is half as long again as wide at the apex. The anterior margin of the clypeus is a little more produced in the middle, and the transverse lamella above the antennal sockets is more prominent, it forms, with the apical median prominence of the face, a T -shaped protuberance. Wings feebly fusco-hyaline at the apical margin. Otherwise like algoensis.

Pretoria, April. Type in T.M. coll.
I had the opportunity to examine this type only after having made out the keys to the species. This species belongs to Group A, and in the key runs down to paragraph (4) 5 . and may be separated from algoensis $q$ by the longer petiole.
T. confrater Kohl (fig. 8). Ann. K.K.N.H. Mus. Wien, Ix, p. 292, 9.1894.
"우. 14.5 mm . long. Black; calcaria, inner side of the anterior tibiae and the apical joints of the tarsi, rusty brown. Wings feebly infuscate. Pubescence whitish....The eyes are distinctly convergent towards the clypeus; their distance apart at that point is as great as their least distance apart on the
vertex, less the diameter of one of the posterior ocelli. The face is on the whole, convex and has a deeply impressed middle line; the swelling of the face is margined on each side by an arcuate and sharp keel which extends towards the inner orbits....The posterior ocelli are near together, the distance between them being less than the diameter of one of them. Their distance from the eyes is equal to half their own diameter....The flagellum is fairly slender; its second joint is about three times as long as thick, the following joint two and a half times....Face not very closely punctured. Mesonotum shining, punctured; the punctures wider apart than in T. scutatum. Mesopleurae shining, with sparser and more shallow puncturation. Dorsum of epinotum with three longitudinal grooves, of which the middle one is the deepest and transversely striate. The declivity, deeply sulcate in the middle lengthwise, is strongly and transversely striate. The sides of the epinotum are smooth, without striae. Petiole elongate, about as long as the two following segments united. The second segment is nearly twice as long as wide in the middle, the third not quite twice as long....Chutes de Samlia, West Africa."

## T. patruelis n.sp. (fig. II).

ㅇ. 7 mm . long. Allied to confrater Kohl, but smaller. It differs from that species as follows.

The angle formed by the facial carinae is much wider; and the carinae themselves are straight, not arcuate as in the other species; the median longitudinal impression is very shallow. The sides of the epinotum are distinctly, closely and obliquely striated; the dorsum is fairly closely and obliquely striated, but the apical half of the median groove is transversely striated as in confrater. The petiole is much shorter than in confrater, being only as long as the second segment plus half of the third; it is also fairly thick, or not more than three times longer than its apical width. The second segment is two-thirds longer than its apical width and nearly parallel-sided; the third segment is a little longer than the second and only a quarter longer than its apical width. Otherwise like confrater.

Willowmore, C.P. Type in coll. Brauns.
T. frontale Smith. Cat. Hymen. Brit. Mus. Iv, p. 378, 9.1856.
" $ㅇ$. Length 3 lines. Black; head subquadrate, very closely and finely punctured; the mandibles pale rufo-testaceous; the front produced into an angular prominence between the antennae, the apex acute; a slightly impressed line runs from the anterior stemma to the angular point. The posterior margin of the prothorax and the tegulae, the anterior tibiae in front, and the tarsi, pale testaceous; the mesothorax and scutellum very closely and finely punctured; the wings hyaline and splendidly iridescent; the metathorax transversely striated; at the base is an enclosed space which is obliquely striated, with a deep longitudinal channel, slightly interrupted at the verge of the oblique truncation. Abdomen smooth and shining, covered with a fine cinereous pile. Hab. Africa."

## T. punctatissimum n.sp. (fig. I2).

우. 12 mm . long. Black; calcaria pale ochreous, apical half of the mandibles ferruginous; posterior margin of the pronotum black, not testaceous as in Stroudi, Kohli and others. Clypeus and lower half of face with silvery pubescence. Head and thorax with a whitish, outstanding and fairly abundant pilosity (much more noticeable than in Stroudi). Pubescence on the abdomen fine and inconspicuous except on the apical margins of the first three tergites. Head dull, clypeus and lower half of the face microscopically coriaceous-
punctate; the upper half of the face, including the shield, and the vertex fairly closely and shallowly punctate and scabrous, the spaces between the top of the shield and the inner orbits more deeply punctured; the temples very finely punctured. Declivous face of the pronotum, mesonotum and mesopleurae slightly shining, fairly strongly and closely punctured, the majority of the punctures about half as wide as the spaces between them and somewhat confluent transversely. In front of the posterior margin the mesonotum has an ovoid depression, longer than the scutellum but not so wide, which is transversely striate. Scutellum and postscutellum more closely and more finely punctured than the mesonotum. Dorsum and declivity of the epinotum dull, transversely and rather irregularly rugose, the median area not much raised, ill-defined, rounded posteriorly and as long as wide; sides of epinotum dull, finely reticulate with a close and vertical striation superimposed, the basal (anterior) third without striae. Abdomen slightly shining. Anterior margin of the clypeus convex, very feebly sinuate on each side of the middle, narrowly depressed. Interocular distance on the vertex equal to the length of the first three joints of the flagellum and greater than the interocular distance across the base of the clypeus by as much as the diameter of one of the posterior ocelli. Second joint of the flagellum slightly longer than the third. The boundary of the facial shield differs from that of the rest of this group in being interrupted a little below the level of the anterior ocellus, the free end of the inferior broken margin being incurved and thickened (fig. 12). The apex of the shield is narrowly truncate, much less acute than in Stroudi. The distance between the posterior ocelli and the eyes is equal to the diameter of one of the posterior ocelli. The thorax is narrower than in Stroudi, especially the epinotum, which is not wider at the base than long. The petiole is distinctly slender, nearly seven times longer than its greatest width, and as long as the second and third segments plus a quarter of the fourth segment. Sixth tergite acute at the apex, not produced into a spine. Wings clear hyaline.

Algoa Bay, March and July, 2 오, nesting in hollow reeds. Type in coll. Brauns.
T. cognatum $\mathrm{n} . \mathrm{sp}$. (Pl. I, figs. 2, $2 a, \mathrm{II}$, text-figs. 9, 18 ).

ㅇ. ${ }^{10-13} \mathrm{~mm}$. long. Black; tegulae, apical joints of the tarsi and the calcaria, brown. Posterior margin of the pronotal collar testaceous. Wings hyaline, the apical margin narrowly pale fusco-hyaline. Clypeus and lower half of the face clothed with silvery pubescence. Thorax with a thin, silverywhite pilosity. Abdominal segments with a very fine, sparse and whitish pubescence, longer on the apical margins. Face above the emargination of the eyes, including the shield, almost dull, sparsely and shallowly punctured, the punctures smaller and closer together towards the top of the shield, the space between the shield and the eyes with some larger punctures, the vertex and temples almost smooth. Thorax slightly shining, sparsely punctured, the punctures much smaller than the spaces between them. Dorsum and declivity of the epinotum fairly closely, irregularly and somewhat transversely reticulate-rugose. The low median area is longitudinally and widely grooved in the middle, the groove often margined by one or two longitudinal rugae, the sides of the epinotum closely, finely and obliquely striate. The whole epinotum fairly dull. Abdomen almost smooth and slightly shining.

Anterior margin of the clypeus convex. The emargination of the inner orbits is a little deeper than wide. Face gradually sloping forwards towards the apex of the shield. The latter is moderately concave, triangular in its lower third, the upper two-thirds or so more or less semicircular. The shield
is wide, the width between the lateral angles (where short carinae extend into the emargination of the eyes), being equal to the distance from the apex to the anterior ocellus. The interocular distance on the vertex is one and a half times the least distance between the eyes across the base of the clypeus. The posterior ocelli are separated from the eyes by a distance which is less than half the diameter of one ocellus. Scapes with an emargination on the inner side to accommodate the transverse lamella which lies below the apex of the shield. Second joint of the flagellum nearly twice as long as the first, very little longer than the third. Anterior margin of the pronotal collar feebly concave, the dorsal face transversely impressed. First segment of the abdomen as long as the second and third united, only slightly widened towards the apex, fully five times longer than its greatest width. The second segment is nearly as long as the third, and almost parallel-sided.
$\hat{\delta} .9^{-12 ~ m m}$. long. Puncturation of the shield and the space behind it stronger than in the $\%$. Anterior margin of the clypeus less convex, very feebly sinuate. The distance between the posterior ocelli and the eyes is equal to the diameter of one of the ocelli. Apical joint of the flagellum acuminate, curved, two and a half times longer than wide at the base, as long as the four preceding joints united, the tenth joint of the flagellum nearly twice as wide as long. Petiole a little shorter than in the q. Eighth ventral plate angularly emarginate on each side, the apical margin straight, produced at the corners into blunt spines. Outer paramera fringed with hairs, the median paramera bidentate at the apex (Pl. 1, figs. 2, 2a). Otherwise like the 9 .

Bulawayo, Sawmills, Hopefountain, S.R., common; Mfongosi, Zululand (W. E. Jones). Types in R.M. coll. (R.M. and T.M. colls.)

A of from Sundays River, and another from Algoa Bay, in Dr Brauns' collection, which I place with this species, vary slightly from the type in having the facial shield narrower, the distance between the lateral angles being a little less than the distance from the apex to the anterior ocellus.

## T. Braunsi n.sp. (Pl. I, figs. 8, $8 a$, text-figs. ${ }^{15}$, 2 r ).

or: 9 mm . long. Colour and pubescence as in cognatum. The fuscous margin of the wings somewhat wider and darker. Facial shield and vertex closely and finely punctured, more finely than in cognatum or Stroudi, the shield narrowly rounded at the apex, the width between the lateral angles slightly less than the length from the apex to the anterior ocellus, rather deeply impressed lengthwise in the middle. The interocular distance on the vertex is greater by the diameter of a posterior ocellus than the interocular distance across the base of the clypeus. Posterior ocelli separated from the eyes by a distance as great as the diameter of one of the posterior ocelli. Pronotum and mesothorax shining, almost smooth, minutely and sparsely punctured. The collar of the pronotum transversely impressed, the posterior half piceous, not testaceous as in cognatum. Dorsum of epinotum with a well-defined and subrectangular median area which is shallowly grooved lengthwise in the middle; the area is dull, closely and obliquely striate, the groove transversely striate. The lateral areas of the dorsum and the declivity are irregularly rugoso-reticulate and dull, the sides dull and closely striolate obliquely. Abdomen shining and nearly smooth. Apical joint of the flagellum long and acuminate, fully as long as the four preceding joints united, the penultimate joint twice, the antepenultimate one and a half times


Fig. 21. Trypoxylon Braunsi, ठf. Epinotum and abdomen.
wider than long. Petiole wide and fairly short, three and a half times longer than its apical width, distinctly shorter than the second and third segments united. Apical margin of eighth ventral plate semi-elliptically emarginate in the middle, the lateral arms formed by the emargination fully as wide as long and slightly oblique at the apex.

Willowmore, C.P., December, $2 \delta^{\circ} 0^{\circ}$. Type in Coll. Brauns.
T. Stroudi Gribodo (Pl. I, figs. 4, $4 a, 9$; text-figs. 10, 20, 22). Bull. Ent. Soc. Ital. xvI, p. 279, 오, ત九. 1884.
.9. I I-I 3 mm . long. Black; apical joints of all the tarsi and the anterior tibiae beneath, more or less fusco-ochraceous. Puncturation of the head and thorax distinctly shallower than in cognatum and of the thorax a little shallower and finer than in Kohli. The facial shield ends in a more acute angle at the apex and is narrower than in cognatum, the width between the lateral angles being distinctly less than the distance between the apex and the anterior ocellus. The lateral carinae extend further into the bays of the eyes. The interocular distance on the vertex is less than in cognatum, being not greater than the distance across the base of the clypeus. The posterior ocelli are separated from the eyes by a distance equal to the diameter of one ocellus. The epinotum differs from that of cognatum in having the median area more distinctly defined, i.e. it is raised higher above the lateral areas. It is also more widely grooved in the middle. The dorsum and declivity of the epinotum are transversely and sparsely striate, the striae closer together on the lateral areas and on the declivity than on the median area; the latter is


Fig. 22. Trypoxylon Stroudi, 9. fairly shining. The sides of the epinotum are almost smooth, at the most only very finely obliquely striolate. The petiole is a little more distinctly clavate than in cognatum, and is a little longer than the second and third segments united. Apical tergite produced into a sharp spine. Calcaria pale ochreous.

む. 8-11 mm. long. Mandibles pale ferruginous in the middle. The interocular distance on the vertex is greater than the distance across the base of the clypeus by as much as the diameter of one of the posterior ocelli. Apical joint of the flagellum shorter than the two preceding joints united, the antepenultimate joint on its greater curvature a little longer than wide. The eighth ventral plate is almost semicircularly emarginate, with the lateral arms obliquely truncate and short. The genitalia do not differ very much from those of $T$. Kohli, but the apical spines of the inner paramera are larger (Pl. I, figs. 4, 4 a).
S. Rhodesia, November to July; Willowmore and Sundays River, C.P. (R.M. and T.M. colls.)
T. Kohli n.sp. (Pl. I, figs. 3, $3 a$ and ro).
${ }^{*}$. 8-I I mm. long. Deceptively like $T$. Stroudi from which it differs as follows.

Mesonotum less shining, but not as dull as in T. abditum. Facial shield above the lateral carinae a little narrower. The flagellum is very much like that of Stroudi but the apical joint is more gradually attenuate and somewhat longer in relation to the two preceding joints. The sculpture of the epinotum is finer and the striae are usually much more oblique over the median area, not sinuously transverse as in Stroudi. The eighth ventral plate (Pl. I, fig. $3 a$ ) is lyre-shaped, having the lateral angles produced into arms which are longer than wide and truncate at the apex. The margin between their bases has a small tooth in the middle, of variable width and acuteness. The genitalia are narrower than in Stroudi.

ㅇ. $11-13 \mathrm{~mm}$. long. This differs from the $\%$ of Stroudi mainly by the sculpture of the epinotum which, as in the ${ }^{*}$, is an oblique and fine striation. The antennae are relatively shorter, but the proportionate lengths of the joints are the same. The petiole is as long as the second and third segments united.

Bulawayo, November to August; Pretoria. Types in the R.M. coll. (R.M. and T.M. colls.)
T. tristis n.sp. (fig. 16).
d. 8 mm . long. Very closely related to cognatum from which it differs as follows.

The facial shield is more closely punctured and is also differently shaped; the posterior or elliptical part is distinctly longer, or almost twice as long as the anterior and triangular portion, whereas in cognatum they are of about equal length. The apical joint of the antenna is shorter, not more than twice as long as wide at the base, and not longer than the three preceding joints united. The mesonotum and scutellum are a little more deeply punctured and the whole epinotum is distinctly narrower. The sculpture of its dorsum is finer, reticulate-rugose, and the median area is longer than wide and subrectangular, semi-elliptical in cognatum. The eighth ventral plate and the genitalia hardly differ from those of cognatum. The second segment of the abdomen is shorter and relatively wider, being only twice as long as wide at the apex, whereas in cognatum it is two and three-quarter times as long as wide at the apex.

Sawmills, S.R., April. Type in R.M. coll.
T. abditum $\mathrm{n} . \mathrm{sp}$. (Pl. I, figs. I, г $a$; text-fig. 14).
${ }^{\top} .9 \mathrm{~mm}$. long. Allied to Stroudi, from which it differs as follows.
Pro-mesonotum and scutellum dull, the puncturation very shallow. The longitudinal groove on the median area of the epinotal dorsum is more distinctly defined and more strongly striate. The apical joint of the flagellum is longer than the two preceding joints united, and is nearly two and a half times as long as its basal width. The first segment of the abdomen is somewhat narrower over its basal two-thirds, and is as long as the second and third segments united. The eighth ventral plate (PI. I, fig. Ia) is unlike that of any of our other species except Braunsi. Its apical margin is moderately convex and has a narrow excision in the middle which is deeper than wide. The outer paramera of the genitalia are only feebly hirsute, and the inner paramera have only one distinct tooth at the apex.

Bulawayo, January to June; George, C.P. (leg. Brauns), March. Types in R.M. coll. (R.M. and T.M. colls.)
T. massaicum Cameron. Sjöstedt's Kilimandjaro-Meru Exped. p. 290, ㅇ. 1910.
"Black, the palpi and spurs pale testaceous, the head and thorax densely covered with silvery pubescence, the wings hyaline, iridescent, the nervures black; the front with a large area, bounded by distinct keels; it extends beyond the anterior ocellus, where it is rounded, but projecting slightly in the middle behind; below the middle it becomes gradually obliquely narrowed to a blunt rounded point; it is almost twice longer than wide. Metanotal area large, wide, widely furrowed in the middle, and bordered laterally by a narrower furrow; the central furrow is more shining and more strongly striated than the raised sides, the striation on which becomes finer and closer towards the apex; on the sides and apical slope the striation is stronger, with the striae clearly separated. Pro- and mesopleurae smooth; the metapleurae obliquely striated, more closely and strongly below. First abdominal segment as long as the following two united, its base flat above, the apex not much dilated. Mandibles ferruginous.

ㅇ. Length 13 mm . Kilimandjaro, May.
The form of the frontal area is not unlike what it is in T. scutifrons Sauss.; in that species the basal part becomes gradually widened and the apex ends in a sharp point; in the present species the basal part does not become widened and the apex is distinctly rounded....In length, as compared with the width, it more resembles that of Stroudi Grib. but in it the apex ends in an acute point."

## T. marginifrons Cameron. Ann. Soc. Ent. Belg. vol. Lvi, p. 399, ¢. 1912.

"Black, covered with silvery pubescence, the pile on the apical abdominal segments tinged with fulvous, the mandibles rufo-testaceous, the teeth black; wings hyaline, the basal abscissa of the radius straight, oblique, the apical more than twice its length, roundly curved. Front at the antennae margined by a wide keel, dilated in the middle. Metanotal furrow wide, and at the base shallow, of equal width, the apical part with the sides sloping obliquely and with a furrow in the centre; the basal part is bordered by a narrower oblique furrow; except the part outside this furrow the metanotum is striated. A smooth line (it can hardly be called a furrow) widened below, runs from the ocelli to near the antennal transverse keel. Apex of clypeus broadly rounded. Mesonotum shining, distinctly, not very closely, punctured; a narrow furrow on either side of its middle. Apex of pronotum roundly raised, trilobate, the central lobe small and more like a tubercle than the lateral. $q$.

Length 12 mm . Congo da Lemba, April (R. Mayné).
The apex of the cubitus is thickened and rounded. Tarsal spines pale. The pubescence on the pleurae long and dense. The abdomen is rather short, the basal four segments united being not much longer than the head and thorax united; the first segment is distinctly, the second less strongly nodose. The eyes at the antennae are separated by almost the same distance as they are at the vertex. The first abdominal segment is clearly longer than the second and third united.

Characteristic of this species is the transverse trilobate keel over the antennae."
T. foveatum Cameron. Records Albany Mus. 1, p. 139, ¢. 1904.
"Black; the mandibles rufo-testaceous, palpi pale testaceous; calcaria white; wings hyaline, the anterior with a slight fuscous tinge and highly iridescent; the nervures and stigma black; frontal area large; broadly rounded behind and enclosing the front ocellus; its apex narrowed to a sharp point,
the keels there slightly curved inwardly, head and thorax covered with longish white pubescence; abdominal petiole longer than the second and third segments united; last segment ending in a long, curved, stout spine.
¢. Length 11 mm . Eyes distinctly converging below. The frontal area is raised; its sides have an oblique slope outside the keel; inside it is depressed towards the centre where there is an impressed line. Eye incision and vertex obscurely punctured; the face and clypeus covered with silvery pubescence. Area on metanotum raised, depressed in the centre which is transversely striated; its raised sides rounded; the part at its apex depressed; the depression narrowed and rounded at the apex; the part at the sides of the area with a few irregular transverse striae; the apical slope irregularly transversely striated. Pro-, meso- and base of metapleurae smooth; the rest of the metapleurae closely, finely obliquely striated, the top and bottom more strongly than the middle at the base. Pleural suture irregularly striated; there is a round fovea behind the middle of the mesopleurae; propleural depression wide and deep; it is finely obliquely, but not closely, striated. Radial cellule elongated, as in T. confrater Kohl. Malar space absent. From the angle of the frontal area where it commences to narrow, a not very distinct keel runs to the eyes; the apex of the clypeus is depressed and bordered behind by a fine furrow; cubitus at its junction with the transverse cubital nervure broadly rounded, not acute as in T. confrater. Comes near to T. Stroudi Grib."

The type appears to have been lost, and as far as one can judge from the confusing description, this insect is probably synonymous with Stroudi Grib.
T. Magrettii Gribodo. Bull. Soc. Ent. Ital. xvi, p. 280, ô. 1884.
"T. praecedenti (i.e. Stroudi) affinis quidem et similis et nullo modo ejusdem varietas; et enim dignoscitur thorace crassiori minus cylindrico; metanoto crassissime irregulariter rugoso-reticulato; abdominis segmento primo, comparate, breviori, femoribus posticis paulum excedente; genubus, tibiis anticis intra, tarsis anticis totis, tibiis posticis tarsorumque posticorum articulis rufis. © ${ }^{\text {on }}$, Long. corp. 8.5."

Hab. Metemma, i example.
Since the completion of the fourth part of this work, a new genus of the Miscophus group, and several new species of the Miscophus, Pemphredon and Astata groups have been discovered. In addition, very many new species of Tachysphex await description. Owing to an unfortunate oversight, many of these, belonging to the collection of Dr Brauns, were not submitted to me at the time when that genus was being dealt with. These additions form such a large percentage of the total that it will be necessary to revise entirely the key to the species of the genus which was published in Part II. As it will be some time before all the genera have been monographed, I think it will be more convenient to the student of the Sphegidae to deal with these additions immediately in what will constitute the first Appendix, instead of relegating them to the inevitable and final Appendix which will complete this work.

## Appendix I

MISCOPHUS Group
Miscophus verecundus n.sp.
t. 4.5 mm . long. Black, first segment of abdomen red, the apical margins of the remaining segments narrowly testaceous. Mandibles in the middle, base and apex of the anterior tibiae, and the tarsi, fusco-flavous, the tarsi a little darker towards the apical joint. Face, clypeus, temples, thorax (chiefly at the sides and on the declivity of the epinotum) and apical margins of the abdominal segments clothed with a very short, scanty and whitish pubescence, that of the face somewhat brassy. Apical margins of the sternites with a row of black and outstanding hairs. Wings fusco-hyaline, the veins black. Dull, the whole body finely and evenly punctured, the punctures as large as the spaces between them, somewhat more distant on the face. Clypeus microscopically punctured, its anterior margin convex, angularly but not deeply excised between the median and the lateral sclerites. Inner orbits almost parallel, the interocular distance on the vertex equal to the length of the first four joints of the flagellum. The first joint of the latter is a trifle longer than wide, the second joint half as long again as the first, and as long as the third. The distance between the posterior ocelli is equal to their distance from the eyes. Collar of pronotum convex in front, fairly long, hardly four times as wide across the posterior margin as long in the middle. Mesonotum twice as wide as long, and twice as long as the scutellum. Dorsum of epinotum two and a half times wider at the base than long in the middle, distinctly carinated in the middle as far as the brow of the declivity. Apical margin of the eighth ventral plate feebly bisinuate. Stalk of the second cubital cell about half as long as the first abscissa of the radius.

Sawmills, S.R., April (R. Stevenson). Type in R.M. coll.
Miscophus bellulus n.sp. (Pl. II, fig. r).
우. 5.5 mm . long. Head and thorax black, clypeus and mandibles fuscoferruginous, the front of the scapes ochreous. Legs ferruginous, the upper surface of the coxae, trochanters and femora clouded with fuscous. First and second abdominal segments ferruginous, their tergites bluish black on each side, the colour not reaching the apical margin; the remaining segments fusco-ferruginous or brownish, their apical margins paler, the third tergite with the basal half bluish black like the sides of the first two tergites. Wings faintly fusco-hyaline, with a clear area across the middle of the front wing; the veins blackish except across the clear area where they are ochreous. Face and clypeus with a dull silvery and decumbent pubescence, scanty on the clypeus, and on the face arranged in fairly distantly spaced tufts, similar to the pubescence of $M$. Kriechbaumeri. Thorax and abdomen with a sparse, short and whitish pubescence, almost absent from the pro-mesonotum and scutellum, fairly dense on the epinotum and extreme base of the first tergite. On the abdomen the pubescence is confined chiefly to the ventral surface and the sides of the tergites at their apical margins. Apical margins of the sternites with a few long black hairs. Head dull, microscopically coriaceouspunctate, the clypeus smooth and nitidulous. Thorax dull, finely and closely reticulate-punctate, more finely and somewhat rugoso-punctate on the dorsum of the epinotum. Abdomen dull, closely and very finely punctured, the punctures just visible under a magnification of twelve diameters. Clypeus not deeply excised between the median and lateral sclerites, the anterior
margin of the median sclerite depressed and feebly sinuate, ending in a blunt angle on each side. Eyes feebly convergent above, the interocular distance on the vertex not much less than across the clypeus and equal to the length of the first three joints of the flagellum. Second joint of the flagellum one-third longer than the third and two and a quarter times longer than the first, the latter nearly twice as long as wide at the apex. The ocelli are placed in an equilateral triangle, the distance between the posterior pair is equal to their distance from the eyes. Temples as wide as the eyes when seen from the side. Collar of pronotum convex transversely and lengthwise, nearly as long in the midde as the scutellum; the mesonotum about twice as wide as long and twice as long as the scutellum. Dorsum of epinotum carinate longitudinally in the middle, as long as the scutellum and metanotum united. Spines on the legs black. The stalk of the second cubital cell is a little shorter than the base of that cell on the cubitus.

Filabusi, S.R., 2 아, Sept. (R. Stevenson). Type in R.M. coll.

## Miscophus crispus n.sp.

o. 6 mm . long. Black; tarsi and apical segment of the abdomen ferruginous, the femora and tibiae brown, mandibles in the middle and the first four joints of the antenna below, ochreous; the rest of the antenna dark brown. Lower third of the eyes pale cinnamon red. Clypeus densely covered with long yellowish silvery hairs. Face, mesopleurae and sides of the epinotum with widely spaced tufts of short, curved and yellowish silvery hairs, which seen under a low magnification have the appearance of scales. Vertex, temples and pro-mesothorax with a whitish, short and somewhat woolly pubescence, microscopic on the vertex, longest on the temples, nowhere very dense. The middle and hind femora with similar pubescence on the undersides. Base of first tergite and apical margins of the first and second tergites with a very sparse whitish pubescence. Temples and the third to fifth segments of the abdomen slightly shining, the rest of the body dull. The anterior margin and the sculpture of the clypeus are obscured by the long pubescence. The face is microscopically granulate or reticulate-punctate, the vertex finely, closely and shallowly punctured, the temples smooth. Pro-mesonotum closely, very finely and transversely rugose, the mesopleurae and sides of the epinotum finely coriaceous and irregularly reticulate, the scutellum more or less longitudinally rugulose, the metanotum coriaceous. Dorsum of epinotum with a fine median longitudinal carinula which nearly reaches the apical margin; on each side of the carinula the surface is obliquely and finely rugose, the rugae becoming more transverse in the middle posteriorly, the declivity transversely striate. Abdomen evenly, closely and microscopically punctured. Interocular distance on the vertex equal to a little less than the length of the first four joints of the flagellum, and about equal to the interocular distance across the base of the clypeus. Posterior ocelli slightly nearer to each other than they are to the eyes. First joint of the flagellum as long as wide at the apex, the second joint twice as long as the first and one-fourth longer than the third joint. Collar of pronotum convex transversely, the anterior face oblique, the anterior angles rounded, about four times wider than long in the middle. Mesonotum a little more than twice as long as the scutellum. Dorsum of epinotum shorter than the mesonotum, about as long as the scutellum and metanotum united. Seventh tergite widely rounded at the apex, the eighth sternite feebly bidentate (possibly tridentate, the segment is not clearly exposed in the two specimens before me). Apical third of the wings (beyond the cells) fuscous, the basal two-thirds pale fusco-hyaline,
the veins brownish, the stalk of the second cubital cell a little shorter than the distance on the cubitus between the first recurrent and the first transverse cubital veins.

Killarney, Natal, November, 2 ỡ (W. C. Eales). Type in S.A. Mus. coll., paratype in R.M. coll.

Easily distinguished from our other species in having the tufts of hairs on the sides of the thorax as well as on the face.

## Miscophoides formosus n.sp. (fig. 23).

ㅇ. 4 mm . long. Head and thorax burnt-sienna red, the vertex and occiput darker; pronotal tubercles, tegulae and pronotal collar excepting its lateral angles and a streak in the middle, lemon-yellow. Antennae yellowish brown, becoming gradually darker towards the apex. Anterior margin of the clypeus ochreous. Abdomen fusco-stramineous, the basal segment almost pale brown, the fifth and sixth segments somewhat reddish ochreous, the second and third tergites with a transverse oval brownish mark on each side near the apical margin. Femora pale reddish brown, the apices of the fore and middle femora pale lemonyellow, the tibiae and tarsi ochreous, becoming darker towards the apex, the spines on the legs black. Wings brownish black, with a band a little beyond the middle and the apical margin of the fore wing, hyaline. Pubescence microscopic and very


Fig. 23. Miscophoides formosus, ㅇ. hind coxae above with a longer and denser silvery pubescence. Vertex and face nitidulous, very finely and not very closely aciculate-punctate, the sculpture becoming gradually finer towards the clypeus, which is shining and smooth. Temples shining, microscopically punctured. Thorax and abdomen shining, the former microscopically rugulose, with a few fine punctures on the mesonotum, the abdomen sparsely, finely and very shallowly punctured. Mandibles deeply excised on their outer margins before the middle. Cheeks well developed, as long as the first joint of the flagellum. Anterior margin of the clypeus convex, with a wide and shallow excision in the middle. Antennae inserted close to the posterior margin of the clypeus, the distance between the antennal sockets being only half as great as their distance from the eyes. First joint of the flagellum two-thirds the length of the second, the latter a little shorter than the third and fourth, which are of equal length and the longest. Face wide, the eyes moderately convergent above, the interocular distance on the vertex equal to the length of the first four joints of the flagellum. Posterior ocelli twice as far from each other as they are from the eyes, their distance from the anterior ocellus a little greater than their distance from the eyes. Thorax stout; pronotal collar about five times wider than long in the middle, half as long as the mesonotum, its dorsal face fairly flat, the declivous anterior face subvertical, its anterior margin convex. Mesonotum a little more than twice as wide as long, only a little longer than the scutellum and metanotum united. The dorsum and declivity of the epinotum feebly depressed longitudinally in the middle and transversely
aciculate, their junction widely rounded. Middle and posterior tibiae with two rows of strong black spines on their outer margins. Wings widely rounded apically, the venation greatly reduced and similar to that of M. Handlirschi Brauns, but the medial vein of the fore wing is more strongly curved upwards, and there is no trace of the pterostigma.

Sawmills, 3 fof, April. This pretty wasp hops over the sand, keeping its wings in constant motion; when disturbed it takes short jerky flights. Type in R.M. coll.

## Saliostethoides genus nov.

Characters. p. Episternal suture absent. A pygidial area present, feebly marginate at the sides. The venation is reduced and occupies a position intermediate between that of Saliostethus and Miscophoides. Fore wing: the anal, medial and basal veins are complete, the subcostal ends at its junction with the submedial, the proximal portion of the cubitus remains and forms the upper margin of the single discoidal; the stigma, radial vein, second recurrent vein, the cubital, radial and second discoidal cells are absent. Hind wing: only the extreme base of the radius is present, and the medial vein is considerably abbreviated, the two being joined in short curve by the proximal part of the cubitus. The basal lobe is obsolete. (A long and coarse pilosity is present over the greater part of the body, possibly only a specific, and not a generic character). Otherwise the characters of Miscophus.

Genotype. S. saltator. In the general characters of the head and thorax, excepting the absence of the episternal suture, this genus hardly differs at all from Miscophus, but it is distinct from all the other genera of the Miscophus group by the presence of a distinct pygidial area.
S. saltator n.sp. (fig. 24).

ㅇ, 3.6 mm . long. Head and thorax black, excepting the clypeus which is flavo-testaceous, and the pronotum which is dark reddish brown; the abdomen in greater part, the legs, scapes and first five joints of the flagellum ferruginous, the remaining joints of the latter reddish brown. The third to fifth tergites are darker or reddish brown; spines on the legs yellowish white, the calcaria black. Wings densely pubescent and fuscous, with a transverse, glabrous and hyaline bar across the middle; the veins brown, except across the clear area where they are ochreous. Head and thorax, and the sides of the apical margins of the first four tergites with a sparse, decumbent and very pale golden pubescence. In addition, the face, thorax and apical margins of the abdominal segments, above and below, and the femora, are clothed with a long, outstanding, coarse and whitish pilosity, the hairs of the face


Fig. 24. Saliostethoides saltator, and pronotum blunt and somewhat thickened towards the apex. Clypeus smooth and shining; face and vertex dull, closely reticulate-punctate; temples shining, sparsely and coarsely
punctured. Thorax dull; collar of pronotum finely granulate, the mesonotum and scutellum irregularly and fairly strongly punctured, the metanotum more finely so; mesopleurae strongly punctured, dorsum and declivity of the epinotum finely rugoso-reticulate, the sides striato-punctate. The dorsum of the epinotum is longitudinally carinate in the middle, the carina extending over the apex where it joins a transverse raised line. Abdomen finely and closely punctured, dull above, less closely punctured and shining below; the pygidial area triangular, as long as wide at the base, finely and not very closely punctured, fairly shining, the sides and apex slightly depressed inside the margin, the apex subacute.

Anterior margin of clypeus convex and entire. First joint of the flagellum a little longer than the second, and not much shorter than the third, the latter and the two succeeding joints subequal, all the joints longer than wide. Face wide, as in Miscophus; the eyes are slightly convergent above, the interocular distance on the vertex equal to the length of the first three joints of the flagellum plus half of the fourth. Collar of the pronotum convex transversely and lengthwise, merging gradually into the neck, not much shorter than the mesonotum. The latter is wide and not longer than the dorsum of the epinotum. Scutellum half as long as the mesonotum. Dorsum of epinotum fairly flat. Posterior and middle tibiae spinose, the anterior tarsi with a comb of short spines, of which there are three on the basal joint. (For the wings see characters of the genus.)
o. 3.5 mm . long. Scapes and first four joints of the flagellum flavoferruginous, the rest black; collar of pronotum blackish posteriorly, the abdomen entirely ferruginous. Otherwise like the $\%$ in colour, sculpture and pubescence. Abdomen less elongate than in the $q$; the eighth ventral plate semicircular, its margin minutely serrated. Otherwise like the $\circ$.

Sawmills, S.R., April, 1 웅 Filabusi, S.R., 1 o (R. Stevenson). Types in R.M. coll.

In its movements this insect resembles Miscophoides.

## ASTATA Group.

Astata tropicalis n.sp. (fig. 26).
ㅇ. 11 mm . long. Head and thorax, coxae, trochanters, basal two-thirds of the anterior femora and basal third of the middle femora above, black. The rest of the legs and the abdomen, reddish ochreous. The mandibles with a narrow ferruginous transverse streak across the middle. Apical half of the pygidial area and its raised lateral margins ferruginous. Wings fuscous, the veins black. Lower half of the face, temples and declivity of the epinotum with long, whitish and coarse pilosity, dense on the face, fairly scanty on the epinotum. Thorax on the sides and lower surface with a short, very scanty and whitish pubescence. Abdomen with a few short, brown and outstanding hairs on the first and second sternites, apical margins of the remaining sternites


Fig. 25. Pygidium of Astata gracilicornis, 9.

and apex of the last sternite. Pygidial area fringed at the sides with curved brown setae. Clypeus finely and shallowly rugulose-punctate. Face irregularly and closely punctured, the punctures fairly small below, larger above, a median longitudinal space below the anterior ocellus smooth and shining. Vertex shining, very coarsely and irregularly punctured, the punctures far apart; temples and occiput shining, very shallowly and sparsely punctured. Pronotum closely punctured in front above, striate at the sides. Mesonotum shining, sparsely and coarsely punctured, the anterior third dull, closely and strongly punctured. Scutellum and metanotum shining, sparsely and coarsely punctured in the middle, dull and finely and closely punctured at the sides. Mesopleurae irregularly and very coarsely punctured. Dorsum of epinotum dull, with a close and even rugose reticulation, the rugae somewhat emphasised in an oblique direction from the middle line outwards. The declivity is sculptured like the dorsum but less closely; the sides obliquely rugose, also somewhat reticulate in between, the rugae large and prominent near the posterior upper angle. Abdomen smooth and shining, the first tergite with a few large and scattered punctures. Pygidial area equilaterally triangular, dull, tricarinate, the median carina strongest and reaching the apex, the outer carinae weaker and shorter, the lateral margins sharply raised. Median area of the clypeus produced into a short lobe. Interocular distance across the base of the eyes nearly half as great again as across the vertex; at the latter point it is equal to a trifle more than the length of the second and third joints of the flagellum. The first joint of the latter is as long as wide at the apex, the second joint is three times longer than the first, and half as long again as the third. The posterior ocelli are separated from each other by a slightly greater distance than they are from the eyes. Mesonotum three-quarters wider than long, and twice as long as the scutellum. Dorsum of epinotum subrectangular posteriorly, twice as wide at the base as long, the posterior angles slightly depressed. Femora with long, thin exserted hairs on their under sides. Legs strongly spinose, the spines black. Anterior tarsi with a comb of reddish, long and flattened spines, of which there are four on the basal joint. Radial cell nearly three times longer on the radius than wide; the third abscissa as long as the fourth, and a little longer than the first and second united. Third cubital cell nearly as wide on the cubitus as on the radius, the second and third transverse cubital veins nearly parallel.

Ndola, N. Rhod., May, i $q$ (leg. T. Gresham-Williams). Type in R.M. coll. Astata Stevensoni n.sp. (fig. 27).

ㅇ. 11.5 mm . long. Superficially very much like $A$. tropicalis. Head and thorax black, abdomen and legs ferruginous, the basal third of the anterior femora and all the coxae and trochanters black. Wings pale fusco-hyaline, the apical portion beyond the cells much darker, the veins black, the stigma brown. Pilosity like that of tropicalis but longer and thinner, and much more scanty on the face. Head moderately shining, the face as far as the ocelli closely, finely and shallowly, but not coarsely punctured, the punctures as large as, or larger than the spaces between them. A small area on each side of the posterior ocelli is smooth. Vertex shining, sparsely and coarsely punctured; temples and occiput shining, finely and sparsely punctured Collar of pronotum short, but linear as in tropicalis, its lateral angles subdentate. Mesonotum in the middle posteriorly shining and with a few large punctures, elsewhere dull and closely striato-punctate transversely. Scutellum shining and with a few large punctures; like the metanotum its sides are dull and closely punctured. Mesopleurae coarsely and closely reticulate-punctate above (episternum and epimerum), strongly striato-
punctate below, the metapleurae finely punctured. Dorsum of epinotum fairly shining, evenly and widely reticulate-rugose, the reticulations broken and much wider apart than in tropicalis; the sides and declivity dull, unevenly and more closely reticulate than the dorsum. Abdomen shining, the first and fifth tergites with a few large punctures, the apical margins of the first five tergites depressed, the pygidial area dull, microscopically reticulate-punctate, much narrower and more acute than in tropicalis, the lateral margins fringed with curved reddish black setae. The first and second sternites have a thin, yellowish and exserted pilosity, the apical margins of the remaining sternites have a few short black hairs. Mandibles ferruginous in the middle.

Median lobe of clypeus wider than in tropicalis, bluntly tridentate on the apical margin. Antennae distinctly more slender than in tropicalis, the first joint of the flagellum a little longer than wide, the proportions of the following joints as in tropicalis. Eyes more convergent above than in that species, the interocular distance at the base of the eyes being nearly twice as great as across the vertex, where it is equal to the length of the second and third joints of the flagellum. The posterior ocelli are twice as far from each other as they are from the eyes. The proportions of the mesonotum and scutellum are the same as in tropicalis. The dorsum of the epinotum is twice as wide at the base as long in the middle, but it is rounder posteriorly, the lateral angles being widely rounded. The third abscissa of the radius is slightly shorter than the first and second united, and about half as long as the fourth. The third cubital cell is fully half as wide again on the cubitus as on the radius, the third transverse cubital vein is not parallel with the second, but is strongly curved outwardly in its lower half. Legs strongly spinose, the spines black, including those of the tarsal comb, which is formed as in tropicalis.
$\delta^{\hat{\delta}}$. 11 mm . long. Head and thorax black, femora, excepting the apex of the hind pair, black; tibiae and tarsi dark ferruginous. Abdomen ferruginous, the basal two-thirds of the first tergite black, the third segment apically and the following segments, fusco-ferruginous, the apical margins narrowly testaceous. Face dull, closely coriaceous punctate, except at the sides and at the anterior angles, where it is finely punctured and less dull. Mesonotum more closely punctured in the middle than in the 9 . First tergite and base of the second tergite shallowly and fairly closely punctured, the rest of the tergites microscopically rugulose and slightly shining. Otherwise the sculpture and pilosity is like that of the 9 . Lobe of the clypeus feebly sinuous in front, not tridentate. Flagellum with the third and following joints compressed and widened, as usual in the genus, the first joint as wide as long, the rest as in the 9 . Posterior ocelli not quite touching the eyes. The distance between the base of the eyes is a little greater than the length of the inner orbits from the base to their point of contact. Shoulders of pronotal collar rounded. Pygidial area triangular, the apex rounded, longitudinally striate with a few irregular striae. Spines on the legs weaker than in the $\%$, otherwise like that sex.

Bulawayo, July and August, taken on aphid-infested Thuya bushes,


Astata gracilicornis n.sp. (fig. 25).
ㅇ. io mm. long. Head, thorax and coxae black; trochanters dark reddish brown, the rest of the legs dark red. Apical half or less of the first tergite and the second and third abdominal segments dark dull red, the depressed margins of the third blackish, the remaining segments and the base of the first tergite black. Wings hyaline, feebly fusco-hyaline beyond the cells. Head, thorax
and declivous portion of the first tergite with a fine, outstanding and whitish pilosity, scanty on the pronotum, scutellum and dorsum of the epinotum. Apical margins of the sternites with a row of short black hairs. Clypeus and a small area of the face at the sides of the antennal sockets shining, sparsely and finely punctured, the rest of the face dull, shallowly and closely reticulate and also somewhat rugulose-punctate; the vertex fairly strongly and closely punctate in the middle, more sparsely near the eyes, the occiput closely, the temples sparsely punctured. Pronotum dull, finely, closely and transversely striate. Mesonotum dull, strongly reticulate-punctate, the punctures more or less confluent transversely, the middle third of the segment shining and more sparsely punctured. Middle of the scutellum shining, with a few large and deep punctures; its sides dull, and like the metanotum, closely rugosopunctate. Mesopleurae dull, closely and strongly punctured. Dorsum of epinotum slightly shining, fairly evenly rugoso-reticulate, the reticulations not quite so open as in Stevensoni, with a fine carina in the middle reaching from the base to the apex; the declivity more finely, the sides more closely rugoso-reticulate. Abdomen dull, microscopically reticulate-punctate. Pygidial area subulate behind, acute at the apex, fringed at the sides with curved black setae. Median area of the clypeus produced into a short lobe which is bluntly tridentate and fringed with blackish hairs in front. Antennae slender, the first joint of the flagellum as long as wide, the second longest of all and four times longer than its apical width or than the first, the third joint fourfifths the length of the second. Interocular distance across the clypeus threequarter times greater than across the vertex; at the latter point it is equal to a little more than the length of the first two joints of the flagellum. Posterior ocelli nearer to the eves than they are to each other. The pronotum is not quite linear above, it has a very short dorsal edge or collar which is convex transversely. Mesonotum one and a half times wider than long, as long as the dorsum of the epinotum. The latter is twice as wide as long, the apical margin faitly straight, the lateral apical angles narrowly rounded. Legs strongly spinose, the spines black; tarsal comb like that of Stevensoni. First abscissa of the radius as long as the third, a little longer than the second, the three combined about as long as the fourth. Third transverse cubital vein curved outwardly below, so that the third cubital cell is nearly twice as wide on the cubitus as on the radius.
$\delta^{6} .8-5-10 \mathrm{~mm}$. long. Head, thorax and abdomen black, the tegulae yellowish white, the legs coloured as in the $q$. Pilosity scantier than in the 9. Clypeus shallowly and sparsely punctured, the median lobe rectangular, its anterior margin straight. Face coriaceously punctate and dull, swollen below the anterior ocellus and longitudinally impressed in the middle of the swelling. Temples and occiput nearly dull, finely rugulose-punctate. The sculpture of the rest of the body like that of the 9 , but finer, especially on the dorsum and sides of the epinotum, and the first five sternites are slightly shining, shallowly and not very closely punctured, the sixth and seventh more strongly punctured. The distance between the eyes across the clypeus is equal to the length of the inner orbits from their base to their point of contact. Posterior ocelli not quite touching the eyes. Joints of the flagellum of the same proportionate length as in the 9. Pygidial area elongate triangular, the apex narrowly truncate. First abscissa of the radius twice as long as the second, the two united a little shorter than the third, the fourth a little longer than the other three united. The third cubital cell considerably larger than in the 9.

Sawmills, S.R., i q, July; Bulawayo, several iq and $\sigma^{\circ} \sigma^{\circ}$, August, frequenting aphid-infested Thuya bushes. Types in R.M. coll. (R.M. \& T.M. colls.)

## Astata ruficaudata Turner. ©

${ }^{*}$ (hitherto undescribed). 8-9 mm. long. Black; tibiae, tarsi and apices of the femora ferruginous, the last three abdominal segments and sometimes the apical margin of the fourth, pale ferruginous. The sculpture differs considerably from that of the $q$, but taking into account the coloration and size, and the fact that they were taken in the same situations as several females, there cannot be much doubt that these $\sigma^{\pi} \sigma^{\pi}$ should be ascribed to this species.

Face and clypeus dull, finely and closely punctured; the face around and below the ocelli is moderately swollen, shining, less closely but more strongly punctured. Temples shining, very finely and sparsely punctured. Pronotum dull, transversely rugulose. Mesonotum dull and closely, strongly punctured in front, posteriorly more coarsely and more distantly punctured and also shining. Scutellum smooth and shining in front, dull and closely punctured behind and at the sides. Metanotum dull, transversely rugulose-punctate. Mesopleurae shining, not very closely punctured. Dorsum of epinotum nearly dull, finely and longitudinally rugoso-striate, the striae connected by transverse and irregular branches; the declivity and sides dull, finely punctaterugose. First tergite shallowly punctate, rugulose and dull, the remaining tergites microscopically rugulose and slightly shining, their apical margins widely impressed. Mesosternum and abdominal sternites shining, sparsely and very shallowly punctured. Face below the ocelli, temples, mesonotum in front, sides of the thorax, metanotum, declivity of the epinotum and base of the first tergite clothed with a long, fine and white pilosity; base of second tergite, the sternites and femora with shorter and much scantier pilosity.

Median lobe of the clypeus rounded at the corners in front, wider than long. Anterior ocellus fully twice as large as one of the posterior, the latter nearly touching the eyes. The inner orbits, from the base to their point of contact, are as long as the distance between their bases. Second joint of the flagellum nearly three times longer than the first, and a little longer than the third; the latter and the fourth subequal. Declivity of the epinotum more convex transversely than in the 9 . Pygidial area dull, irregularly and superficially rugose, triangular, the apex widely rounded. Radial cell longer than in the $q$, but the proportions of the abscissae of the radius are about the same as in the $\%$.

Several $\delta^{*} \delta^{\circ}$ and $9+9$, taken on aphid-infested Thuya bushes, Hillside, Bulawayo. Type of $\delta$ in R.M. coll. (R.M. \& T.M. colls.)

## Astata melanaria Cameron.

Having recently seen an example, I am now able to give a correct description of this species. Cameron's description is incorrect in several particulars and suffers from some important omissions.
$d^{*}$. 10 mm . long. Black, tegulae and base of fore tibiae yellowish white, middle and hind tarsi fusco-ferruginous, the fore tarsi ferruginous. Face below the ocelli with a dense whitish pilosity; temples, thorax (chiefly at the sides), base of first tergite and first and second sternites with a fine, sparse and whitish pilosity. Clypeus and lower half of the face closely and finely punctured; upper part of face swollen, impressed longitudinally in the middle, strongly punctured and slightly shining, behind the posterior ocelli more finely punctured and dull. Mesonotum shining, strongly and irregularly punctured, the puncturation closer and finer in front and at the extreme base. Scutellum shining, sparsely and coarsely punctured in the middle, more finely and closely punctured and dull at the sides. Metanotum dull, punctate rugose. Mesopleurae dull, closely and deeply punctured. Dorsum of epinotum reticulate, the meshes wide apart and thin. The declivity, sides of epinotum
and the metapleurae closely finely reticulate and dull. Abdomen above microscopically rugulose, the basal segments fairly dull, the three apical segments slightly shining, the first tergite closely but not coarsely punctured, the second tergite with a few scattered punctures, the first to sixth sternites shining, sparsely and sharply punctured, chiefly at the sides.

Clypeus produced in the middle in front into a short triangular point, not rectangularly lobed as in most of the species. The length of the inner orbits from the base below to their point of contact above is distinctly greater than the distance between their bases. Second joint of the flagellum nearly three times longer than the first, the third and fourth subequal.

Pygidial area triangular, the apex rounded, dull, with a few large and shallow punctures near the base. There is no sign in the specimen before me of the "large oval depression" on the apical sternite which is mentioned in Cameron's description.

Fore wings faintly fusco-hyaline, the apex beyond the cells hyaline.
Willowmore, C.P. (leg. Dr H. Brauns).

## Astata flavo-undata Brauns, var. quadrisignata, n.v.

Of the same size as the type species, from which it differs only in having the abdomen black instead of piceous, and in having transverse lemon-yellow streaks on the second tergite as well as on the first.

I omitted to mention in the description of this species that it belongs to the species-group Dryudella Spinola. This is characterised by the more delicate sculpture of the epinotum, the yellow markings on the abdomen and by the radial cell being shorter than in the Astata-group, s.str., or less than twice as long as wide. The first recurrent vein is also interstitial as a rule with the first transverse cubital vein, and the first cubital cell is much larger than the second or third, often larger than those two combined.
var. quadrisignata was taken in some numbers by Mr R. Stevenson at Hillside, Bulawayo, July-August. Type in R.M. coll. (R.M. \& T.M. colls.)

## REVISED KEY TO THE SPECIES OF ASTATA.

( O .
(4) I. Abdomen with yellow markings; radial cell less than twice as long as high.
(3) 2. Transverse lemon-yellow streaks on the first tergite only.
flavo-undata Brauns
(2) 3. Transverse lemon-yellow streaks on the first and second tergites.
flavo-undata, var. quadrisignata Arnold
(I) 4. Abdomen without yellow markings; radial cell fully twice as long as high.
(8) 5. Tegulae yellowish-white.
(7) 6. Legs in greater part red; clypeus produced into a short rectangular lobe; mesonotum shining only in the middle. gracilicornis Arnold
(6) 7. Legs in greater part black, the tarsi more or less reddish brown, the base of the fore tibiae yellowish white; clypeus narrowed to a point in the middle; mesonotum shining. melanaria Cameron
(5) 8. Tegulae black.
(12) 9. Last two or three abdominal segments reddish.
(iI) 10. Tibiae and tarsi ferruginous; dorsum of epinotum longitudinally striato-reticulate.
ruficaudata Turner
(10) 11. Tibiae and tarsi fusco-ferruginous; dorsum of epinotum closely reticulate-rugose. rufitarsis Smith
(9) 12. Last two or three abdominal segments black.
(14) 13. Posterior tibiae and tarsi, middle tibiae on the inner side and tarsi dark ferruginous; dorsum of the epinotum with a very open and strong reticulation.

Stevensoni Arnold
(13) 14. Posterior and middle tibiae black; dorsum of epinotum closely longitudinally striate and also somewhat reticulate. albopilosella Cameron

## ¢\%.

(4) 1. Abdomen very shining, red or yellowish red.
(3) 2. Abdomen yellowish red, wings fuscous; dorsum of epinotum closely reticulate and dull; pygidial area tricarinate. tropicalis Arnold
(2) 3. Abdomen red, wings hyaline, pale fusco-hyaline beyond the cells; dorsum of epinotum shining, with a strong and very open reticulation; pygidial area microscopically reticulate-punctate and without carinae.

Stevensoni Arnold
(I) 4. Abdomen dull or not very shining, not entirely ferruginous; if smooth and shining, then the last three segments are ferruginous.
(6) 5. Abdomen smooth and shining, the last three segments ferruginous; radial cell short; small species less than 8 mm . long.
ruficaudata Turner
(5) 6. Abdomen dull, the apical segments black.
(8) 7. Legs, apical half of the first, whole of the second and base of the third abdominal segments dark red; abdomen quite dull.
gracilicornis Arnold
(7) 8. Legs black, only the tarsi fusco-ferruginous, if at all.
(10) 9. Dorsum of epinotum longitudinally and somewhat obliquely striatorugose, and with transverse branches ; first tergite glabrous.
fuscistigma Cameron
(9) 10. Dorsum of epinotum widely and coarsely reticulate, the rugae not greatly emphasised lengthwise; first tergite with a thin and long whitish pilosity.
albopilosella Cameron

## A. fuscistigma Cam., and A. albopilosella Cam.

Failing an examination of the types, the validity of the second species remains at present in doubt. Some years ago some specimens from Rhodesia were identified for me by Mr Rowland Turner as $\boldsymbol{o t}^{\boldsymbol{*}}{ }^{\boldsymbol{N}}$ of albopilosella, and at the same time a $q$ from Willowmore as a fuscistigma. On what grounds the latter identification was based I do not know, but it has to be borne in mind that Cameron described only the $\delta^{\prime}$, from Dunbrody, C.P. The $q$ corresponding to the of identffied by Turner as albopilosella is not in doubt, as I have taken it in company with the males and have seen a large series of both sexes, all from Rhodesia. It has the first tergite distinctly pilose. On the other hand, Dr Brauns has submitted to me all his material of what he takes to be fuscistigma, all captured in the Karroo and coastal districts of the Cape Province, and comprising 409 and $140 \sigma^{\circ} \sigma^{\circ}$. These $9 \%$, like the specimen identified by Mr Turner as fuscistigma, have the first tergite glabrous, but amongst the $14 \delta^{7} \sigma^{7}$ I cannot find a single constant character which will serve to distinguish them from the $\mathbf{o n}^{\circ} \sigma^{\circ}$ albopilosella from Rhodesia. Moreover, there is not in Dr Brauns' collection a single $q$ from the Union with a pilose first tergite. I can therefore only conclude that albopilosella is only a northern variety of fuscistigma, differing only in the 9 sex from the type.

It is perhaps hardly necessary to add that Cameron in his description of albopilosella has confused the base and apex of the thoracic segments; by "apical half of the scutellum closely punctured" he means the basal or posterior half.

## Diploplectron africanum Arnold.

Several specimens of this insect have been taken by Mr Stevenson and myself near Bulawayo. Like the Astata they are fond of the honey-dew secreted by aphids infesting Thuya bushes. The size varies from 4 to 6.5 mm . The prey is a small Heteropteron.

# PEMPHREDON Group. 

Psen Latr. (Kohl).
Psen silvaticus n.sp. (fig. $28 a, b$ ).
9. 12 mm . long. Black; scapes and first two joints of the flagellum underneath, the pronotal tubercles and tegulae, the apical joint of the anterior tarsi, the anterior and middle femora in front, the basal third of the anterior tibiae and the extreme base of the middle tibiae and hind femora, dark red; the petiole and apex of the pygidium piceous, the calcaria dirty ochreous. Wings fusco-hyaline, the veins black. Face below the antennae clothed with golden pubescence, the rest of the head and the thorax with a greyish and sparse


Fig. 28. Psen silvaticus, ㅇ. $a$, head; $b$, hind wing.
pubescence, longest on the declivity and sides of the epinotum. Legs with a decumbent and fine greyish pubescence. Abdomen smooth and shining, with a very scanty, microscopic and whitish pubescence, chiefly at the sides of the apical margins, the pygidial area with a few longer, exserted hairs. Face below the antennae dull, closely, finely and shallowly punctured, above the antennae nitidulous, more strongly punctured, the punctures becoming progressively larger and further apart towards the occiput. Temples finely and not closely punctured. Thorax fairly dull; mesonotum strongly and closely punctured, and somewhat longitudinally rugose in addition; scutellum longitudinally striate, with a few shallow punctures between the striae; metanotum closely and finely punctate-rugulose, the mesopleurae closely punctatestriate. Epinotum closely reticulate-rugose, finely so at the sides and on the declivity, the dorsum with some stouter striae near the base, the declivity with a shallow median sulcus.

Anterior margin of the clypeus slightly and narrowly produced in the middle. The transverse carina below the antennal sockets does not reach the margins of the eyes, in the middle it is connected with a feebly raised line which does not extend to the anterior ocellus. Posterior ocelli nearer to each other than they are to the eyes. The scape is as long as the second joint of the flagellum, the latter is about three and a half times longer than wide at the apex,
about one-third longer than the third joint, and three and a half times longer than the first; the flagellum is subclavate. Temples and vertex well developed, the former when seen from the side being nearly as wide as the eyes. Interocular distance on the vertex equal to the length of the first four joints of the flagellum. Pronotum linear behind. Mesonotum very convex, twice as long as the scutellum and much wider than long. Dorsum of epinotum very short, merging into the declivity by a rapid curve. Petiole moderately curved, as long as the first and second tergites united. Pygidial area elongate-triangular, three and a quarter times longer than wide at the base, sharply marginate latefally, shining, with a few fine punctures at the sides, the apex subacute. Posterior femora with a row of short spines on the outer side. Third abscissa of the radius as long as the first and second united; the first recurrent vein enters the second cubital cell at the middle, the second is interstitial with the second transverse cubital vein. In the hind wing the cubital vein originates well before the apex of the submedial cell.

Mt. Chinzewa, 6200 ft ., Vumba Range, near Umtali, S.R. One $q$ taken flying round a species of wild raspberry, in the hollow stems of which it probably nests. Type in R.M. coll.

In the key to the genera, this genus runs down to paragraph 37, and may be separated from Psenulus by the character of the venation in the hind wing, the cubitus in Psen always arising before the apex of the submedial cell. For other differences between this genus and Psenulus, which are really rather slight, see remarks on p. 47, Part IV.

Psen patellatus n.sp. (fig. 29, $a, b$ ).
万. 7 mm . long. Black; basal joints of all the tarsi whitish, the remaining joints yellowish white, becoming
darker towards the apical joint which is brown. Last five joints of the flagellum ochreous below, the apical joint also of that colour on the upper side. Anterior tibiae brownish inwardly on the upper

a surface. Tegulae testaceous. Wings hyaline, the veins and stigma black. Face and clypeus clothed with a dense silvery pubescence, entirely obscuring the sculpture; the pubescence extends above the antennal sockets in a triangular median patch nearly as far as the anterior ocellus; the face, above and to the sides of that point, and the vertex have only a very fine, outstanding and greyish pubescence. The thorax and legs have a whitish and not very dense suberect pubescence, which, however, is long and dense on the anterior tibiae. Abdomen with a decumbent, scanty and whitish pubescence, not forming distinct transverse fasciae on the apical margins.

Face and vertex dull, closely punctured, almost reticulate-punctate, the punctures becoming larger behind the eyes and near the occipital margin; the ocellar area sparsely and coarsely punctured. Temples wide, as wide as the eyes when seen from the side, dull, closely striato-punctate. Neck of pronotum
rugulose, the collar dull and strongly punctured. Mesonotum, mesopleurae, scutellum and metanotum punctured, the mesopleurae and metanotum fairly closely so, the mesonotum and scutellum more unevenly, more coarsely and less closely punctured. Metapleurae nearly smooth. Dorsum of epinotum oblique, twice as long as the declivity, their junction defined by sharp and outstanding rugae. At the base, the dorsum has a wide triangular area bounded by sharp carinae or rugae, the space so enclosed having two or three oblique carinae on each side. The apex of the triangle is continued into a wide depression at the bottom of which is a deep sulcus; the depression is margined laterally by one or two rugae which join the transverse ones on the brow of the declivity. The sides of the latter area are also sharply margined. The sides of the epinotum are vertically rugose, the rugae becoming thicker and further apart below. Petiole rugose above, the abdomen nitidulous, microscopically rugulose.

Anterior margin of clypeus straight. There appears to be a low transverse carina between the antennal sockets, but it is difficult to see owing to the pubescence. Scapes much widened, subglobose, a little longer than wide. First joint of the flagellum globose and sunk into the scape, the second and third joints as long as wide at the apex, all the remaining joints except the last wider than long; the last six joints greatly widened, hollowed out below, produced laterally towards their apices; the apical joint is slightly curved near the blunt apex and is a little longer than its basal width. Posterior ocelli slightly further from each other than they are from the anterior ocellus, separated from the eyes by a distance twice as great their distance from the anterior ocellus. Eyes equally divergent above and below. Collar of pronotum short, its anterior margin carinate (obscured by the pubescence). Mesonotum in front of the tegulae twice as wide as long in the middle, and twice as long as the scutellum; the whole epinotum somewhat shorter than the mesonotum and scutellum united. Petiole twice as long as wide, the rest of the abdomen oblongo-ovate, the first tergite as long as wide at the apex; eighth ventral plate produced into a short, sharp spine. Posterior tibiae with a widely spaced row of short spines on the outer margin. Anterior tibiae dilated and fringed with long pubescence on the outer margin. Basal joint of anterior tarsi greatly widened, patellate, fully as long as the remaining joints united, the third and fourth asymmetrical. Both recurrent veins enter the second cubital cell, but the first is almost interstitial with the first transverse cubital vein.

Onoolonga and Mafa, S.W. Afr. Protectorate, 3 d $^{\star} \delta^{\circ}$, February. Type in the S.A. Museum coll.

According to the structure of the antennae this species belongs to the Psen group, s.str., but in the venation it partakes of the characters of the subgenus Mimesa Wesmael.
Spilomena Stevensoni n.sp. (fig. 30).
ㅇ. 2.5 mm . long. This species is very closely allied to $S$. Merceti Brauns, from which it differs as follows.

Head seen from in front distinctly wider than long (as long as wide in Mercetz); median area of clypeus carinate longitudinally. Mesopleurae microscopically rugulose, without punctures. Face impunctate. Otherwise like Merceti.
ot. 2.2 mm . long. Black; legs, mandibles, clypeus, sides of the face as far as the upper third of the eyes, lower half of the underside of the head, prosternum, sides of the pronotum, pronotal tubercles and tegulae, pale lemonyellow. Scape and first joint of the flagellum ochreous, the rest of the flagellum pale brown. Cheeks well developed, one-third the length of the scape. Meso-
notum more convex and narrower than in the $q$. First segment of the abdomen more narrowed towards the base than in the 9 , a little longer than wide across its apical margin; apical segment triangular, a little wider than long, the apex subacute. Otherwise like the 9 .

Nesting in straws of thatch, Hillside, Bulawayo, March. Several of and 3 ơ $^{\circ}$ (R. Stevenson). Type in R.M. coll. (R.M. \& T.M. colls.)

Of Merceti I have seen another specimen preserved in spirit, ex coll. Brauns, and can add to my former description the following notes.

The face is very finely and sparsely punctured in addition to the microscopic


Fig. 30. Spilomena Stevensomi, of, head. $\times 60$ diameters, the dotted part black, the rest yellow. rugulosity. The mesopleurae are smooth in the middle, finely punctured in front and obliquely striolate behind. The dorsum of the epinotum is transversely striate, and has two longitudinal rugae in the middle which reach the apex, the space between very regularly and sharply striate. The median area of the clypeus is strongly convex but not carinate.
Stigmus rugosifrons Arnold, $\widehat{\sigma}$.
${ }^{\circ}$ (hitherto undescribed). 4.5 mm . long. Mandibles and palpi lemonyellow, legs and antennae paler than in the $q$. Sculpture like that of the $q$ but stronger, especially on the epinotum. Clypeus finely aciculate-punctate and not very shining, its produced median portion wider than in the $q$ and less deeply excised in front. Third and following joints of the flagellum slightly widened below. The first joint is slightly shorter than the second, the latter and the third subequal. The head is much shorter behind the eyes than in the $\rho$. In the latter, the distance in the middle from the level of the posterior margin of the eyes to the neck is two-thirds the length of the interocular distance on the vertex, whereas in the $\sigma^{\circ}$ it is barely half. The petiole is longer, or a little longer than the first and second tergites united (clearly shorter than that in the ${ }^{\text {q }}$ ). The spine of the eighth ventral plate is subacute. Otherwise like the $q$.

Hillside, Bulawayo. Taken with the $\circ \rho$, nesting in the straws of thatch. Type in R.M. coll.
Ammoplanus rhodesianus n.sp. (figs. 3 I $a \& b$ ).
ㅇ. 2 mm . long. Black; mandibles, scapes, first three joints of the flagellum below, the anterior tibiae and the tarsi, pale yellow; the rest of the flagellum brown. Pronotal tubercles, tegulae in part, trochanters, apical third or fourth of the middle and hind femora, basal third of the middle and hind tibiae, the middle and hind tarsi, dirty white; the rest of the femora and tibiae blackish brown, the apical joint of all the tarsi brownish. Epinotum slightly, the rest



Fig. $31 a$ and $b$. Ammoplanus rhodesianus, $9 . \times 30$ diam.
of the body very shining. Face microscopically rugulose, chiefly longitudinally. Pronotum, mesonotum and scutellum very finely but distinctly transversely rugulose. Metanotum smooth in the middle, striolate at the sides. Dorsum of epinotum evenly and sharply reticulate, the meshes fairly wide; the sides finely, irregularly and obliquely striate, the declivity shining and transversely striate. Head distinctly wider than long (as wide as long in A.capensis Brauns), much shorter above the eyes than in capensis. Clypeus not linear, much more strongly developed than in capensis; the median area is three times wider than long, slightly raised in the middle, the anterior margin feebly concave, with the anterior lateral angles subacute. The ocelli are much larger than in capensis. The mesonotum is more convex in front, and the dorsum of the epinotum is shorter than in capensis, with the apical angles more widely rounded. Antennal joints as in capensis. The pterostigma is blackish in its distal half, not yellowish brown as in the other species. The venation is similar, but the radius ends abruptly some distance away from the costa.
$\delta^{*}$. A trifle smaller than the $\stackrel{p}{ }$. Mandibles, clypeus, scapes and lower half of the face at the sides, lemon-yellow. Anterior and middle tibiae pale ochreous, the dark area on the femora paler than in the 9. First joint of the flagellum barely longer than the second, the latter as long as the third. Median area of the clypeus obtusely carinate in the middle, the carina ending in a blunt tubercle in front; the lateral angles of the median area produced into short rounded teeth. Otherwise like the of.

Sawmills, S.R., December, nesting in a sandy bank ; Bulawayo (Stevenson), nesting in the cracks of an old mud wall. (R.M. \& T.M. colls.) Types in R.M. coll.

Easily distinguished from A. capensis by the wider head and the different sculpture of the epinotum.

## LARRA Group.

## Kohliella Stevensoni n.sp.

${ }^{7} .9 \mathrm{~mm}$. long. Head and thorax black, tegulae, costa and veins ochreous, the latter becoming darker distally. Coxae and trochanters black, legs and first three abdominal segments burnt-sienna red, the remaining segments black with narrow testaceous margins. Wings hyaline. Face below the median protuberance densely clothed with silvery pubescence which obscures the sculpture. Thorax with a long, outstanding and greyish pilosity. Abdomen almost glabrous. Clypeus sparsely and strongly punctured, the anterior margin narrowly depressed and strongly bidentate in the middle. Median swelling of the face shining and sharply punctured, the punctures fairly far apart. Ocellar area shining and more closely punctured. Vertex shining and sparsely punctured, with a median groove from the occipital margin which does not reach the ocellar area. Temples smooth and almost impunctate. Thorax shining, finely and sparsely punctured, the epinotum more finely than the rest and also very superficially aciculate. Abdomen shining, sparsely and microscopically punctured.

The median swelling of the face is less prominent than in $K$. alaris. The interocular distance on the vertex is equal to the length of the first two joints of the flagellum. The second joint is as long as the third, and twice as long as the first. The mesonotum is relatively wider and less convex transversely than in alaris, and the scutellum and metanotum are also flatter than in that species. The venation, tarsal comb and shape of the eighth ventral plate are like those of alaris. The spines on the legs are blackish.

Sawmills, S.R., July, $2 \sigma^{\circ} \sigma^{\circ}$ (R. Stevenson). Type in R.M. coll.

## Kohliella alaris Brauns, 아.

O (hitherto undescribed). 7 mm . long. Legs dark brown, the tarsi paler, their apical joints ochreous. Clypeus shining, coarsely punctured. Median swelling and sides of the face, and the vertex shining, finely, sharply and not closely punctured. Mesonotum and scutellum shining, sparsely punctured, the punctures larger than those of the face. Mesopleurae shining, closely and finely punctured. Pygidial area sparsely and very finely punctured, elongatetriangular, the apex subacute, the lateral margins barely raised. Antennal joints longer than in the $\delta^{\circ}$. Anterior tarsi with a well developed comb of long brownish spines, of which there are eight on the basal joint, and two each on the others, the first three acute, the other spines slightly spatulate. Abdomen less oblong than in the ${ }^{\star}$, shaped as in Tachysphex. Otherwise like the $\delta^{*}$.

Hex River, C.P. (L. Peringuey). Type in the R.M. coll.
This species also occurs in S. Rhodesia, a $\delta^{\pi}$ having been taken by myself near Bulawayo in February.

## Tachysphex Kohl.

A large number of new forms has to be added to our list for this genus, necessitating a complete revision of the keys to the species. Some observations, based on the examination of quite a large amount of material, may be noted at this point.

In a few species, e.g. octodentatus, Hermia, Titania, there is a distinct degree of variation in the width of the vertex, although in the majority of the species that character is very constant. There is also a noticeable amount of variation within some species in the structure of the median area of the clypeus, it is, for instance, more tumid in some specimens than in others, sometimes the teeth and excisions which may be present on the anterior margin vary to a recognisable extent in their width, acuteness and length, but on the whole, it may be said that that region of the head furnishes quite reliable characters for the separation of the species. On the other hand, the supra-antennal bosses or tubercles, which are present in all the species of the genus, vary so little in shape, with the exception of T. bituberculatus, that it has not seemed necessary to mention them in the descriptions. Similarly, the longitudinal sulcus in the middle of the declivity of the epinotum is a structural character common not only to all the members of this genus, but also to all the Larrinae and to some other groups of the Sphegidae. Some authors have paid some attention to it in their diagnoses, but as it does not vary sufficiently to furnish any reliable specific characters, it seems to me that any special reference to it can only mislead the student into the belief that it is absent from other species.

In taking the measurements of the width of the dorsum of the epinotum, it should be borne in mind that in the descriptions throughout this work, the width is measured along a line joining the extreme anterior angles of the segment, that is to say a line which usually cuts across the base of the scutellum or across the metanotum : it is not to be measured along a line tangential to the curve of the metanotum. It is very desirable that measurements of the joints of the antennae and of the interocular width should be made with a micrometer eyepiece or a prism drawing-apparatus, since the unaided eye is very easily deceived in this respect.

With a few exceptions, the structure of the apical tergite and sternite in the $\sigma^{7}$ varies so little within the genus that it has not been found necessary to mention it in the descriptions.

## KEY TO THE SPECIES OF TACHYSPHEX + 아.

(6) 1. Species with dark fuscous wings.
(3) 2. Abdomen dark red.

## depilosellus Turner

(2) 3. Abdomen black.
(5) 4. Wings with a strong violaceous tint; the apical abdominal segment rufo-testaceous; interocular distance on the vertex slightly less than the length of the second joint of the flagellum. Marshalli Turner
(4) 5. Wings without a violaceous tint; apical segment of the abdomen black; interocular distance equal to the length of the first two joints of the flagellum.
punctatus Smith
(I) 6. Wings not dark fuscous.
(22) 7. Wings moderately, but distinctly, fuscous, or fusco-flavo-hyaline.
(19) 8. Whole body, excluding the legs, black; red colour if present confined to the last two abdominal segments; mesonotum finely punctured, dorsum of epinotum finely and closely reticulate-punctate or rugoso-punctate.
(12) 9. Interocular distance on the vertex greater than the length of the first two joints of the flagellum.
(ii) io. Wings strongly flavo-hyaline basally, fusco-hyaline apically.
saevus Arnold
(io) ir. Wings fuscous all over, the apex paler.
Braunsi Arnold
(9) 12. Interocular distance on the vertex less than the length of the first two joints of the flagellum.
(16) 13. Femora and tibiae black.
(15) 14. Abdomen entirely black. diabolicus Arnold
(14) i5. Pygidium and apical half of the preceding segment red.
diabolicus, var. analis Arnold
(13) 16. Tibiae and apical third or more of the femora, red.
(18) 17. Interocular distance on the vertex shorter than the second joint of the flagellum; mesonotum very shining. diabolicus, var. claripes Arnold
18. Interocular distance on the vertex a little longer than the second joint of the flagellum; mesonotum dull. diabolicus, var. trifasciatus Arnold
19. Very coarsely punctured, the epinotal dorsum coarsely reticulate; at least the second and a part of the first abdominal segments red.
20. The greater part of the first, and the whole of the second abdominal segments red.

Turneri Brauns
21. The whole abdomen, except the base of the first tergite, red.

Turneri, race transvaalensis Arnold
(7) 22. Wings hyaline, or faintly fusco-hyaline or flavo-hyaline, rarely (T. Barkeri) with darker colour proximally.
23. Body, excluding the eyes and legs, black, at the most only the apical fourth of the abdomen otherwise coloured.
24. Larger species, usually more than 10 mm . long, rarely as little as 9 mm ., if the latter, then the claws are not asymmetrical, nor has the clypeus eight rounded teeth on the anterior margin.
25. Pilosity abundant on the thorax, especially on the epinotum, where it obscures the sculpture; transverse fasciae of pubescence on the abdomen quite conspicuous.
26. Mesonotum dull, microscopically reticulate-punctate; eyes greenish yellow in life, yellow when dead; interocular distance on the vertex equal to twice the length of the second joint of the flagellum.
bruneiceps Arnold
27. Mesonotum sharply and fairly finely punctured, aciculate between the punctures; eyes blackish green in life, dull olive when dead; interocular distance barely greater than the length of the second joint of the flagellum.
syriacus Kohl
(25) 28. Pilosity less abundant, never obscuring the sculpture of the epinotum.
(30) 29. All the tibiae and tarsi, the apical third or more of the fore and middle femora, and all the hind femora, ferruginous.
sericeus Smith
(29) 30. Legs otherwise coloured.
(32) 3r. The fifth and sixth, and apical margin of the fourth abdominal segment, ferruginous (epinotum sharply and longitudinally striate, punctulate between the striae; interocular distance a little shorter than the second joint of the flagellum). vulneratus Turner
(31) 32. Abdomen entirely black.
(34) 33 . Wings faintly fusco-hyaline, strongly tinged with ochreous proximally; mesonotum dull, very finely and closely punctured. Barkeri Arnold
(33) 34. Wings without ochreous tint; mesonotum not very finely punctured and more or less shining between the punctures.
(36) 35 . Mesonotum deeply and fairly closely punctured (pygidial area finely punctured).
ambiguus Arnold
(35) 36. Mesonotum shallowly and not very closely punctured.
(38) 37. Interocular distance on the vertex greater than the length of the first two joints of the flagellum (pygidial area finely punctured; pilosity of head and thorax short).
punctatiformis Brauns
(37) $3^{8}$. Interocular distance on the vertex equal to the length of the first two joints of the flagellum (pygidial area with large, shallow and widely spaced punctures; pilosity of head and thorax long).
crassipes Arnold
(24) 39. Smaller species, 8 mm . long or less, rarely as much as 9.5 mm ., if more than 9 mm . long then the claws are asymmetrical or the clypeus is crenulate, with eight rounded teeth on the anterior margin.
(45) 40 . Legs in greater part red, at least all the tibiae and tarsi are wholly red.
(42) 41. Claws thin and long, as long as the apical joint of the tarsus, the apical joint as long as the second.
unguiculatus Arnold
(41) 42. Claws hardly as long as, or shorter than the apical joint of the tarsus, the latter shorter than the second joint.
(44) 43. Last two abdominal segments red; mesonotum and scutellum shining, dorsum of epinotum sharply longitudinally rugoso-striate.

Stevensoni Arnold
44. Abdomen entirely black; mesonotum and scutellum dull; dorsum of epinotum closely and finely rugose, also reticulate.
karrooensis Arnold
(40) 45 . Legs usually in greater part black, if not, then the posterior tibiae at least are not wholly red.
(47) 46. Anterior and middle tibiae and tarsi, and apices of all the femora, pale ferruginous; hind tibiae fuscous, ferruginous only at the base and apex.
modestus Arnold
(46) 47. Femora and tibiae blackish.
(49) 48. Supra-antennal tubercles greatly hypertrophied, forming two wedgeshaped prominences set close together. bituberculatus Arnold
(48) 49. Supra-antennal tubercles normal.
(53) 50. Claws of the tarsi asymmetrical, one much larger than the other.
(52) 51. Anterior margin of the clypeus narrowly excised in the middle, with two distinct teeth on each side of the median area; fourth tarsal joint broadly conical, the apical angles not produced ( $6.5-9.5 \mathrm{~mm}$. long).

Hippolyta Arnold
(51) 52. Anterior margin of the clypeus convex and entire, with an indistinct tooth on each side of the median area; fourth tarsal joint deeply bifid, with rounded and widely projecting apical angles. harpax Arnold
(50) 53. Claws normal.
(55) 54. Anterior margin of the median area of the clypeus crenulate, forming eight more or less distinct, rounded teeth ( $9-10 \mathrm{~mm}$. long).
octodentatus Arnold
(54) 55. Clypeus differently formed.
(57) 56. Whole body, excepting the epinotum, very shining, finely punctured, the thorax very sparsely so; abdomen without pubescent fasciae.
limatus Arnold
(56) 57. At least the face dull, the puncturation rarely sparse, pubescent fasciae usually present on the abdomen.
(59) 58. Antennae long and slender; the second joint of the flagellum from two and a half to two and three quarter times longer than the first.
filicornis Kohl
(58) 59. Antennae shorter, the second joint of the flagellum not more than twice as long as the first.
(61) 60. Second joint of the flagellum not more than one-third longer than the first; wings pale flavo-hyaline, faintly fuscous towards the apex $(8.5 \mathrm{~mm}$. long).

Oberon Arnold
(60) 6r. Second joint of the flagellum at least two-thirds longer than the first; wings without any yellow tint.
(63) 62. Mesonotum shining, sparsely and shallowly punctured (interocular distance on the vertex equal to the length of the first two joints of the flagellum, plus half of the third).
aterrimus Arnold
(62) 63. Mesonotum closely punctured, not very shining.
(65) 64. Dorsum of epinotum dull, exceedingly finely and evenly reticulatepunctate (mesonotum dull, very closely and finely punctured).
argentifrons Arnold
(64) 65 . Dorsum of epinotum more or less striate or rugose, or reticulaterugose.
(67) 66. Dorsum of epinotum short, two and a half times wider at the base than long in the middle, its outline seen from above almost semicircular.
tridentatus Arnold
(66) 67 . Dorsum of epinotum longer, its outline subelliptical or trapezoidal.
(69) 68. Tergites fairly closely and distinctly punctured, the punctures becoming gradually finer towards the apex of the abdomen. Titania Arnold
(68) 69. Tergites only feebly punctured, if at all.
(73) 70. Wings pale fusco-hyaline.
(72) 71. Interocular distance on the vertex greater than the length of the first two joints of the flagellum, and slightly greater than that of the second and third; mesonotum not very coarsely punctured, sides of epinotum closely and finely striate.
saturnus Arnold
(71) 72. Interocular distance on the vertex equal to the length of the first two joints of the flagellum; mesonotum coarsely punctured, sides of epinotum coarsely and not closely striate.
ambiguus, var. congoensis Arnold
(70) 73. Wings hyaline.
(75) 74. Interocular distance on the vertex greater than the length of the first two joints of the flagellum, but equal to that of the second and third.

Hermia Arnold
(74) 75. Interocular distance on the vertex less than the length of the second and third joints of the flagellum.
(77) 76. Median area of the clypeus narrowly excised in the middle of the anterior margin, and with two small teeth at its lateral angles; vertex dull, finely and closely punctured (calcaria of hind tibiae dull ochreous).
laticeps Arnold
(76) 77. Clypeus not excised, with only one tooth at the lateral angles; vertex shining, not very closely punctured.
(79) 78. $5 \cdot 5-7 \mathrm{~mm}$. long; clypeus finely punctured; abdomen with pubescent fasciae on the apical margins of the first four tergites.
minutulus Arnold
(78) 79.8 mm . long; clypeus coarsely punctured; abdomen without pubescent fasciae (calcaria of hind tibiae piceous).
crassipes, var. claripennis Arnold
(23) 80. Abdomen in greater part red, or at least the first two segments red.
(84) 81. Wings flavo-hyaline and more or less fuscous towards the apex; fairly large species, i3 mm . long, or more.
(83) 82. Last three segments of the abdomen blackish; dorsum of the epinotum coriaceous-reticulate; antennae short and stout. asinus Arnold
(82) 83. Abdomen entirely flavo-ferruginous; dorsum of epinotum finely and closely reticulate-punctate; antennae slender.

Panzeri v.d. Lind, var. rhodesianus Bischoff
(81) 84. Wings hyaline or pale fusco-hyaline.
(86) 85 . Wings pale fusco-hyaline; large species $13-15 \mathrm{~mm}$. long (first two abdominal segments red, clypeus entirely black).
consanguineus Arnold
(85) 86. Wings hyaline; smaller species, less than 13 mm . long.
(90) 87. Dorsum of epinotum strongly and longitudinally rugose.
(89) 88. Legs black; mesonotum dull, strongly and closely punctate; interocular distance on the vertex equal to the length of the first two joints of the flagellum; first three abdominal segments red, the rest black.
prosopigastroides Bischoff
(88) 89. Legs red; mesonotum shining, finely and sparsely punctured; interocular distance equal to the length of the second joint of the flagellum; first, second, fifth and sixth abdominal segments red, the third and fourth black.
sericeus, race kalaharicus Arnold
(87) 90. Dorsum of epinotum not very strongly sculptured.
(92) 91. Mesonotum, scutellum and sides of the thorax very shining, finely and sparsely punctured. fulgidus Arnold
(91) 92. Mesonotum and scutellum not very shining, nor sparsely punctured.
(94) 93 . Dorsum of epinotum irregularly and somewhat sparsely rugose, the rugae chiefly longitudinal ( 7 mm . long).
subfimbriatus Arnold
(93) 94. Dorsum of epinotum very finely or microscopically sculptured.
(96) 95. Femora, tibiae and basal joint of middle and hind tarsi black.

Panzeri, var. miniatulus Arnold
(95) 96. Tibiae, tarsi and apices of the femora ferruginous.
(98) 97. Median area of the clypeus entirely black, its anterior margin with two teeth on each side ( 10.5 mm . long). Schönlandi Cameron
(97) 98. Anterior half of the median area of the clypeus flavo-ferruginous, or at least piceous.
(100) 99. Anterior half of the median area of the clypeus piceous; 7.5 mm . long.

Panzeri, var. nanus Arnold
(99) 100. More than 8.5 mm . long.
(102) 101. Pygidium and greater part of the abdomen ferruginous; 12 mm . long. Panzeri, var. dolosus Arnold
(IOI) 102. Last three abdominal segments black; less than 12 mm . long, usually between 8 and io mm .

Panzeri, vars. aethiopicus and Caliban Arnold

## KEY TO THE SPECIES OF TACHYSPHEX đ̛đ

(4) I. Species with dark fuscous wings.
(3) 2. Wings with a strong violaceous tint; seventh tergite rufo-testaceous; interocular distance on the vertex equal to the length of the first two joints of the flagellum.

Marshalli Turner
(2) 3. Wings without a violaceous tint; seventh tergite black; interocular distance on the vertex greater than the length of the first two joints of the flagellum, but equal to that of the second and third.
punctatus Smith
(1) 4. Wings not dark fuscous.
(14) 5. Wings moderately fuscous, fusco-hyaline or fusco-flavo-hyaline, at least not glassy clear.
(i3) 6. Whole body, excluding the eyes and legs, black; mesonotum finely punctured, dorsum of epinotum reticulate-punctate, abdomen not punctured. Eyes black; interocular distance on the vertex greater than the length of the first two joints of the flagellum, but equal to that of the second and third; 9 mm . long (wings fuscous).

Braunsi Arnold
8. Eyes greenish yellow; interocular distance on the vertex not greater than the length of the first two joints of the flagellum; $10-12 \mathrm{~mm}$. long.
9. Interocular distance on the vertex equal to the length of the first two joints of the flagellum.
10. Abdomen without pubescent apical fasciae; the apical fourth of the femora more or less ferruginous; wings fusco-hyaline, tinged with yellow basally.
diabolicus Arnold
II. Abdomen with narrow greyish pubescent fasciae on the first three tergites. Femora black, ferruginous only at the extreme apex; wings pale fusco-hyaline.
diabolicus, var. trifasciatus Arnold
12. Interocular distance on the vertex not greater than the length of the second joint of the flagellum; femora in greater part ferruginous; wings as in the type of the species.
diabolicus, var. claripes Arnold
13. Second abdominal segment and apical half of the first red; mesonotum coarsely punctured, dorsum of epinotum coarsely reticulate, abdomen strongly punctured.

Turneri Brauns
14. Wings hyaline, sometimes faintly fusco-hyaline or flavo-hyaline.
15. Body, excluding the eyes and legs, black, if at all ferruginous then at least the first four abdominal segments are black.
16. Epinotum with a long pilosity, more or less obscuring the sculpture; face with outstanding pilosity, plainly visible from above.
17. Basal half of first tergite with a dense, long and erect pilosity; interocular distance on the vertex a trifle more than the length of the second joint of the flagellum; mesonotum finely but distinctly punctaterugulose.
syriacus Kohl
(17) 18. Basal half of first tergite bare; interocular distance on the vertex about twice the length of the second joint of the flagellum; mesonotum microscopically reticulate-punctate. bruneiceps Arnold
(16) 19. Epinotum without a long and dense pilosity.
(35) 20. Tibiae and tarsi ferruginous (pubescence of face usually golden).
(22) 21. Third sternite with a dense fimbria of brown hairs extending over the middle third of the apical margin.
sericeus Smith
(21) 22. Abdomen without distinct ventral fimbriae.
23. Second and following sternites with a long and abundant pubescence, the sternites very distinctly punctured, the puncturation increasing in size posteriorly
24. 7.3 mm . long; femora black, red only at the extreme apex; mesonotum and scutellum dull, very closely and finely punctured.
modestus Arnold
25. $8.5-9.5 \mathrm{~mm}$. long; femora ferruginous, black only in the basal third, the posterior pair entirely ferruginous; mesonotum and scutellum shining, not very closely punctured.
punctiventris Arnold
26. Sternites without a long and dense pubescence.
(28) 27. Supra-antennal tubercles greatly hypertrophied, forming two wedgeshaped prominences set close together. bituberculatus Arnold
(27) 28. Supra-antennal tubercles normal.
(30) 29. Median area of the clypeus not much wider than long, the anterior margin obtusely angular in the middle; apex of abdomen black; pubescence of face silvery, becoming slightly golden above.
unguiculatus Arnold
(29) 30. Median area of clypeus at least half as wide again as long; apex of abdomen ferruginous or piceous; pubescence of face golden all over.
(32) 31. Legs almost entirely ferruginous, only the coxae and trochanters and a spot at the base of the middle femora black. Stevensoni Arnold
(31) 32. Fore and middle femora black, at least over the basal half.
(34) 33. Dorsum of epinotum with longitudinal rugae; fore and middle femora with only the extreme apex ferruginous; last two abdominal segments red. vulneratus Turner
(33) 34. Dorsum of epinotum without longitudinal rugae; apical halves of the fore and middle femora ferruginous; apical segment of the abdomen piceous.
karrooensis Arnold
(20) 35. Tibiae not ferruginous, usually black.
(37) 36. Dorsum of epinotum sparsely rugose, over the basal half or more the rugae radiate from the base outwardly, over the apical half they extend transversely from side to side ; interocular distance on the vertex equal to the length of the first four joints of the flagellum; 5 mm . long.
egregius Arnold
(36) 37. Dorsum of epinotum in no part transversely rugose.
(43) 38. Interocular distance on the vertex not, or only very little greater than the length of the first two joints of the flagellum.
(40) 39. Interocular distance on the vertex equal to the length of the second joint of the flagellum; second and third sternites with fimbriae of whitish or pale brown hairs on the apical margins. laticeps Arnold
40. Interocular distance on the vertex equal to the length of the first two joints of the flagellum, or a trifle more; sternites without fimbriae.
41. Median area of the clypeus tridentate on the anterior margin; dorsum of epinotum widely reticulate-rugose; apex of the first and all the remaining tarsal joints ferruginous, the second and third joints of about equal length.
octodentatus Arnold
42. Median area of clypeus produced into a short lobe in front, without teeth; dorsum of epinotum longitudinally and finely rugose; only the last three tarsal joints ferruginous, the second clearly longer than the third.
crassipes Arnold
43. Interocular distance on the vertex distinctly greater than the length of the first two joints of the flagellum.
44. Mesonotum dull, very finely and closely punctured, the dorsum of the epinotum microscopically reticulate and dull; anterior margin of the clypeus with a low triangular tooth in the middle.
argentifrons Arnold
(44) 45. Thorax with coarser sculpture.
(53) 46. Median area of clypeus with one or more teeth.
(48) 47. Median area of clypeus with a small and sometimes blunt tooth in the middle of the anterior margin, and one at each corner; apex of the first and all the remaining tarsal joints flavo-ferruginous.
tridentatus Arnold
(47) 48. Median area of the clypeus with only one tooth on the anterior margin; tarsal joints darker, or only the last two reddish.
(52) 49. Abdomen strongly punctured above, at least on the first two tergites.
(51) 50. Interocular distance on the vertex nearly equal to the length of the first four joints of the flagellum.

Titania Arnold
(50) 51. Vertex wider, the interocular distance being equal to the length of the first four joints of the flagellum, plus half of the fifth joint.

Titania, var. willowmorensis Arnold
(49) 52. Abdomen feebly punctured; tooth of clypeus narrow, as long as wide at the base.

Hermia Arnold
(46) 53. Anterior margin of the median area of the clypeus straight, or feebly convex, or obtusely angular in the middle, or produced into a short lobe, but without distinct teeth.
(55) 54. Clypeus produced into a short lobe in front (mesonotum shallowly and not very closely punctured; 10 mm . long). punctatiformis Brauns
(54) 55. Clypeus not lobed.
(57) 56. Sixth to ninth joints of the flagellum as wide as long; small species about 5 mm . long. minutulus Arnold
(56) 57 . Sixth to ninth joints of flagellum longer than wide; larger species, more than 5 mm . long.
(59) 58. Mesonotum shining, finely and not closely punctured.
aterrimus Arnold
(58) 59. Mesonotum not very shining, deeply, fairly closely and strongly punctured.
(61) 60 . Second joint of the flagellum only one-third longer than the first.

Hermia, var. angustus Arnold
(60) 61. Second joint of the flagellum at least half as long again as the first.
(63) 62. Tarsal joints fuscous; $5^{5 \cdot 3 \cdot 6} \cdot 5 \mathrm{~mm}$. long. filicornis Kohl
(62) 63 . Last three tarsal joints ferruginous; 7-8 mm . long. ambiguus Arnold
(15) 64. Abdomen, or at least its basal segment, ferruginous.
(66) 65 . Sculpture of head and thorax coarse, the dorsum of the epinotum strongly and longitudinally rugose; thorax without adpressed pubescence.
prosopigastroides Bischoff
(65) 66. Sculpture of head and thorax not coarse, the thorax usually with adpressed pubescence; the dorsum of the epinotum not strongly and longitudinally rugose.
(70) 67. Some of the sternites with tufts or fimbriae of long brown hairs on their apical margins.
(69) 68. Interocular distance on the vertex equal to the length of the second joint of the flagellum; second to fifth sternites with wide fimbriae of brown hairs. Schönlandi Cameron (var. detritus, fimbriae on third sternite only, the mesonotum very finely and sparsely punctured.
var. luctuosus, all the abdominal segments blackish with the apical margins fusco-testaceous.)
(68) 69. Interocular distance on the vertex equal to the length of the first two joints of the flagellum; third to sixth sternites with narrow tufts of brown hairs in the middle of the apical margins. subfimbriatus Arnold
(67) 70. Sternites without fimbriae.
(72) 71. Mesonotum and scutellum very shining, sharply but sparsely punctured (first three abdominal segments ferruginous; interocular distance on the vertex equal to the length of the second and third joints of the flagellum).
fulgidus Arnold
(71) 72. Mesonotum and scutellum not shining, closely punctured.
(78) 73. Wings flavo-hyaline, more or less fuscous towards the apex; io mm. long, or more.
(75) 74. Fourth to seventh sternites strongly punctured. Tuckeri Arnold
(74) 75. Sternites not strongly punctured.
(77) 76. Drrsum of epinotum coarsely reticulate-rugose; interocular distance on the vertex equal to twice the length of the second joint of the flagellum.
asinus Arnold
(76) 77. Dorsum of epinotum microscopically reticulate-punctate; interocular distance on the vertex nearly equal to the length of the second joint of the flagellum.

Panzeri, var. rhodesianus Bischoff
(73) 78. Wings hyaline, or pale fusco-hyaline.
(80) 79. Wings pale fusco-hyaline; ir mm. long (first and second abdominal segments ferruginous).
consanguineus Arnold
(79) 80 . Wings hyaline; smaller species, less than 10 mm . long.
(82) 81. Legs ferruginous, black only at the extreme base of the femora; abdomen pale ferruginous, slightly infuscated on the fifth and sixth tergites.

Panzeri, var. dolosus Arnold
(81) 82. At least the basal third of the femora blackish.

Panzeri, vars. aethiopicus, Caliban and nanus Arnold
T. diabolicus Arnold, var. analis v.n.

ㅇ. 12 mm . long. This differs from the type of the species as follows. Tarsi, apical half of the fifth and the whole of the sixth abdominal segments, ferruginous. Pubescence of the face and clypeus yellowish silvery.

Algoa Bay (Brauns). Type in coll. Brauns.
Not unlike T. Marshalli Turner, but smaller, and easily distinguished by the pale wings, finer sculpture of the thorax and the black tibiae, tarsi and femora.

## T. diabolicus Arnold, var. claripes v.n.

$\delta^{*} .12 \mathrm{~mm}$. long. Red colour of the legs paler and more extensive than in the type of the species, only the basal third of the upper surface of the fore and middle femora black. Pilosity and pubescence of the thorax and abdomen yellowish grey, not brown as in the type of the species, the pubescence forming distinct apical fasciae on the first four tergites. Median area of the clypeus more strongly punctured, its anterior margin straighter, with a distinct tooth on each side. Interocular distance shorter, being not greater than the length of the second joint of the flagellum. Antennae more slender.

ㅇ. 13.5 mm . long. Only the extreme base of the hind femora black; apical half of the fifth and the whole of the sixth abdominal segment ferruginous. Otherwise coloured like its $\delta$. Antennae even more slender than in the $\hat{\delta}$, the second joint of the flagellum nearly three times as long as the first. Interocular distance on the vertex less than the length of the second joint of the flagellum, equal to about twice the length of the first. Otherwise like the $\begin{gathered}0 \\ 0\end{gathered}$

Bulawayo, I ㅇ, 4 ơ $^{\star}$, August. Types in R.M. (R.M. and T.M. colls.)

## T. diabolicus, var. trifasciatus v.n.

ㅇ. 12.5 mm . long. Tibiae, tarsi and apical third of the femora pale ferruginous, the wings slightly paler than in the type of the species. Abdomen with dull greyish and very fine pubescent fasciae on the apical margins of the first three tergites; dorsum of epinotum finely reticulate-punctate or granulate, and with a very fine rugosity superimposed. Otherwise like the type of the species in pubescence, colour and sculpture.

Clypeus more convex lengthwise and relatively wider.
$\sigma^{t}$. 10 mm . long. Colour as in the 9 , but only the extreme apex of the femora ferruginous. Face and clypeus clothed with a fine pubescence, silvery below, golden above the antennal sockets. Anterior femora feebly excised, not deeply as in the type of of the species, which it otherwise resembles.

Algoa Bay, November-March, 2 ¢甲, 1 ơ (Brauns). Types in coll. Brauns.

## T. saevus n.sp.

ㅇ. 12 mm . long. Black; coxae, trochanters and extreme base of the anterior femora above, black, the rest of the legs bright ferruginous. Wings deep flavo-hyaline, the apical third from the second cubital and second discoidal outwards, fusco-hyaline, the nervures and tegulae yellow. Face and thorax with a short, yellowish grey pubescence, sparse and decumbent on the face, denser on the thorax; mesonotum and abdomen almost glabrous. Head dull, finely and closely punctured, the anterior half of the median area of the clypeus slightly shining, more sparsely and more coarsely punctured. Mesonotum and scutellum shining, evenly and very finely punctured, the mesopleurae and metanotum dull, the former as finely punctured as the mesonotum, the metanotum microscopically punctured. Dorsum of epinotum dull, finely reticulate-punctate, with a sparse and superficial rugosity superimposed on the basal half; the sides dull, microscopically and sparsely punctured, the declivity transversely striate. Abdomen smooth and almost dull, the pygidial area twice as long as wide at the base, its lateral margins feebly convex, the apex angularly emarginate, nitidulous, finely and closely punctured in the middle, more coarsely and less closely at the sides. Median area of the clypeus convex, a little wider than long, its anterior margin depressed, feebly bisinuate, ending on each side in two small blunt teeth. Interocular distance on the vertex equal to the length of the second and third joints of the flagellum and only half as great as the interocular distance across the base of the clypeus. Antennae fairly short, the second joint of the flagellum twice as long as the first, and as long as the third. Dorsum of epinotum shorter than the mesonotum, barely longer than the scutellum and metanotum united, its posterior margin fairly convex. Spines on the legs ferruginous, the comb of the anterior tarsi composed of long stiff spines, of which there are about nine on the basal joint.

Pietersburg, Transvaal (R. Stevenson), i q. Type in R.M. coll.

## T. saturnus n.sp.

오. 8.5 mm . long. Black; tarsi blackish brown, the apical joint paler below; tegulae testaceous. Clypeus, face, thorax and apical margins of the first four tergites with a short and fairly sparse whitish pubescence. Clypeus and face dull, closely and finely punctured, the punctures larger and further apart in the middle below the anterior ocellus. Vertex, behind the ocellar area, and the temples shining, finely and distantly punctured, the temples very shallowly so. Mesonotum and mesopleurae slightly shining, finely punctured, the punctures much smaller than the spaces between thern, the scutellum closely and finely punctured. Dorsum of epinotum dull, obliquely rugose, the rugae divergent outwardly from the base, becoming finer posteriorly. Sides and declivity closely and evenly striate transversely. Abdomen almost smooth, distinctly shining below, less so above, the first and the base of the second sternites dull, microscopically punctured, the pygidial area shining, with sparse and elongate punctures. Median area of the clypeus not very convex from back to front, half as wide again as long, its anterior margin depressed and feebly dentate at the lateral angles. Interocular distance at the base of the eyes twice as great as across the vertex, at the latter point it is slightly greater than the length of the second and third joints of the flagellum. The second joint is nearly twice as long as the first, twice as long as wide at the apex, a trifle shorter than the third. An impressed line extends half way down the face from the anterior ocellus. The ocellar area impressed in the middle, the impression continued back to the occipital margin. The middle third of the mesonotum in front is depressed and margined by a thin impressed line on each side. The dorsum of the epinotum is a little more than twice as
wide at the base as long in the middle, shorter than the mesonotum, its posterior corners rounded. Pygidial area elongate triangular, the apex very narrowly truncate. Inner spur of hind tibia as long as the basal joint of the tarsus, the apical joint of all the tarsi as long as the second; spines on the legs reddish ochreous, the comb of the anterior tarsi composed of long thin cilia, of which there are about ten on the basal joint.

Algoa Bay, i ㅇ, November (Brauns). Type in coll. Brauns.
Not unlike T. Oberon Arnold superficially, but less pubescent and differently sculptured.

## T. limatus n.sp.

ㅇ. 8 mm . long. Black; the posterior margin of the tegulae testaceous, the mandibles with a dark ferruginous band across the middle. Wings hyaline, faintly tinged with fuscous, the veins brown. Apical margins of the abdominal segments narrowly piceous. Almost glabrous, except for a few blackish hairs on the sternites. Dorsum of the epinotum dull, closely and very finely rugose longitudinally, the rugae uneven and somewhat divergent outwardly from the base. The rest of the body very shining. Median area of the clypeus with a few large punctures, the lateral areas, the face and vertex very finely and not closely punctured, the temples almost impunctate. Mesonotum, scutellum and mesopleurae sparsely and minutely punctured. The puncturation on the abdomen is exceedingly fine and scattered; the pygidial area triangular, only a little longer than wide at the base, punctured like the mesonotum, the apex narrowly truncate. Flagellum fairly short, the first joint not much shorter than the second, the third half as long again as the second. The interocular distance across the base of the clypeus is nearly three times as great as across the vertex, where it is equal to the length of the second joint of the flagellum. The mesonotum is half as wide again as long, and two-thirds longer than the dorsum of the epinotum. The latter is fully twice as wide at the base as long in the middle. Spines on the legs blackish, the tarsal comb composed of long thin spines, of which there are about nine on the basal joint.

Willowmore, i 9 , November (Brauns). Type in coll. Brauns.

## T. ambiguus Arnold, var. congoensis v.n.

ㅇ. 9 mm . long. A smaller and more slender insect than the type of the species, from which it differs as follows:

Last four joints of all the tarsi fusco-ferruginous. Median area of the clypeus wider, its anterior margin straight, not crenulate. Mesopleurae shining, finely and sparsely punctured. Wings not clear hyaline, but tinged with fuscous.

Lubumbashi, Belgian Congo (M. Bequaert). Type in R.M. coll.

## T. crassipes Arnold, var. claripennis, v.n.

ㅇ. 8 mm . long. Wings clear hyaline; median area of the clypeus more convex and more strongly punctured than in the type of the species, its anterior margin more widely depressed. Dorsum of the epinotum less convex transversely, strongly and longitudinally striato-rugose, a narrow area in the middle behind the apex with a few transverse striae. Otherwise like the type of the species.

Essexvale, S.R., I $q$ (type); Bulawayo, i $q$ (R. Stevenson). Type in R.M. coll.

## T. Hermia n.sp. (fig. $33 a, b$ ). <br> A species closely allied to T. Titania.

o. 8 mm . long. Last two or three joints of the tarsi ferruginous or reddish brown (all the joints black in Titania). Sculpture finer than in the other
species. On the face the puncturation is shallower. Clypeus dull, closely and finely punctured excepting the shining and depressed apical margin. The puncturation of the mesonotum, scutellum and mesopleurae is as close as in Titania but distinctly shallower. The dorsum of the epinotum is irregularly rugoso-reticulate and dull, the rugae becoming finer towards the apex. The abdomen is moderately shining, closely and very finely punctured; the pygidium duller than in Titania, sparsely and finely punctured.

The median area of the clypeus is much less tumid than in Titania and the lateral angles of the anterior margin are sharply rectangular (obtusely angular in Titania). The interocular distance on the vertex is relatively greater, being equal to the length of the second and third joints of the flagellum and greater than the length of the first two by as much as the length of the first joint again. The dorsum of the epinotum, seen from above, is less convex at the sides and behind, and is not so acutely narrowed in the middle above the brow of the declivity as in Titania (see figs. 33 and 34). Otherwise like the $q$ of Titania.

a

b
32



33



34

Fig. 32. Tachysphex tridentatus.

$$
" 33 . \quad \# \quad \begin{array}{ll}
\text { Hermia. }
\end{array}
$$

a. clypeus of the ${ }^{3} ; \boldsymbol{\prime} ; b$. epinotum of the $\rho$.
in the type of the species). The dorsum of the epinotum is more finely sculptured and has distinct longitudinal rugae which reach the middle of the segment.

Bulawayo, July-August, $7 \sigma^{\circ} \sigma^{\text {( }}$ (R. Stevenson). Type in R.M. coll. (R.M. and T.M. colls.)

## T. Titania Arnold, var. zwillowmorensis v.n.

ㅇ. 9 mm . long. Larger than the type of the species, from which it differs as follows. Clypeus, face and vertex with pale brownish white pubescence, fairly long and outstanding on the face and vertex. The latter is more coarsely and less closely punctured than in the type. Scutellum more finely and closely punctured. Dorsum of epinotum dull, closely wrinkled between the longitudinal rugae which are closer together, weaker and less regular. The tergites are more finely and more closely punctured, in some specimens the puncturation is almost obsolete. The median area of the clypeus is narrower, and its anterior margin less abruptly depressed. The interocular distance on the vertex is equal to the length of the first two joints of the flagellum, plus half of the third. (In two specimens which otherwise do not differ from the others, the vertex is a little wider, being equal to the length of the first three joints of the flagellum.)
d. 6.5 mm . long. Smaller than the type of the species, from which it differs as follows. The sculpture is finer all over, the punctures on the face, vertex and thorax further apart, the dorsum of the epinotum is only reticulatepunctate, but has some short and thin striae near the base. Abdomen moderately shining, more closely and distinctly more finely punctured than in the type of the species. The tooth on the clypeus is shorter and more acute. The vertex is relatively much wider, the interocular distance being equal to the length of the first four joints of the flagellum, plus half of the fifth. Tarsal joints dark reddish brown. Temples finely and sparingly punctured.

Willowmore, C.P., July to May, 6 \&f, $30^{\circ} 0^{\circ}$. Types in coll. Brauns. (R.M. coll.)
T. tridentatus n.sp. (fig. 32).
t. 5.5-7 mm. long. In this sex this species bears a strong resemblance to T. Hermia, particularly in the wide vertex, and the shape of the clypeus, but the sculpture is much weaker.

Black; tegulae testaceous, the apex of the first and the whole of the remaining joints of the tarsi pale ferruginous. Calcaria ochreous, the spines on the legs yellowish white. Face and clypeus with silvery pubescence, becoming pale golden above the middle of the face. Temples and thorax with a short, outstanding and whitish pubescence. Abdomen with narrow fasciae of very fine whitish pubescence on the apical margins of the first three tergites. Clypeus and lower half of face dull, closely and finely punctured, the upper part of the face and the vertex slightly glossy and more strongly and less closely punctured. Temples almost smooth. Mesonotum and scutellum with a slight gloss, closely, shallowly and not largely punctured, the punctures for the greater part separated by spaces at least a little wider than the punctures. Metanotum closely and finely punctured, dull. Dorsum of epinotum fairly dull, irregularly reticulate-rugose, the rugae somewhat emphasised longitudinally near the base, the junction of the dorsum and declivity delimited by a transverse ridge, the declivity dull, closely and transversely striate, the sides closely and transversely striate, dull and punctured between the striae. Mesopleurae dull, closely and evenly punctured, the punctures smaller than on the mesonotum. Abdomen almost dull above, shallowly aciculate-punctate,
the depressed apical margins smooth, the ventral surface shining and with the same sculpture as the dorsal. Median area of the clypeus wider than long, its anterior margin furnished with a sharp triangular tooth on each side, and a wider and blunter tooth in the middle, feebly concave between the teeth. Interocular distance across the base of the clypeus barely more than twice as great as across the vertex, at which point it is equal to the length of the first three joints of the flagellum. Ocellar area fairly tumid. Temples very short. Thorax short and compact, the mesonotum nearly twice as wide across the tegulae as long in the middle. Dorsum of epinotum wide, two and a half times wider at the base than long in the middle, the posterior angles widely rounded, seen from above its outline is nearly semicircular. Legs short and stout, the tarsi somewhat flattened, the inner calcar of the hind tibia two-thirds the length of the metatarsus. Wings hyaline, the veins brown, the second recurrent vein strongly convex outwardly in its lower half.

ㅇ. 8.5 mm . long. Tarsi fusco-ferruginous, the basal joint somewhat darker, otherwise with the same colour, sculpture and pubescence as the $\sigma^{\circ}$. Median area of the clypeus wider than long, narrowly depressed at the anterior margin, which is narrowly excised in the middle and feebly bidentate on each side at the lateral angles. Interocular distance on the vertex and across the base of the clypeus as in the $\delta$. The second, third and fourth joints of the flagellum are of about equal length, the second nearly twice as long as the first. Pygidial area slightly longer than wide at the base, shining, very sparsely and finely punctured, the apex narrowly truncate. Otherwise like the $\hat{\sigma}$.

Bulawayo, Sawmills and Khami Ruins, S.R., May to August. Types in R.M. coll. (R.M. and T.M. colls.)

## T. aterrimus n.sp. (fig. 35).

우. $6-9 \mathrm{~mm}$. long. Black; last three joints of the tarsi dark brown, the spines of the legs and tarsal comb yellowish white, the calcaria of the front legs ferruginous, of the middle and hind legs blackish. Mandibles with a ferruginous band behind the apex. Wings clear hyaline, the veins blackish. Face and clypeus with a thin, somewhat outstanding and yellowish pubescence. Temples, epinotum and sides of the thorax with a short, exserted and white pubescence, fairly scanty, and on the mesonotum confined to the lateral


Fig. 35. Tachysphex aterrimus, of, head.

margins. First four abdominal segments with apical fasciae of silvery pubescence. Median area of the clypeus slightly shining, finely punctured, closely so on its posterior half, also with a few larger punctures interspersed. Face dull, finely and closely coriaceous-punctate. Ocellar area and vertex slightly shining, sharply and finely punctured, the punctures much smaller than the spaces between them. Temples shining, sparsely and microscopically punctured. Mesonotum, scutellum, metanotum and mesopleurae very shining, finely and shallowly punctured, the majority of the punctures smaller than the spaces between them. Dorsum of epinotum dull, closely reticulate-rugose, the rugae emphasised longitudinally in the middle, where the reticulations are more or less obliterated; the sides and declivity shining and transversely striated. Abdomen fairly shining, microscopically rugulose above, very finely and sparsely punctured below. Pygidial area elongate triangular, twice as long as wide at the base, the apex acute, distantly and finely punctured.

Median area of the clypeus wide, fairly flat, its apical margin depressed. its anterior angles obtuse. Interocular distance on the vertex only half as great as across the base of the clypeus and equal to the length of the first two joints of the flagellum, plus half of the third. The latter joint is a little longer than the second, which is two-thirds longer than the first. The occipital margin is almost contiguous with the upper margin of the eyes, and the temples are therefore narrow, at their widest only half as wide as the eyes, when seen from the side. Mesonotum not much wider than long, as long as the epinotum and metanotum united. Dorsum of epinotum only feebly convex at the sides. Tarsal comb composed of long thin cilia.
$\delta^{7} .5-7 \mathrm{~mm}$. long. Dorsum of the epinotum more coarsely rugose than in the $P$, and also less closely. The abdomen is duller above, closely and microscopically punctured. The median area of the clypeus is much narrower, being not much wider than the lateral sclerites. The interocular distance on the vertex is equal to the length of the first three joints of the flagellum, plus half of the fourth. The first joint is as long as wide at the apex and as long as the second joint; the third joint is not much longer than the second. Otherwise, apart from the usual sexual differences, like the $9 \circ$.

Bulawayo, Sawmills, Victoria Falls, Matopos, S.R., January to November,


The variation in size of this species is considerable, the smallest $q$ (from Willowmore, leg. Brauns) being only 6 mm . long. This specimen has the face shining owing to the almost complete effacement of the sculpture. In the smaller examples in both sexes the sculpture is correspondingly finer than in the larger ones.

## T. filicornis Kohl.

There is a variety of the $\delta$ in this species in which the vertex is shining, with a stronger and less close puncturation than in the type of the species. The epinotum is also more finely sculptured. As intermediate forms may be found in the future, it appears unnecessary to give it a special name.

I have seen examples from Willowmore, Algoa Bay, Lichtenburg (Transvaal) and Khami, S.R. The last is only 5 mm . long.

## T. minutulus Arnold.

This species varies in size in the 8 from $5 \cdot 5$ to 7 mm . A correction has to be made in the original description. The first joint of the flagellum is only a little more than half the length of the second, not two-thirds as stated therein.

## T. argentifrons n.sp. (fig. $37 a, b$ ).

ㅇ. 7 mm . long. Black; mandibles ferruginous, the extreme apex piceous, tarsi pale ferruginous. Clypeus and lower half of the face clothed with a dense and very fine, silvery pubescence. Seen from above, this pubescence appears narrowed to a sharp angle on each side of the face and is continued from the apex of the angle as a narrow line bordering the inner orbits. On the rest of the head and the body there is only a sparse, microscopic or pruinose pubescence, but more apparent on the apical margins of the first three tergites where it forms transverse fasciae. The whole body is dull except the pygidial area and the sternites which are moderately shining. Head and thorax, excepting the sides and declivity of the epinotum, very finely and closely reticulatepunctate (barely visible with an aplanat lens $\times 15$ diameters). The sides of the epinotum are closely and obliquely striated, the declivity transversely so. Tergites microscopically rugulose, the sternites exceedingly finely punctured; pygidial area elongate triangular, half as long again as wide at the base, with a few punctures near the sides, the apex narrowly truncate.

Median area of the clypeus quadrate, about one-third wider than long, its anterior margin almost straight, subrectangular at the anterior corners. Interocular distance on the vertex short, slightly shorter than the length of the first two joints of the flagellum. The interocular distance across the base of the clypeus is two and a half times as great as across the vertex. Flagellum slender, the second to fourth joints subequal, the second twice as long as the first. Temples short. The pronotum has a short collar nearly as well developed as in T. Panzeri, var. aethiopicus. Dorsum of epinotum fairly flat, the sides oblique and very feebly convex, as long as the mesonotum. Spines on the legs pale ferruginous, the tarsal comb composed of long and thin cilia, of a reddish colour with the tips darker. Wings hyaline, the costa and subcosta brown, the other veins yellowish brown.
$\delta^{t} .7 \mathrm{~mm}$. long. Mandibles ferruginous in the middle, piceous at the base and apex. Pubescence of the clypeus and face coarser and not so dense as in the $\phi$. The puncturation on the head and thorax is distinctly stronger and more widely spaced; on the vertex and mesonotum the average space between the punctures is about twice as wide as one of the punctures. The dorsum of the epinotum is exceedingly finely and somewhat irregularly reticulate; it is relatively wider than in the 9 , and shorter, being shorter than the mesonotum. The clypeus has the median area flatter than in the 9 , and also wider. The anterior margin has a short triangular tooth in the middle, wider at the base than long. The interocular distance on the vertex is equal to the length of the second and third joints of the flagellum, or a little less, and in proportion to the interocular width across the base of the clypeus greater than in the $\phi$. The first joint of the flagellum is hardly shorter than the second, both are almost as wide apically as long; the third joint twice as long as the second. Otherwise like the $q$.

Algoa Bay, 6 아, I ot; Bothaville, O.F.S., I ot; Sundays River, C.P., i $q$; Willowmore, ${ }^{1}{ }^{\star}$, November-February (Brauns). Types (Algoa Bay) in coll. Brauns. (R.M. and T.M. colls.)

## T. laticeps n.sp. (fig. 36).

ㅇ. $7 \cdot 5^{-8} \mathrm{~mm}$. long. Black, the last three joints of the tarsi fusco-ferruginous; tegulae flavo-testaceous on the outer half. Face, clypeus and temples with a dense and silvery pubescence; thorax with a somewhat woolly, long and whitish pilosity. This pilosity is exceedingly fine, so that although it is fairly dense, it does not obscure the sculpture below it. First four tergites with apical fasciae of silvery pubescence, wide and fairly conspicuous when
viewed from in front. The calcaria and spines on the legs are ferruginous. Wings clear hyaline, the veins blackish. Clypeus dull, not very closely punctured. Face and vertex dull, closely, very finely and rather shallowly punctured. Mesonotum and mesopleurae dult, the former very shallowly and finely punctured, the average space between the punctures being at least four times wider than any puncture; the mesopleurae are microscopically and closely punctured. The scutellum is slightly shining, punctured like the mesonotum. Metanotum dull, microscopically coriaceous. Dorsum of epinotum dull, longitudinally and finely rugose, the rugae in some specimens not reaching the posterior margin; here and there with faint reticulations between the rugae; the sides are obliquely, the vertical declivity transversely, finely striated. Abdomen dull above, shining and almost impunctate below, excepting the second sternite which is dull, closely and microscopically punctured at the sides. The tergites have the apical halves clearly depressed. Pygidial area triangular, a little longer than wide at the base, the apex narrowly rounded, sparsely, finely but distinctly punctured. Head nearly one-third wider than long and clearly wider than the thorax. The interocular distance across the base of the clypeus is two and three-quarter times greater than across the vertex, where it is equal to the length of the first two joints of the flagellum. The second joint of the flagellum is twice as long as the first, and a trifle shorter than the third. The antennae are fairly short. Median area of the clypeus strongly impressed transversely behind the anterior margin; the latter is feebly convex, narrowly excised in the middle and furnished with two minute teeth on each side. Mesonotum two-thirds wider across the tegulae than long; dorsum of epinotum fairly flat, slightly longer than the scutellum and metanotum united. Inner calcar of hind tibia almost as long as the metatarsus. Tarsal comb composed of long cilia.
o. $7-7.5 \mathrm{~mm}$. long. Colour, sculpture and pilosity as in the $\%$. Median area of the clypeus narrower than in the $\rho$, its anterior margin straight or only feebly convex, entire, without lateral teeth or median excision. The eyes are strongly convergent above, so that the interocular distance across the base of the clypeus is fully four and a half times greater than across the vertex; at the latter point it is equal to the length of the second joint of the flagellum, or a little more, but distinctly shorter than the first and second united (there is a slight degree of variation in this character). The first joint of the flagellum is a trifle longer than wide, the second one-third longer than the first, and only slightly shorter than the third. A distinctive feature of this species in this sex is the presence of fairly dense fimbriae of long hairs on the middle of the apical margins of the second and third sternites, that on the second of a whitish colour, on the third pale brownish yellow. The rest of the sternites, which including the second are smooth and shining, have a fine, sparse and greyish pubescence. Otherwise like the $q$.

Bulawayo, July-November, 3 ㅇㅇ, $40^{\circ} 0^{\circ}$; Victoria Falls, it ${ }^{\circ}$; Sawmills, S.R., April, i q. Types $\%$ (Sawmills), ${ }^{\circ}$ (Bulawayo) in R.M. coll. (R.M. and T.M. colls.)

Three $\delta \delta \frac{1}{}$ from Willowmore (Brauns) have the fimbriae on the sternites much reduced and the interocular distance on the vertex slightly greater.

## T. Hippolyta n.sp. (fig. $3^{8} a, a^{\prime}$ ).

A species closely allied to $T$. harpax Arn., with asymmetrical claws as in that species, but with different sculpture and a differently formed clypeus.
\$. $6.5-\mathrm{Io} \mathrm{mm}$. long. Black; last two joints of the tarsi fusco-ferruginous, the first three dark brown (in harpax the first is dark reddish brown and the other four are flavo-ferruginous); tegulae testaceous. Wings hyaline, the
veins blackish. The pubescence is like that of harpax, the abdomen also having the fine pruinose pubescence which is present in that species, but the mesonotum has only a short and exserted pubescence, not decumbent and dense like that of harpax. The puncturation is very different; on the face it is composed of fine sharp punctures, close together at the sides, more widely spaced in the middle and on the vertex, the surface in between the punctures shining, not dull and microscopically punctured as in the other species. The clypeus is coarsely and sparsely punctured on the median area, finely and closely on the lateral sclerites. Mesonotum, scutellum, meso- and metapleurae fairly shining, the mesonotum with punctures slightly larger than those of the face, the mesopleurae more finely and less closely punctured than the mesonotum; scutellum very finely and fairly closely punctured, the metapleurae almost impunctate. The dorsum of the epinotum is dull, with some fine rugae radiating from the base to about the middle of the segment, beyond which the rugosity is irregular and weaker; just in front of the apical margin in the middle there is a round and clear space; the declivity is shining, strongly and transversely striate, the sides shining, sparsely and very finely punctured. Abdomen dull, only the apical segment shining. The pygidial area is of the same shape as in harpax, but distinctly more strongly punctured. The median


Fig. 38 a. Tachysphex Hippolyta, 9 head.

| $"$ | 38 | $a^{\prime}$. | $"$ |
| :---: | :---: | :---: | :---: |
| 39 | $b$. | ", | harpax , head. hind tarsus. |
| $"$ | 39 | $b^{\prime}$. | $"$ |$\quad$ " left hind tarsus.

area of the clypeus (fig. $3^{8 a}$ ) is wider and much less gibbose than in harpax (fig. $39 b$ ), only feebly convex transversely. It is more widely and less deeply depressed behind the anterior margin; the latter is narrowly excised in the middle and armed with three small teeth on each side. The supra-antennal tubercles are more strongly developed than usual, but much less than in bituberculatus Arn. The interocular distance on the vertex is equal to the length of the first two joints of the flagellum, and is hardly more than onethird of the interocular distance across the base of the clypeus. On the vertex there is a Y -shaped depressed line. Flagellum like that of harpax. Dorsum of epinotum longer than in harpax, nearly as long as the scutellum and metanotum united, also more convex at the sides. All the tarsi have asymmetrical claws as in harpax, but the apical joint is relatively shorter and distinctly shorter than the second joint; the fourth is triangular or subconical, not deeply bifid as in harpax (see figs. 38 and $39 a^{\prime}, b^{\prime}$ ), and the inner spur of the tibia is not longer than the first joint of the tarsus. The tarsal comb of the fore legs is composed of thin spines, not of long cilia as in harpax.

The description given herein is based on the type, but the species is rather variable in sculpture. In two specimens, one from Algoa Bay (coll. Brauns) and one from Bulawayo, the face, mesonotum and mesopleurae are dull, more strongly punctured than in the type, and the sides of the epinotum are distinctly, closely and finely striate. In a small example, 6.5 mm . long, from

Filabusi, S.R. (coll. R. Stevenson), the head and mesonotum are more shining, and much more sparsely punctured than in the type, but the sides of the epinotum are striated.

Type (Sawmills, S.R., November) in R.M. coll.

## T. bituberculatus Arnold.

© (hitherto undescribed). 7.5 mm . long. Black; tibiae, tarsi and tegulae reddish ochreous. Face and clypeus clothed with a dense and bright golden pubescence. The pubescence on the mesonotum and abdomen with a slight yellowish tint. Otherwise like the $\%$ in sculpture and pubescence. The supra-antennal tubercles are just as large and of the same shape as in the $q$. The anterior margin of the median area of the clypeus is subangular in the middle. Interocular distance on the vertex a little greater than the length of the first two joints of the flagellum, and only one-third as long as across the base of the clypeus. Flagellum short, the third joint nearly twice as long as the second, the latter only a very little longer than the first.

Bulawayo, January. Type in the R.M. coll.

## T. modestus n.sp.

우. $8-9.5 \mathrm{~mm}$. long. Black; the fore and middle tibiae and tarsi and extreme apex of the femora varying from reddish ochreous to ferruginous, the hind tarsi ferruginous with the first two joints darker, the hind tibiae dark brown with the base and apex ferruginous; tegulae flavo-testaceous. Wings hyaline, the veins blackish but somewhat flavous near the base of the wings.

Temples, clypeus and face with silvery pubescence, becoming slightly golden above the antennal sockets. Thorax with a fine whitish pubescence, decumbent on the mesonotum and mesopleurae, more or less outstanding on the epinotum. Abdomen with pruinose pubescence, and apical fasciae on the first four tergites.

Face and vertex dull, very finely and closely punctured, the anterior third of the median area of the clypeus somewhat shining, more strongly and sparsely punctured; temples nitidulous, closely and microscopically punctured. Mesonotum and scutellum finely punctured, the puncturation being like that of T. Panzeri, var. Caliban Arn. The mesopleurae are dull and microscopically reticulate-punctate; the sculpture of the dorsum of the epinotum is similar but has in addition fine longitudinal rugae which do not reach the brow of the declivity. The sides of the epinotum are nitidulous and transversely aciculate, the declivity finely and transversely striate. First five tergites dull, the first and second sternites dull, very finely and closely punctured, the remaining sternites shining, with a few preapical punctures. Pygidial area shining, sparsely and finely punctured, a little more than twice as long as wide at the base, the apex very narrowly truncate.

Anterior margin of the median area of the clypeus depressed, feebly convex; the area is fairly convex transversely and lengthwise. Interocular distance across the base of the clypeus three times greater than across the vertex; at the latter point it is equal to the length of the first two joints of the flagellum. The second joint of the flagellum is not quite twice as long as the first, and is nearly as long as the third. Temples short. Mesonotum twice as long as the scutellum, the dorsum of the epinotum as long as the scutellum and metanotum united, its posterior angles rounded. Legs stout, the inner calcar of the hind tibia as long as the first joint of the tarsus, the fifth joint as long as the second; the comb of the anterior tarsi is composed of long, thin and pale yellowish cilia.

ठ. 7.3 mm . long. All the tibiae and tarsi reddish ochreous. Face and clypeus with pale brassy golden pubescence. Median area of the clypeus flatter than in the $\%$. Second joint of the flagellum half as long again as the first, and slightly shorter than the third. Apical margins of the second to sixth sternites with an outstanding and fairly dense brownish pubescence, which, however, does not form distinct fimbriae. All the sternites closely punctured, the first two finely so and dull, the rest more strongly punctured and shining. Otherwise like the $\rho$.

Bulawayo (types), December-March; Lichtenburg, Transvaal; Bothaville, O.F.S. and Algoa Bay (Brauns). Types in R.M. coll.
T. octodentatus n.sp. (fig. $40 a, b$ ).

ㅇ. 9-10 mm. long. Black; a narrow band near the apex of the mandibles and the tarsi dark ferruginous, the basal three-fourths of the metatarsus dark brown. Tegulae and basal part of the veins of the wings stramineous, the wings hyaline, faintly smoky, the veins blackish. Tarsal comb and spines on the tibiae ochreous, the spines on the tarsi ferruginous. Face and clypeus with a dense silvery pubescence, tinged with yellow above the antennal sockets. Temples with similar but less dense pubescence. Thorax with short, whitish and outstanding pubescence, fairly dense on the sides. Pubescence on the abdomen decumbent, greyish, denser on the apical margins of the first four tergites, forming transverse fasciae.

Median area of the clypeus shining, sparsely and coarsely punctured; the lateral sclerites and the face finely


Fig. 40. Tachysphex octodentatus.
$a$, head of 8 ; $b$, clypeus of $\delta$. punctured, closely so at the sides and more distantly in the middle, the ocellar area closely punctured, the vertex shining, more strongly and less closely punctured, the temples finely and shallowly punctured. Mesonotum and scutellum fairly strongly punctured, closely so at the sides, but less so in the middle where the punctures are smaller than most of the spaces separating them. Mesopleurae dull, closely and more finely punctured than the mesonotum. Dorsum of the epinotum strongly and openly reticulate rugose, the sides transversely, closely and finely striate, the declivity transversely and finely rugose. The tergites rugulose and moderately shining, the sternites sparsely and very finely punctured, except the first two which are dull, closely and finely punctured, the depressed apical margins excepted. Pygidial area triangular, wide, fully as wide at the base as long, shining, impunctate, the apex narrowly rounded. Clypeus short, the median area twice as wide as long, its anterior margin depressed, crenulate, with four short teeth on each side, of which the two inner ones are often very blunt and wide. Interocular distance across the vertex equal to the length of the first two joints of the flagellum, barely half as great as across the base of the clypeus. Second joint of the flagellum nearly twice as long as the first, barely longer than the third, the whole flagellum short and stout. Dorsum of epinotum wide and short; its length is slightly variable, but it is not longer than the scutellum and metanotum united, and in shape resembles that of tridentatus $\rho$. Legs short and stout. The metatarsus of the hind pair of legs is longer than the inner calcar and only half as long as the tibia. Comb of anterior tarsi composed of long cilia.
d. $6.5-8 \mathrm{~mm}$. long. Anterior tarsi paler than in the $\%$, flavo-ferruginous, otherwise like the $q$ in colour, sculpture and pubescence. Interocular distance as in the 9. Median area of the clypeus fairly closely and finely punctured,
the apical margin less depressed than in the $\rho$, and with only three teeth. Otherwise like the $q$.

Bulawayo, Sawmills and Khami, July to August. Types in R.M. coll. (R.M. and T.M. colls.)

A variety, var. inermis, $9,7.3-9.5 \mathrm{~mm}$. long, is to be found in which the anterior margin of the median area of the clypeus is almost entire, having only a small excision in the middle and a couple of ill-defined teeth on each side. It is also more finely sculptured on the dorsum of the epinotum. Otherwise it is like the type of the species. Bulawayo, July and August. Types in R.M. coll.

## T. unguiculatus n.sp.

ㅇ. 8 mm . long. In colour not unlike T. Braunsi Arn., but clearly distinguished by the shorter epinotum, the long claws, pale wings and duller surface. Black; tibiae and tarsi flavo-ferruginous, tegulae pale ochreous. Mandibles ferruginous in the middle. Wings hyaline, the veins brown. Face, clypeus, temples, anterior and middle femora on their posterior faces clothed with fine silvery pubescence. The pubescence on the face is disposed in the same way as in T. argentifrons Arn. Mesonotum and scutellum with very fine or almost pruinose pubescence, greyish and tinged with yellow, fairly dense but not entirely obscuring the sculpture. The sides of the thorax and the epinotum have a whitish, short and exserted pubescence. Tergites with a microscopic, brownish grey pubescence, the first three also with apical fasciae of silvery pubescence. Median area of the clypeus distinctly tumid, subquadrate, a little wider than long, slightly shining and finely punctured, with a few larger punctures behind the anterior margin which is almost straight. Face and vertex closely and very finely punctured and dull, the temples nitidulous, microscopically punctured. Thorax dull, excepting the sides of the epinotum which are slightly glossy and very finely aciculate. Mesonotum, scutellum and mesopleurae closely and very finely punctate-rugulose; dorsum of epinotum finely coriaceous, with a few feeble rugae near the base, the declivity closely and finely transversely striate. First four tergites dull, the fifth slightly shining; pygidial area shining, sparsely and largely punctured, longer than wide at the base, the apex widely truncate. First and second sternites dull, microscopically punctured, the remaining sternites smooth and shining, except the last which is shallowly, finely and fairly closely punctured towards the apex. Interocular distance across the base of the clypeus nearly three times greater than across the vertex; at the latter point it is barely equal to the length of the first two joints of the flagellum. The latter is fairly slender, the second joint twice as long as the first, very slightly shorter than the third. Temples short, at their widest less than half as wide as the eyes. Mesonotum two and a quarter times longer than the scutellum. Dorsum of epinotum short and oblique, not longer than the scutellum and metanotum united, more than twice as wide at the base as long in the middle, its lateral margins moderately convex, the posterior margin slightly concave. Spines on the legs and the tarsal comb ferruginous, the latter composed of long and thin cilia, the calcaria fusco-ferruginous. The inner calcar of the hind tibia is longer than the metatarsus. The apical joint of all the tarsi is as long as the second, the fourth joint deeply bifid, the claws distinctly long and thin and as long as the fifth joint itself.

万. 7 mm . long. The pubescence of the face just below the ocellar area is pale golden, that of the mesonotum longer and yellower than in the $p$. Dorsum of the epinotum closely and finely reticulate-rugose, the sides of the first tergite where they fold over to the ventral surface, reddish. Otherwise
like the $\%$ in colour, sculpture and pubescence. Interocular distance across the base of the clypeus about two and a half times as great as across the vertex, at the latter point equal to the length of the first two joints of the flagellum. Median area of the clypeus less tumid than in the $\rho$, its anterior margin obtusely angular in the middle. The apical tergite is dull, closely and strongly punctured, the eighth ventral plate is ferruginous, strongly tridentate at the apex, the lateral teeth acute, the middle tooth slightly blunt. The claws of the tarsi are shorter than in the o, being shorter than the apical joint; the latter is hardly as long as the second joint; the inner calcar of the hind tibia is only as long as the metatarsus.

Willowmore, January-February (H. Brauns). Types in coll. Brauns. Paratypes in R.M. coll.

## T. Braunsi Arnold.

The type of the $\delta$ was a worn specimen in which the pubescence on the face and clypeus had faded. It should be noted that in freshly emerged examples the pubescence on those parts is pale golden. A melanic variety of this species occurs in which the legs are black, the tarsi at the most being dark reddish brown. Two males of this form were taken at Algoa Bay by Dr Brauns.

Owing to a misunderstanding I have wrongly attributed to this species (p. 150, Part 2) the same nesting habits as to T. Turneri. This species nests in the ground like the majority of the genus, and not in poplar stems like T. Turneri.

## T. Braunsi Arnold, var. debilis v.n.

Of the same size as the type of the species, from which it differs only as follows.

The median area of the clypeus is not triangularly produced in front, its anterior margin being merely convex. The dorsum of the epinotum is a little shorter and more widely rounded posteriorly, the declivity more strongly striate, and the first three tergites have distinct apical fasciae of greyish pubescence.

Piet Retief, Transvaal, I đ̂ (coll. Brauns).
Another specimen from Algoa Bay has the tibiae black, as well as the femora.

## T. Stevensoni n.sp.

ㅇ. 8 mm . long. Black; last two abdominal segments and the legs bright ferruginous, the coxae, trochanters and upper surface of the femora near the base, blackish. Apical third of the scapes in front flavo-ferruginous. Tegulae flavo-testaceous, the wings hyaline, the veins brown. Mandibles ferruginous, the base and apex narrowly black. Pubescence on the head and thorax short and very scanty, whitish, almost absent from the upper surface of the thorax. Abdomen with a microscopic pruinose pubescence, barely forming transverse apical fasciae on the first three tergites.

Clypeus, ocellar area, mesonotum and scutellum shining; the face, vertex, temples and mesopleurae moderately shining, the epinotum fairly dull, the abdomen dull above, shining and impunctate below, except the first and basal half or more of the second sternites, which are dull, finely and closely punctured. Median area of the clypeus short, more than twice as wide as long, sparsely punctured with small and large punctures intermixed, fairly flat, the apical margin widely depressed, feebly and roundly excised in the middle, armed on each side with two minute denticles. Face finely and closely punctured, the ocellar area very sparsely, the vertex very shallowly punctured.

Temples microscopically punctured. Mesonotum closely and finely punctured, less closely on the disc than on the lateral margins. Scutellum and metanotum much more delicately punctured than the mesonotum, about as finely as the vertex, the mesopleurae a little more deeply punctured than the mesonotum, except above and in front. Dorsum of epinotum longitudinally rugose, the rugae reaching the apical margin only in the middle, and at the sides breaking up into irregular reticulations before reaching the margins; the spaces between the rugae nearly dull and rugulose. Sides of epinotum and the declivity closely, strongly and transversely striate. Pygidial area fully twice as long as wide at the base, shining, beset with a few discrete and small punctures, the apex narrowly truncate. Interocular distance across the base of the clypeus a little more than twice as great as across the vertex; at the latter point it is equal to the length of the first two joints of the flagellum. The second joint of the flagellum is twice as long as the first, and as long as the third; the flagellum is fairly slender and reaches back as far as the base of the mesonotum. Temples very short. Dorsum of the epinotum fairly flat, twice as wide at the base as long in the middle, a trifle longer than the scutellum and metanotum united; its hind margin nearly straight. Tarsal comb only feebly developed, composed of unequal fusco-ferruginous cilia; spines on the legs ferruginous, inner calcar of hind tibia a little shorter than the metatarsus; the fourth joint of all the tarsi very short, almost hemispherical, less than half the length of the third joint; claws asymmetrical, the outer claws of the middle and hind tarsi, and the inner claws of the front tarsi being smaller than their fellow.
б. $6-7.5 \mathrm{~mm}$. long. Legs somewhat paler than in the 8 , the black on the base of the femora almost obliterated. The seventh abdominal segment ferruginous, the rest black, otherwise like the $q$ in colour. Face and clypeus with a dense golden pubescence. The pubescence on the thorax and abdomen longer and more abundant than in the $\rho$, the first five tergites with apical fasciae of whitish pubescence, the apical margins of those segments narrowly testaceous, at least in the middle. Eyes greenish yellow in dead specimens. Puncturation everywhere stronger than in the of. Face dull, clypeus dull, finely and closely punctured, the anterior margin of the median area obtusely angular in the middle, with only one very minute tooth at the corners. The fourth joint of the tarsi slightly longer than in the $q$.

Bulawayo and Hope Fountain, S.R., August to November. Types in R.M. coll.

## T. punctiventris n.sp.

万. $8.5-9.5 \mathrm{~mm}$. long. Superficially not unlike a small specimen of T. diabolicus, var. claripes, but probably more closely allied to $T$. modestus than to any other of our species.

Black; legs ferruginous, excepting the coxae, trochanters and the basal third of the anterior and middle femora. Tegulae and veins of the wings pale ochreous, the wings hyaline. In two of the four examples before me, the apical margins of the abdominal segments and the whole pygidium are testaceous. In addition to the greater size and the different colour of the legs, it differs from modestus as follows.

Pubescence of the face deep golden; sternites with a brownish grey and long pubescence over the whole surface, much more dense than in modestus. Puncturation of the head and thorax relatively much stronger; on the mesonotum and scutellum the spaces between the punctures, at least in the middle, are shining and much wider than the punctures (dull, and not larger in modestus). The mesonotum in front is feebly concave in the middle (convex in modestus), and the dorsum of the epinotum is much less narrowed towards the apex. The
third to sixth sternites are more closely and more strongly punctured than in modestus, and less shining.

Filabusi and Bulawayo, S.R., 4 ỡ $^{\circ}$, September-October. Type in R.M. coll.

## T. egregius $\mathrm{n} . \mathrm{sp}$.

$\mathrm{d}^{*}$. 5 mm . long. Black; tarsi brown, mandibles with a narrow ferruginous band across the middle, tegulae stramineous. Pubescence on the face whitish, thin and scanty, elsewhere the pubescence is very short and sparse, and on the abdomen barely dense enough to form apical fasciae on the first three tergites. Face and clypeus almost dull, very sparsely and microscopically punctured, the fundamental rugulose sculpture not visible under a magnification of less than 30 diameters, the depressed apical margin of the clypeus obtusely angular in the middle and shining. Mesonotum and scutellum slightly glossy, microscopically rugulose like the head, and also shallowly, finely and sparsely punctured, the punctures at least four times smaller than the spaces between them. Mesopleurae shining, coarsely but not closely punctured; the sides of the epinotum shining, punctured like the mesopleurae but a little less closely and less deeply. Dorsum of epinotum rugoso-striate, the rugae over the basal half radiating obliquely outwards from the base, and on the apical half transversely from side to side; the spaces between the rugae shining. The declivity strongly and transversely striate, the striae extending a little beyond the declivity over the apical fourth of the sides. Abdomen microscopically rugulose and slightly shining above, smooth and shining below; apical halves of the second to fourth tergites depressed, more widely so in the middle than at the sides, and in addition the apical margins of the second and third are yet further depressed and testaceous. (In each of the two specimens before me the intussuscepted bases of the third and fourth tergites are much narrower than the apical margins which overlie them, and are strongly and transversely striated; possibly forming a stridulating apparatus.) Anterior margin of the median area of the clypeus obtusely angular in the middle. Interocular distance across the vertex distinctly great, being not much shorter than across the base of the clypeus and fully equal to the length of the first four joints of the flagellum. Wings hyaline, nervures blackish.

This species is easily recognised by the peculiarly contrasted striation of the epinotal dorsum, and also by the very wide vertex.

Bulawayo, November (Arnold). Type in coll. Brauns; August, in coll. R. Stevenson.

## T. asinus Arnold.

$\sigma^{t}$ (hitherto undescribed). 10.5 mm . long. Clypeus and face with a very fine, decumbent and golden pubescence; sides of the epinotum with a fairly abundant, long and dull yellowish pubescence. Dorsum of epinotum strongly reticulate-rugose. Interocular distance on the vertex equal to a little more than twice the length of the second joint of the flagellum. Last tergite trapezoidal, dull, very finely aciculate-punctate. Otherwise like the $\rho$.

Bulawayo, April (R. Stevenson). Type in R.M. coll.

## T. Turneri Brauns, var. transvaalensis v.n.

9. Of the same size as the type of the species, from which it differs by having the abdomen entirely pale ferruginous, except the extreme base of the first tergite. The red colour of the legs is paler and the median tooth of the clypeus is wider at its base.

Lichtenburg, Transvaal, January, 2 ¢ 9 . Type in coll. Brauns. Rhodesdale Ranch, S.R., iq.

## T. consanguineus $\mathrm{n} . \mathrm{sp}$.

ㅇ. ${ }^{1} 3-15 \mathrm{~mm}$. long. Black; tibiae, tarsi, apical third more or less of the femora, and first three abdominal segments, ferruginous. Tegulae testaceous. Wings pale flavo-hyaline, the veins brownish yellow. Face and clypeus with a dense, very fine, brassy golden pubescence, fading to silvery in old specimens; the anterior half of the median area of the clypeus glabrous. Temples and thorax with a brownish yellow, decumbent and very fine pubescence; the pubescence on the first three tergites is similar but is very short, and forms barely perceptible fasciae on the apical margins. Anterior half of the median area of the clypeus deflexed, shining, sparsely and coarsely punctured, the anterior margin depressed, smooth and shining, straight or only feebly sinuate, ending in a sharp angle on each side; the rest of the clypeus, face, mesonotum, scutellum and metanotum dull, microscopically, shallowly and very closely punctured; the mesopleurae dull, rugulose punctate, the dorsum of the epinotum dull, very evenly and finely reticulate-punctate, the declivity transversely, the sides obliquely and closely striate and dull. Abdomen dull above, slightly shining below, the apical halves of the last three sternites finely and not very closely punctured. Pygidial area elongate triangular, about half as long again as wide at the base, shining, strongly but not closely punctured, the apex narrowly truncate. Interocular distance on the vertex equal to the length of the second joint of the flagellum, and only one-third as long as across the base of the clypeus. Flagellum slender, all the joints except the first more than two and a half times longer than wide, the second joint three times longer than the first. Dorsum of epinotum distinctly convex transversely, twice as wide at the base as long, two-thirds the length of the mesonotum. Basal joint of the hind tarsus rather short, about one-fourth longer than the second joint. Claws of the tarsi not long, shorter than the apical joint. Spines on the legs and the tarsal comb ferruginous, the calcaria darker, the tarsal comb composed of long cilia.
$\sigma^{6}$. II mm . long. Only the first two abdominal segments ferruginous. The black colour on the femora is sometimes more extensive than in the $q$, reaching almost to the apex. Pubescence on the face and clypeus of a deeper golden colour; first three tergites with distinct and fairly wide apical fasciae of whitish pubescence. The apical dorsal segment is finely punctured, and the eighth ventral plate has the apical angles produced into short sharp teeth. Interocular distance on the vertex like that of the $\%$, but the antennal joints being shorter, it is in this sex equal to the length of the first two joints of the flagellum. Otherwise like the of.

Lichtenburg, Transvaal, of and $q$; De la Rey, Transvaal and Willowmore, C.P. (Brauns); Bulawayo, it. Types in coll. Brauns.

Apparently closely allied to T. auropilosus Turner and T. Brinkerae Turner. It differs, however, from both in colour, and although no great reliance can be placed on the venation, yet it does not agree with either in that respect, the third abscissa of the radius being no longer than the second; and the latter is also longer than the space between the recurrent veins on the cubitus.

## T. fulgidus n.sp.

ㅇ. 9.5 mm . long. Black; tibiae, tarsi and apices of the femora, mandibles excepting the apex, labrum, first three abdominal segments and apical half of the pygidium, ferruginous; the tegulae ochreous, the apical margins of the fourth and fifth abdominal segments flavo-testaceous. Wings clear hyaline, the veins pale brown. Face and clypeus with silvery pubescence, the face having also some long, exserted and white hairs in the middle. Thorax,
especially at the sides, covered with an abundant, erect and fairly long pilosity; the base of the first tergite also pilose, but the hairs are shorter. The rest of the abdomen is very finely pubescent, without distinct apical fasciae. Anterior half of the median area of the clypeus deflexed, shining, sparsely and coarsely punctured, the anterior margin depressed and feebly convex. The rest of the clypeus and the sides of the face dull, finely and closely punctured, the rest of the face and the vertex shining, sharply but not coarsely punctured, the spaces between the punctures being mostly larger than the punctures. Temples smooth and shining. Pronotum shining, closely and very finely punctured. Mesonotum, scutellum and mesopleurae very shining, sparsely and sharply punctured, the punctures separated by spaces much larger than themselves, except on the margins. Mesosternum finely, sparsely punctured and very shining. Sides of the epinotum punctured like the mesosternum, except over the anterior fourth which is obliquely and closely striate. Dorsum of epinotum slightly glossy, finely and longitudinally striate, the striae thinning off before reaching the apical margin, somewhat punctate-rugulose laterally; the declivity dull, closely and transversely striate, punctured between the striae. Abdomen shining, feebly and very sparsely punctured below, duller and smooth above, the pygidial area elongate triangular, shining, sparsely and fairly finely punctured. Head wide, plainly wider than the thorax at its widest. Interocular distance across the vertex equal to twice the length of the second joint of the flagellum, the distance across the base of the clypeus more than twice as great as across the vertex. Antennae slender but not very long, the second joint of the flagellum twice as long as the first. Ocellar area tumid. Temples very short, the occipital margin being almost contiguous with the upper margin of the eyes. Mesonotum rather convex lengthwise over its anterior half, one-third longer than the dorsum of the epinotum; the latter is twice as wide at its base than long in the middle, its posterior margin convex. Tarsal comb composed of thin yellow cilia. Inner calcar of hind tibia as long as the metatarsus, the apical joint of the tarsi considerably attenuated at its base, not much shorter than the metatarsus, the claws long.
$\delta^{\circ} .8 \mathrm{~mm}$. long. Face and clypeus clothed with golden pubescence. Fourth and fifth tergites finely, shallowly and sparsely punctured. Face more finely and more closely punctured than in the 9. Median area of clypeus subcircular, a little wider than long, convex transversely, the anterior half flattened, shining and feebly punctured. Interocular distance on the vertex equal to the length of the second and third joints of the flagellum. Eyes olive yellow. Apical joint of the tarsi not so long as in the $\%$, and less attenuated at the base. Otherwise like the 9 .

Willowmore, C.P., January it, February ot Types in coll. Brauns.
Superficially this species resembles one of the Panzeri group, but is easily distinguished by the large head, the long pilosity of the thorax and the shining mesonotum.

## T. Schönlandi Cameron.

From an examination of specimens sent to me by Dr Brauns, which he had formerly compared with the type, it is evident that the suggestion which I put forward in regard to this species (p. 176, Part 2) was erroneous. Cameron's species is quite a distinct one, belonging to the group in which the males have fimbriac on the ventral segments. It is not allied to the Panzeri group in which the sternites are simple, or at the most, provided only with lamellae on the fifth and sixth (var. aethiopicus).

The second to fifth sternites have on their apical margins dense fimbriae of long brown hairs, the hairs fairly oblique, but not decumbent. First two
abdominal segments red. Eyes strongly convergent above, the interocular distance on the vertex being equal to the length of the second joint of the flagellum and to not more than a quarter of the length across the base of the clypeus. Temples very short, the back of the head vertical from the posterior margin of the eyes. Mesonotum and scutellum dull, very finely, shallowly and closely punctured, the mesopleurae with a greasy lustre and microscopically rugulose. Dorsum of epinotum dull, microscopically reticulate-punctate, markedly convex from side to side, nearly parallel-sided or only slightly narrowed towards the posterior margin, as long as the scutellum and metanotum united. Abdomen slightly shining above and below.

Several ơ' were taken by Dr Brauns at Algoa Bay, November-December.
of (hitherto undescribed). 10.5 mm . long. Two specimens from Dr Brauns' collection are, I believe, the females of this species. They have the same colour and fine outstanding pilosity of the thorax as the $\delta^{\star}$, and the sculpture is similar, but the dorsum of the epinotum has in addition to the fundamental sculpture a network of thin and very superficial rugae. The pubescence of the face and clypeus is silvery. The anterior margin of the median area of the clypeus is feebly convex and ends on each side in two small teeth. Interocular distance across the base of the clypeus hardly more than three times as great as across the vertex, where it is equal to a little less than the length of the first two joints of the flagellum. Pygidial area triangular, as long as wide at the base, smooth and shining, the apex narrowly truncate. Sternites simple, without fimbriae.

Algoa Bay, November; Willowmore, January (Brauns).

## T. Schönlandi, var. luctuosus v.n.

o. 7 mm . long. This is a melanic form having the abdomen entirely blackish, with the apical margins widely fusco-testaceous. The interocular distance on the vertex is relatively greater, otherwise it is like the type of the species.

Willowmore, C.P. Type in coll. Brauns.
T. Schönlandi, var. detritus v.n.
or. 8.5 mm . long. This differs from the type of the species in having the mesonotum very sparsely and finely punctured as in T. bruneiceps Arn., and also in the abdomen, which is black like that of the variety luctuosus, and has a fimbria only on the third sternite.

Willowmore, C.P. Type in coll. Brauns.

## T. subfimbriatus n.sp.

万. $7-8 \mathrm{~mm}$. long. Black ; first two, or sometimes the first three abdominal segments, the mandibles except the base and apex, the tibiae, tarsi, apices of the femora and apex of the last abdominal segment, ferruginous. Tegulae flavo-testaceous, wings hyaline, the veins brown. Eyes bice-green. Face and clypeus clothed with brassy golden pubescence. Thorax with a yellowish, outstanding and fairly long pilosity, longest and most abundant on the epinotum, shorter and less erect on the mesonotum and mesopleurae. The third to sixth sternites have in the middle of their apical margins a small tuft of long, exserted and brownish hairs. Face and clypeus dull, closely and finely punctured, except the anterior half of the median area of the clypeus which is slightly shining, with a few large punctures. Vertex shining, finely and sparsely punctured. Mesothorax nitidulous, the rest of the thorax dull. Mesonotum and scutellum with small deep punctures, smaller than the spaces between them. Mesopleurae and mesosterna very finely evenly and
somewhat scantily punctured. Dorsum of epinotum coriaceous, with a superficial, close and irregular reticulation superimposed on the posterior two-thirds, the basal third longitudinally striate. Sides of epinotum closely, obliquely and finely striate, the declivity coriaceous and striato-punctate. Abdomen shining and almost smooth below, duller above and impunctate, except the seventh tergite which is finely and fairly closely punctured. Anterior margin of the median area of the clypeus convex. Interocular distance across the base of the clypeus three times greater than across the vertex, at the latter point it is equal to the length of the first two joints of the flagellum. The latter is thin and short, the second joint only a little longer than the first and distinctly shorter than the third. Dorsum of epinotum as long as the scutellum and metanotum united.

ㅇ. 7 mm . long. Face with silvery pubescence. Anterior margin of the median area of the clypeus very feebly convex, its lateral angles rectangular. Second joint of the flagellum half as long again as the first, shorter than the third. Mesonotum and scutellum more shallowly punctured than in the $\delta$. The dorsum of the epinotum with less apparent reticulation, but also with a few longitudinal rugae which reach the apex. Pygidial area triangular, about as wide at the base as long, the apex fairly acute, smooth and shining. Ventral segments simple, without tufts of hairs. Otherwise like the $\delta$.

Willowmore, C.P., November-December. Types in coll. Brauns.

## T. sipapomae Arnold.

Observations in the field leave no doubt that this is the $\delta^{6}$ of prosopigastroides Bischoff; the name sipapomae is therefore to be sunk in synonymy.

## T. Panzeri v.d. Lind.

I have already remarked on the variability of this species, and an examination of material from the Karroo and coastal districts in the collection of Dr Brauns has brought to light several new variations. Amongst others, there are forms which link up the var. aethiopicus with var. Caliban. There is, for instance, a form which has the colour, pubescence and sculpture of aethiopicus or, but which lacks the lamellae on the fifth and sixth sternites. On the other hand another form is like Caliban but has the lamellae, and there are others which are intermediate in sculpture and pubescence.

I am also doubtful whether the var. Sycorax should be maintained as distinct from the var. dolosus. The interocular distance is slightly variable in both, it may be distinctly less than the length of the second joint of the flagellum, and apart from the darker colour of the abdominal segments, sycorax is not distinct from dolosus in any important particular.

I do not think it would serve any useful purpose to give distinctive varietal names to many of these forms, with the exception of the following two which are fairly distinct.

## T. Panzeri, var. miniatulus v.n.

ㅇ. 9 mm . long. Very much like the var. Caliban, but a distinctly more slender insect, especially in the legs. It differs from it as follows.

First three abdominal segments of a deeper red than in Caliban. Legs black, the first or the first and second joints of the middle and hind tarsi brown or blackish, the rest pale ferruginous. Interocular distance on the vertex greater, being equal to the length of the first two joints of the flagellum. Pronotum with a small collar behind, but with the shoulders less prominent than in the var. aethiopicus. The pygidial area is narrower and even more sparingly punctured
than in Caliban. The posterior metatarsi are longer, the tibia being only twice as long as the metatarsus, whereas in Caliban the tibia is fully two and a half times as long.

Sawmills, July, 4 oft. Types in R.M. coll.

## T. Panzeri, var. nanus v.n.

ㅇ. 7.5 mm . long. Black; the apical margin of the clypeus in the middle fusco-ferruginous. Mandibles, except the base and apex, the apices of the femora, the tibiae and tarsi, ferruginous. Tegulae flavo-testaceous, the last two abdominal segments fusco-ferruginous or piceous. Pubescence on the clypeus and face silvery, becoming a little golden on the upper part of the latter. On the thorax the greyish pubescence is very short and sparse. The abdomen has a microscopic pubescence, without distinct transverse fasciae of denser pubescence on the apical margins. Median area of the clypeus shining, sparsely punctured in front, its anterior margin almost straight, the rest of the clypeus, the face and vertex dull, very closely and microscopically punctured. Temples shining, very finely and sparsely punctured. Mesonotum and scutellum shining, very finely punctured (much more sparsely than aethiopicus or Caliban), the punctures on the disc smaller than the spaces between them. Mesopleurae dull, microscopically rugulose. Sides of the epinotum dull, finely and transversely striate like the declivity; dorsum of the epinotum dull, closely rugoso-reticulate, with a few stronger and longitudinal rugae in the middle of the base. Abdomen microscopically rugulose-punctate above and feebly shining, almost impunctate and shining below. Pygidial area shining with a very few fine punctures.

万. 6 mm . long. Tibiae, tarsi, apical halves of the femora, the first or first and second abdominal segments, ferruginous; the remaining abdominal segments black, their apical margins widely fusco-ferruginous. Sometimes all the abdominal segments are black. Apical half of the median area of the clypeus and the middle third of the mandibles, flavo-ferruginous. The puncturation of the mesonotum and scutellum is much more sparse and shallower than in the $\circ$. The median area of the clypeus is subtrapezoidal, narrower than in the f , slightly produced in front, the anterior half smooth and almost impunctate. The lateral angles of the eighth ventral plate are produced into sharp and fairly long teeth. The fifth and sixth sternites have a lamella at the base like the var. aethiopicus of. Otherwise like the $q$.

Willowmore. Types in coll. Brauns.

## T. depilosellus Turner, var. fallax v.n.

ㅇ. 10 mm . long. This variety differs from what I take to be Turner's species (of which I have seen one example from Sawmills, S.R.) as follows.

Coxae, trochanters and basal halves of the femora blackish; antennae and clypeus entirely black, fourth and fifth abdominal segments fuscous over their basal two-thirds. Median area of the clypeus narrower, being very little wider than long (about twice as wide as long in the specimen from Sawmills). The second and third abscissae of the radius are of equal length.
${ }^{\mathbf{t}} .8 .5 \mathrm{~mm}$. long. Scapes in front, apical half of the median area of the clypeus ferruginous; only the extreme base of the femora blackish; first three abdominal segments ferruginous, the rest black. Wings paler than in the $q$. The median area of the clypeus is shaped like that of T. Tuckeri Arn. Face and clypeus clothed with brassy golden pubescence. Abdomen microscopically rugulose above, the last two tergites feebly punctate as well, the seventh trapezoidal and widely rounded at the apex. The sternites very finely and closely punctulate, the first three slightly shining, the rest dull. Vertex wide,
the interocular distance at that point being greater than the length of the first two joints of the flagellum and very nearly equal to that of the second and third. The second joint is fully twice as long as the first and slightly longer than the third. Otherwise like the $q$.

Willowmore, November, $2 \delta^{\circ} \sigma^{\circ}, 1$ ㅇ. Types in R.M. coll.

## T. sericeus Smith, race kalaharicus st.n.

ㅇ. 9 mm . long. Black; mandibles except the base and apex, the upper half of the scapes in front, pronotal tubercles, legs excluding the coxae and trochanters, the first, second, fifth and sixth tergites and all the sternites, ferruginous; the third and fourth tergites blackish, all the segments with the apical margins widely depressed as in the type of the species, and flavotestaceous. Tegulae flavous; wings hyaline, the veins and stigma brown. The long and somewhat woolly pilosity of the thorax is much more abundant than in the type of the species, especially on the mesopleurae and sides of the epinotum, where it obscures the sculpture. The puncturation of the mesonotum and mesopleurae is distinctly finer, but on the other hand the sculpture of the epinotal dorsum is much stronger than in the type of the species, the longitudinal rugae more regular and more prominent. The character of the first and second sternites is the same as in the type of the species. The chief differences lie in the colour and the form of the head and antennae. The latter are decidedly more slender; the second joint of the flagellum is nearly three times as long as its apical width (only twice in the type of the species), and the following joints are even longer. The interocular distance on the vertex is much less, being only equal to the second joint of the flagellum, and not much more than a quarter of the distance across the base of the clypeus (nearly half in the type of the species).

Palapye Road, Bechuanaland Protectorate, October, i $q$ (R. Stevenson). Type in R.M. coll.

## Atelosphex Arnold.

A. miscophoides Arnold, ô (fig. 42).
${ }^{\top}$ (hitherto undescribed). 4.5 mm . long. Abdomen black, the apical segment brownish yellow; only the extreme apices of the femora ferruginous, otherwise coloured like the ㅇ.

Face and vertex less closely punctured than in the $q$. Dorsum of the epinotum more closely sculptured than in the $\%$. Abdomen slightly shining above and closely, evenly punctured, the puncturation relatively stronger than in the $\%$. The base of the second tergite is deeply impressed. Interocular distance across the base of the clypeus half as long again as across the vertex, at which point it is equal to the length of the first four joints of the flagellum. Second joint of the flagellum only a little longer than the first, about two-thirds shorter than the third. Anterior half of the median area of the clypeus smooth and shining, its anterior margin straight. Collar of pronotum shorter and more oblique than in the $\dot{+}$, not much higher than the neck in front of it. Seventh tergite trapezoidal, its anterior margin straight and wide. Otherwise like the $q$.

Willowmore, December (Brauns). Type in R.M. coll.

## A. lugubris n.sp (fig. 4r).

9. 8.5 mm . long. Black; mandibles castaneous in the middle, last two joints of the anterior tarsi, and last joint of the middle and hind tarsi, reddish brown. Head and thorax with a scanty silvery pubescence, absent from the middle of the mesonotum, the scutellum and the middle of the epinotal dorsum. Femora and tibiae and apical margins of the first three tergites with
a very fine silvery pubescence. The whole body dull. Head closely and finely punctured, the spaces between the punctures not larger than the punctures themselves, except on each side of the shining supra-antennal tubercles and on the temples. Pronotum and mesopleurae finely and closely punctured; the mesonotum and scutellum densely punctured, the punctures larger than those of the face, and as large as the spaces between them except on the scutellum and middle of the mesonotum. Metanotum microscopically sculptured. Dorsum of epinotum with a few strong, longitudinal rugae in the middle, reticulate rugose at the sides, the sides and declivity of the epinotum transversely striate and granulate between the striae, the sides very strongly striate, the declivity finely so. Abdomen very densely, evenly and finely punctured above and below, almost reticulate-punctate, the punctures just visible with a magnification of 15 diameters. Pygidial area triangular, about one-third longer than wide at the base, its lateral margins moderately convex, the apex narrowly truncate, microscopically rugulose and finely, sparsely punctured. Median area of the clypeus fully twice as wide as long, its apical half deflexed, the anterior margin straight or nearly so. Antennae slender, the scapes fairly long, fully as long as the first two joints of the flagellum, subclavate or swollen underneath towards the apex, as in A. miscophoides. Second to fourth joints of the flagellum subequal, the second twice as long as the first. The face is excavated below as in $A$. miscophoides, but the sinuous lines enclosing a lyreshaped space are absent in this species. The interocular distance on the vertex is not greater than the length of the first two joints of the flagellum. Temples and occiput large, as in $A$. miscophoides; the thorax is shaped as in that species, with the mesopleurae very prominent, but the collar of the pronotum is less depressed below the level of the mesonotum and is also more oblique. The pygidium is less compressed below the dorsal area than in miscophoides. Spines on the legs and the tarsal comb pale yellowish white, the calcaria black, the inner calcar of the hind tibia only half as long as the metatarsus. Comb of the anterior tarsi composed of long, thin cilia, of which there are six or seven on the basal joint. Wings short, not extending back beyond the apex of the third abdominal segment, hyaline and faintly tinged with fuscous, the veins black. Radial cell widely truncate (much more


Fig. 41. Apical half of wing of Atelosphex lugubris.
Fig. 42. The same of Atelosphex miscophoides. so than in the other species, see figs. 41 and 42), the accessory cell long and clearly defined; first abscissa of the radius as long as the second and third united, the third twice as long as the second. Third cubital cell twothirds wider on the cubitus than on the radius.

Sawmills, December, I 9. Type in the R.M. coll.
This species conforms fairly fully with the characters of the genus, but the absence of the sinuous lines on the face shows that the presence of the same is only a specific, and not a generic character, and the diagnosis of the genus must be emended accordingly.

The antennae are inserted not quite so low down as in $A$. miscophoides, but the scapes, stout and short thorax, and the absence of the episternal suture are all characteristic of the genus.

## PLATES I to VIII

## PLATE I

Figs. 1 to $8 a . \times 31$ diameters.
Figs. 9 to $11 . \times 16$ diameters.
Fig. 9, note, in this figure the epinotum has been drawn too wide and too convex at the apex.
Fig. I and г $a$. Genitalia and 8th ventral plate of Trypoxylon abditum.
Fig. 2 and $2 a$. ", ", ," T. cognatum.
Fig. 3 and $3 a$. ", ", ", T. Kohli.
Fig. 4 and $4 a$. ", ", T. Stroudi.

Fig. 5.
of $T$. testaceipes.
Fig. 6.
of $T$. Stevensoni.
Fig. 7 and $7 a$. "
Fig. 8 and $8 a$.
and 8th ventral plate of T. cataractae.
Fig. 9. Epinotum of T. Stroudi.
Fig. ı. ,, , T. Kohli.
Fig. i I. ", "T. cognatum.



## PLATE II

Fig. 1. Miscophus bellulus Arnold, $q, \times 9$.
Fig. 2. Philanthus histrio Gerst., $\begin{gathered}\text { 人, }\end{gathered} \times 4 \frac{1}{2}$.
Fig. 2a. ",, head from in front.
Fig. 3. Ampulex mutilloides Kohl,,$\stackrel{q}{ } \times 3$.
Fig. 4. Bembex diversipennis Smith, $\widehat{0}, \times 2$.
Fig. 5. Chlorion tuberculatum Smith, $, 9, \times 2$.


[^0]Combillet Dremenily Noss

## PLATE III

Ictidopsis elegans Broom.
A. Dorsal view of specimen No. 80, Transvaal Museum Coll.
B. Same specimen seen from the right side.

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## PLATE IV

Ictidopsis elegans Broom. Dorsal view of specimen No. 172, Transvaal Museum Coll.


## PLATE V

## Ictidopsis elegans Broom.

A. Skull and lower jaw of specimen No. 81 (Transvaal Museum Coll.) seen from the right side.
B. Same specimen seen in ventral view, showing lower jaw, left side of shoulder girdle, and left fore-limb.



## PLATE VI

Ictidopsis elegans Broom. Side view of specimen No. 81, showing nature of anterior dorsal ribs.



I


2


3


I


2


Plate VIIIb


2


3

PLATES IX to XXVI








## PLATE XVI

Figs. 1, 2. Sacred dolls, called mayika, female and male (T.M. 67io, 6709).
Fig. 3. Sacred horn, called tsondo (T.M. 6712).
Fig. 4. Initiation badge, called "license medicine" (T.M. 6713) (Bot. Peziza sp.).
Fig. 5. Head-ornament, called xikuti (T.M. 6345).
Fig. 6. Biological symbols called tinyungufuma (T.M. $6715 a, b, c$ ).
Fig. 7. Sacred drum called nkiringwane (T.M. 6711).



## PLATE XVII

Fig. r. Necklet with front and back pendants, placed on the initiated girl (T.M. 6344 ).

Figs. 2, 3. Upper-arm bracelets, opened up, placed on initiated girl (T.M. 6342,6343 ).
Fig. 4. Girdle, tied over the skirts of initiated girl (T.M. 6348).
Figs. 5, 6. Two specimens of the vanity bag (T.M. 6349, 6350).
Fig. 7. Bead bracelets, worn by the initiated girl on fore-arms (T.M. 6346).
Fig. 8. Bead anklets, worn by initiated girl (T.M. 6347).


## PLATE XVIII

Figs. 1, 2. Skirts of Chopi bark cloth, worn by initiated girl (T.M. 635 r, 6352).


## PLATE XIX

Fig. r. Wooden food-bowl, used as service plate (T.M. 6428).
Fig. 2. Wooden food-dish with pedestal (T.M. 6425).
Fig. 3. Wooden vegetable dish with pedestal (T.M. 6426).
Fig. 4. Wooden food-bowl, used as service plate (T.M. 6429).
Fig. 5. Wooden food-dish (Pig-bowl) (T.M. 6430).
Fig. 6. Wooden food-bowl used as service plate (T.M. 6427)


## PLATE XX

Fig. 1. Mbuwa, large red bead with white spiral porcelain core (in possession of author).
Fig. 2. Andoro of porcelain (T.M. 6891).
Fig. 3. Kota, large hollow brass bead attached to string of blue glass beads (T.M. 6854).

Fig. 4. Small Kota (T.M. 6893).


## PLATE XXI

Figs. 1, 3. Two specimens of the wig or head-dress, xingundu(T.M.6326,6327).
Fig. 2. Head-band with cowrie shells, imbamba (T.M. 6354).
Figs. 4, 5. Two specimens of the thema, axe used in dancing (T.M. 6412,6411). Fig. 6. Sacred basket, ntundo (T.M. 6325).



## PLATE XXII

Fig. 1. Xigara, carved wooden stool (T.M. 6855).
Fig. 2. Whisk, txovo, for smelling out offenders, etc. (T.M. 6841).
Figs. 3, 4. Two rattles (T.M. 6842, 6843).
Fig. 5. Witch-doctor's drum (T.M. 6837).


## PLATE XXIII

Fig. 1. General view of the pelvic girdle of Xenopus showing the epipubis in position anterior to the girdle. A.Ep.=articulation of epipubis and girdle; $A c .=$ acetabulum; $C . E p .=$ corpus epipubis; $I l .=$ ilium; R.C. $=$ residual cartilage, the restknorpel; S.Ep. $=$ stalk of epipubis.
Fig. 2. Ventral view with skin removed. An. = anus; Ep. = epipubis; In.M.R. $=$ inscription of the musculus rectus; L.A. = linea alba; $M . A d . M .=$ musculus adductor magnus; M.Cr. = musculus cruralis; M.Gr.mj. = musculus gracilis major; M.Gr.mn. = musculus gracilis minor; M.P. = musculus pectoralis; M.Sm. = musculus submaxillaris; St. = sternum; X. = extra muscle developed in Xenopus; other abbreviations as above.


## PLATE XXIV

Four consecutive sections to show the precartilaginous anlage of the epipubis: Fig. A, through the posterior region of the abdominal vein; Fig. B, through the region of its bifurcation; Fig. C, through the epipubic muscle; and Fig. D, through the girdle region. B.V.= blood-vessels; C. = cutis; $C . P .=$ clear portion of epipubic anlage; $E .=$ epidermis; E.M. $=$ epipubic muscle; $l . E .=$ lateral extension of epipubic anlage; $M .=$ median portion of same; M.R. = musculus rectus; P.=pigment; P.G. = pelvic girdle; $P . M .=$ pigment obscuring linea alba; $\operatorname{Pr} . M .=$ prolongation of epipubic anlage between the halves of the pelvic girdle; $V . a .=$ vena abdominalis; $V . p . d$. and $V . p . v_{1}=$ dorsal and vertral portions resulting from bifurcation of the abdominal vein; V.B.F. $=$ ventral body fold.


## PLATE XXV

Three consecutive sections to show the cartilaginous anlagen of the epipubis. Ch. $=$ chondrification in the fibrous tissue; F.Ch. $=$ fusion of the chondrifications Ch.; L. = coagulated lymph; M.My.=undifferentiated myocomma of the rectus muscle (linea alba) ; P.M. = muscles of the pelvic girdle. Other abbreviations as in Plate XXIV.




## PLATE XXVI

Hypothetical diagram to explain the probable relations of vertebral column, ribs and sternum. $C l$. = coelome (splanchnocoele); $C M$. = future centrum; $D . A .=$ dorsal aorta; $D . R .=$ dorsal ribs; $E=$ epidermis; $G .=$ gut $; M Y$. $=$ myotome; $N .=$ notochord; $N . A_{.}=$neural arch; $N . S .=$ neural spine; $P . S \dot{P} .=$ parietal splanchnopleure ; $S .=$ future sternum ; $S P .=$ splanchnotome; SP.C. = spinal cord; V.R. = ventral ribs.



[^0]:    (4) Arwill nuat

