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Annals and Magazine of Natural History: Series 8

Publication details, including instructions
for authors and subscription information:
<http://www.tandfonline.com/loi/tnah14>

XLI.—Notes on Fossorial Hymenoptera.—XIII

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Published online: 15 Sep 2009.

To cite this article: Rowland E. Turner F.Z.S. F.E.S. (1914) XLI.—Notes on Fossorial Hymenoptera.—XIII, Annals and Magazine of Natural History: Series 8, 14:82, 337-359, DOI: [10.1080/00222931408693582](https://doi.org/10.1080/00222931408693582)

To link to this article: <http://dx.doi.org/10.1080/00222931408693582>

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Fam. **Membracidæ**.*Ebhul tessellatus*, sp. n.

Head, pronotum, and posterior pronotal process black, the latter somewhat tinted with castaneous; body beneath black, legs more piceous brown; tegmina black, a large spot in claval area, a similar spot in radial area, and a broad apical margin castaneous brown, a spot near claval margin, a transverse series before apical area, and a few smaller scattered spots greyish white; pronotum centrally longitudinally strongly ridged, its anterior lateral angles slightly prominent, not produced, the posterior pronotal process moderately sinuately waved, arched at base where it is separated from the scutellum, and then a little concavely sinuate and following the direction of the tegmina, its apex reaching the posterior angle of the inner tegminal margin; face centrally longitudinally sulcate.

Long. 6 mm.

Hab. Borneo, Mt. Merinjak (type in Brit. Mus.).

Allied to *E. varius*, Walk., but structurally differing by the much less prominently waved posterior pronotal process; colour-markings also different.

XLI.—*Notes on Fossorial Hymenoptera*.—XIII.

By ROWLAND E. TURNER, F.Z.S., F.E.S.

*A Revision of the Paranyssoninæ.*Family **Crabronidæ**.Subfamily *PARANYSSONINÆ*.

Sericophorinæ, D. T., Cat. Hymen. viii. p. 578 (1897).

I follow Kohl and Dalla Torre in the association of the genera in this group. They are all distinguished by the incision on the outer margin of the mandibles and the presence of only one spur on the apex of the intermediate tibiæ. The recurrent nervures are received by the first and second cubital cells, except in *Sphodrates*, in which both are received by the second cell. From *Pison* and its allies the group is distinguished by the entire eyes and the incision of the mandibles; from *Nysson* by the single spine of the intermediate tibiæ and the incision of the mandibles. The relationship to *Larra* is nearer, but the form of the third cubital

cell and the position of the recurrent nervures is different, as well as the normal form of the ocelli. The genera which Ashmead associates with *Sericophorus* and *Zoyphium* in his Lyrodinæ are probably the nearest relations, though I do not consider the relationship very close.

As *Paranysson* is an older name than *Sericophorus*, it should be used for the subfamily.

The pulvilli are very much developed in most of the genera, especially in *Sericophorus* and *Zoyphium*, but not more so than in some other Crabronidæ.

Key to the Genera.

1. Second cubital cell pointed on the radial nervure; antennæ short and clavate.....	2.
Second cubital cell petiolate; antennæ not clavate and longer	3.
2. Radial cell with an appendiculate cell	<i>Sericophorus</i> , Sm.
Radial cell without an appendiculate cell	<i>Zoyphium</i> , Kohl.
3. Cubitus of hind wing originating at a distance beyond the transverse median nervure not exceeding the length of that nervure; hind coxæ without a spine or tubercle; no pygidial area	<i>Sphodrotes</i> , Kohl.
Cubitus of hind wing originating at a distance beyond the transverse cubital nervure equal to at least twice the length of that nervure; hind coxæ of female with a spine or tubercle; with a pygidial area	<i>Paranysson</i> , Guér.

Genus PARANYSSON, Guér.

Nysson (*Paranysson*), Guér. Iconogr. Règn. Animal, Insect. p. 441 (1844).

Helioryctes, Sm. Cat. Hym. B.M. iv. p. 358 (1856).

Pseudohelioryctes, Ashm. Can. Entom. xxxi. p. 248 (1899).

This genus has the mandibles deeply excised on the outer margin, and the intermediate tibiæ have only one apical spine, as in other genera of the group. The second cubital cell is petiolate, the cubitus of the hind wing originates much further from the transverse median nervure than in *Sphodrotes* or other genera of the family. The radial cell is without an appendiculate cell. There is a distinct pygidial area in the female, and also in that sex a tubercle, or more often a long spine, on the hind coxæ. The male has a pygidial area, but is without the spine or tubercle on the hind coxæ. The position of the first recurrent nervure at the apex of the first cubital also separates this genus from *Sphodrotes*, in which both recurrent nervures are received by the second cubital cell, or in one species the first interstitial with the first transverse cubital nervure.

I have discussed my identification of the type species *P. abdominale*, Guér., under that species. Ashmead (Can. Ent. p. 326, 1899) evidently differs from these conclusions, and uses *Paranysson* for several North-American species which are true Nyssoninæ; but I consider he is completely mistaken in his identification of the genus. He also associates *Heliorctes* with the Nyssoninæ, but the incision of the mandibles and the presence of only one spur to the intermediate tibiæ seem to me to render this association impossible. Probably he was only acquainted with *H. melanopyrus*, which he gives as the type by description. Associated with the Pisoninæ together with *Sphodrotes* he places his genus *Pseudoheliorctes* (type *P. foxii*, Ashm.), which he founds for a species apparently only distinguished from true *Heliorctes* by the absence of the coxal spine. This spine is also missing in *Paranysson heliorctoides*, Turn., which I certainly look on as congeneric with other *Paranysson*.

Key to the Species of *Paranysson*.

♀ ♀.

1. Wings hyaline, very slightly clouded at the apex; posterior ocelli very near to the eyes, fully three times as far from each other as from the eyes. (Asiatic.) . . . *P. assimilis*, Bingh.
 Wings fuscous or fusco-violaceous; posterior ocelli never more than twice as far from each other as from the eyes, usually much less. (African.) 2.
2. Posterior ocelli nearly twice as far from each other as from the eyes; spur of hind coxæ reduced to a tubercle *P. heliorctoides*, Turn.
 Posterior ocelli very little, if at all, further from each other than from the eyes; spur of hind coxæ well developed 3.
3. Spur of the hind coxæ originating before the inner angle, near the middle of the inner margin 4.
 Spur of the hind coxæ apical, originating close to the inner angle 5.
4. Apical joint of the flagellum no longer than the penultimate; median segment striate-reticulate *P. melanopyrus*, Sm.
 Apical joint of the flagellum distinctly longer than the penultimate; median segment longitudinally striated *P. oscari*, Turn.
5. Median segment longitudinally striated; pronotum ferruginous. *P. abdominale*, Guér.
 Median segment reticulate or striate-reticulate; pronotum black. *P. quadridentatus*, Cam.

Paranysson abdominale, Guér.

Nysson (*Paranysson*) *abdominale*, Guér. Iconogr. Règn. Animal, Insect. p. 441 (1844).

Nysson abdominalis, Gerst. Abhandl. Halle, x. p. 122 (1866); Handl. Sitzungsber. kais. Akad. Wiss. Wien, xciv. p. 318 (1887).

♀. Nigra; mandibulis fusco-ferrugineis; pronoto, abdomine, femoribus, tibiis tarsisque rufo-ferrugineis; postscutello tegulisque obscure fusco-ferrugineis; alis fusco-violaceis.

Long. 15 mm.

♀. Clypeus transverse at the apex, without lateral teeth. Second joint of the flagellum nearly twice as long as the third, apical joint equal in length to the penultimate. Posterior ocelli a little nearer to each other than to the eyes. Median segment longitudinally striated, the enclosed area very broadly rounded at the apex, no spine or tubercle on the sides of the segment. The spine on the hind coxæ originates close to the apex. Second abscissa of the radius almost equal to the third; cubitus of the hind wing originating at a distance beyond the transverse median nervure equal to nearly two and a half times the length of that nervure.

Hab. West Africa, Senegal (*Guérin*).

I have no doubt that the specimen in the British Museum mentioned by Bingham belongs to *Guérin's* species. Although his description is very brief, it would not fit any other African species known to me, and corresponds in every point to the specimen mentioned above.

Paranysson quadridentatus, Cam.

Helioryctes quadridentatus, Cam. Ann. Transv. Mus. ii. p. 142 (1910). ♀.

♀. Nigra; abdomine, femoribus, tibiis tarsisque rufo-ferrugineis; alis fusco-violaceis.

Long. 12–15 mm.

♀. Clypeus with two distinct teeth on each side. Second joint of the flagellum nearly half as long again as the third, apical joint no longer than the penultimate. Posterior ocelli a little further from each other than from the eyes. Median segment with short longitudinal striæ at the base, the rest of the enclosed area coarsely reticulated, with a small depression at the apex; a spine on each side of the posterior slope. Spine of the hind coxæ originating close to the apical angle. Third abscissa of the radius longer than the second, cubitus of hind wing originating at a distance from the transverse median nervure equal to at least three times the length of that nervure.

Hab. Transvaal and as far north as Nyasaland.

There seems to be some variation in the development of the spine on the sides of the median segment.

Paranysson melanopyrus, Sm.

Helioryctes melanopyrus, Sm. Cat. Hym. B.M. iv. p. 359 (1856). ♀.

♀. Nigra; mandibulis basi, tegulis, abdomine, femoribus, tibiis tarsisque ferrugineis; alis fuscis.

Long. 8-10 mm.

♀. Clypeus with two very minute teeth on each side. Second joint of the flagellum very little longer than the third, the apical joint no longer than the penultimate. Posterior ocelli about half as far again from each other as from the eyes. Median segment striate-reticulate, the enclosed area longer and more nearly semicircular than in other species. Spur of the hind coxæ originating much further from the apex than in *abdominale*, not far from the middle of the inner margin. Third abscissa of the radius scarcely as long as the second; cubitus of the hind wing originating at a distance from the transverse median nervure equal to nearly two and a half times the length of that nervure. A tubercle on each side of the median segment.

Hab. Gambia (*Smith*); Sierra Leone; Ojogbo, S. Nigeria (*J. J. Simpson*); Eastern Mbale district, S. of Mt. Elgon, Uganda (*S. A. Neave*).

The male is similar to the female, but, as in other species, the spine on the hind coxæ is not developed.

*Paranysson oscar*i, sp. n.

♀. Nigra; mandibulis basi, tegulis, abdomine, femoribus, tibiis tarsisque rufo-ferrugineis; alis fusco-violaceis.

Long. 8 mm.

♀. Clypeus with two small teeth on each side; second joint of the flagellum short, but longer by about one-third than the third joint, apical joint distinctly longer than the penultimate. Posterior ocelli a little further from each other than from the eyes. Median segment with the enclosed area longitudinally striated, not reticulate, short and broad, the apex of the enclosed area broadly rounded and distinctly depressed below the dorsal surface towards the posterior slope, which is finely transversely striated and without lateral spines or tubercles. Spine of the hind coxa originating near the middle of the inner margin, not at the apex. Third

abscissa of the radius a little longer than the second, cubitus of hind wing originating at a distance from the transverse median nervure equal to two and a half times the length of that nervure.

Hab. Pakasa, N. Rhodesia (*Silverlock*).

This is near *melanopyrus*, Sm., but differs in the sculpture of the median segment, the absence of the lateral spines on that segment, the greater length of the apical joint of the flagellum, and in the presence of a distinct groove reaching from eye to eye behind the posterior ocelli.

Paranysson helioryctoides, Turn.

Nysson helioryctoides, Turn. Ann. & Mag. Nat. Hist. (8) ix. p. 416 (1912). ♀.

♀. Nigra; abdomine, femoribus, tibiis tarsisque rufo-ferrugineis; alis fusco-violaceis.
Long. 7 mm.

♀. Clypeus broad, without lateral teeth; second joint of the flagellum equal to the third, apical joint no longer than the penultimate. Posterior ocelli nearly twice as far from each other as from the eyes. Median segment very coarsely reticulate, the apical margin above the posterior truncation transverse, not rounded, and margined by a carina; the surface of the posterior truncation striato-punctate, with a small triangular spine on each side near the middle; the sides of the segment strongly striate. Third abscissa of the radius more than half as long again as the second. Cubitus of the hind wing originating at a distance beyond the transverse median nervure equal to about twice the length of that nervure.

Hab. Pakasa, N. Rhodesia (*Silverlock*).

This is a true *Paranysson*, having the mandibles excised on the outer margin and only one spine at the apex of the intermediate tibiæ, differing in these points from *Nysson*. The hind coxæ have no spine beneath, but there is a small tubercle.

Paranysson assimilis, Bingh.

Helioryctes assimilis, Bingh. Fauna Brit. India, Hymen. i. p. 271 (1897). ♂ ♀.

♀. Nigra; abdomine ferrugineo; tegulis, femoribus apice, tibiisque fusco-ferrugineis; tarsis brunneo-testaceis, alis hyalinis apice pallide infuscat.

♂. Feminæ similis.

Long. 6-7 mm.

♀. Clypeus broad, with two small teeth on each side. Second joint of the flagellum short, scarcely as long as the third, apical joint no longer than the penultimate. Posterior ocelli separated from the eyes by a distance scarcely exceeding one-half of their own diameter, more than three times as far from each other as from the eyes. Median segment with the enclosed area very coarsely reticulate, a small blunt tubercle on each side of the posterior truncation. Tubercle on the hind coxæ very minute and indistinct. Third abscissa of the radius at least half as long again as the second, origin of cubitus of hind wing separated from the transverse median nervure by more than twice the length of that nervure,

Hab. Tenasserim (*Bingham*).

Paranysson foxii, Ashm.

Pseudohelioryctes foxii, Ashm. Can. Entom. xxxi. p. 248 (1899). ♀.
Helioryctes melanopyrus, Fox, Proc. Acad. Nat. Sci. Philadelphia, p. 554 (1896, nec Smith).

I have not seen this species, and the description is very insufficient.

"*Female*.—Length 14 mm. Head, thorax, antennæ, and all coxæ and trochanters black; rest of legs and the abdomen, except the pygidium above (which is dusky), ferruginous; wings fuscous black."

In the generic description he mentions that there is no coxal spine.

Genus SPHODROTES, Kohl.

The species of this genus may be distinguished from *Sericophorus* and *Zoyphium* by the petiolate second cubital cell, by the coarse sculpture, by the comparatively small pulvilli, and by the antennæ, which are normal, not clavate, thirteen-jointed in the males, instead of twelve-jointed, as in those genera.

The genus is confined to Australia, and seems to be widely spread, though the species are not found commonly. When captured they make a buzzing sound, similar to that made by some of the larger species of *Crabro* and *Pison*.

Type of the genus, *S. punctuosus*, Kohl.

The species do not differ very greatly structurally; in all the second and third joints of the flagellum are almost equal and the posterior ocelli are nearly equidistant from the eyes and from each other. The most important structural differences are on the median segment and second ventral segment. There is no pygidial area.

Ashmead places this genus in his Pisoninæ together with his genus *Pseudohelioryetes*, which I treat as a synonym of *Paranysson*. But I consider the entire eyes and incised mandibles remove it from that group, though the genus is the most isolated of the present subfamily, and some doubt as to the correct position is justifiable. The incised mandibles and single spur of the intermediate tibiæ remove it from the Nyssoninæ. The mandibles of *S. rubricatus*, the only species in which I have been able to study the inner margin, have two small teeth near the base, as in the other genera of the subfamily. This points to the correctness of Kohl's views as to the relationship of the genus.

Key to the Species of Sphodrotes.

♀ ♀.

1. Second ventral segment angular at the base and subtuberculate; abdomen black	<i>S. cygnorum</i> , Turn.
Second ventral segment rounded at the base, not subtuberculate; abdomen not wholly black	2.
2. Abdomen wholly ferruginous red	<i>S. rubricatus</i> , Turn.
Basal abdominal segment only ferruginous; the other segments with the apical margin narrowly ferruginous brown covered with golden pubescence	<i>S. marginalis</i> , Turn.

♂ ♂.

1. First recurrent nervure interstitial with the first transverse cubital nervure	<i>S. pilosellus</i> , Turn.
Both recurrent nervures received by the second cubital cell	2.
2. Abdomen black; median segment without tubercles on the sides of the posterior truncation	<i>S. punctuosus</i> , Kohl.
Abdomen more or less ferruginous; a blunt tubercle on each side of the median segment, near the middle of the posterior truncation	<i>S. rubricatus</i> , Turn.

Sphodrotes punctuosus, Kohl.

Sphodrotes punctuosus, Kohl, Ann. naturh. Hofmus. Wien, iv. p. 189 (1889). ♂.

♂. Niger; mandibulis, antennis, articulis tribus apicalibus exceptis, femoribus apice, tibiis tarsisque ferrugineis; tegulis fusco-ferrugineis; alis hyalinis, leviter infuscat, venis fusco-ferrugineis.

Long. 9 mm.

♂. Coarsely punctured, an obscure longitudinal carina on the scutellum; median segment punctured-rugose, with an

obscure median carina, no spines or tubercles on the sides of the segment; first dorsal segment broad, not strongly narrowed to the base. Third cubital cell nearly half as long again on the radius as on the cubitus.

Hab. Mt. Kosciusko, N.S.W. (Australian Museum); Eaglehawk Neck, Tasmania (Turner).

Sphodrotes cygnorum, Turn.

Sphodrotes cygnorum, Turn. Proc. Zool. Soc. London, p. 349 (1910). ♀.

♀. Nigra, pedibus ferrugineis; mandibulis tegulisque fusco-ferrugineis; alis hyalinis, leviter infuscatis, venis fusco-ferrugineis. Long. 10 mm.

♀. Coarsely punctured, more finely on the abdomen than on the thorax; median segment very coarsely rugose, longitudinally striated at the base, abruptly truncate posteriorly, with a blunt tubercle on each side of the truncation near the middle, the sides of the segment striated at the base. Abdomen broad at the base, first ventral segment with a tubercle beneath, second strongly angular at the base and subtuberculate. Third cubital cell very slightly longer on the radius than on the cubitus.

Hab. Claremont, near Perth, W. Australia (Giles).

The flagellum is missing in the type. This is nearer to *punctuosus* than to any of the other species, but differs in the shape of the third cubital cell, in the tubercles on the sides of the median segment, and in the angular and subtuberculate base of the second ventral segment. I do not think that these distinctions are merely sexual.

Sphodrotes pilosellus, Turn.

Sphodrotes pilosellus, Turn. Trans. Ent. Soc. London, p. 427 (1910). ♂.

♂. Niger; scapo, flagello subtus, callis humeralibus, tegulis pedibusque brunneo-ferrugineis; abdomine segmento primo toto, segmentisque 2-7 margine apicali fusco-ferrugineis; alis hyalinis, leviter infuscatis; venis fuscis, stigmatibus testaceo. Long. 7 mm.

♂. Clypeus, front, pronotum, mesopleuræ, angles of the median segment, and apical margins of the abdominal segments clothed with short golden pubescence. Second and third joints of the flagellum equal; posterior ocelli as far from each other as from the eyes. Coarsely and closely punctured; median segment coarsely rugose, with a median carina not reaching the apex, a tubercular prominence on

each side of the posterior truncation near the middle. First recurrent nervure interstitial with the first transverse cubital nervure, third cubital cell longer on the radius than on the cubitus.

Hab. Cairns, Queensland (*Dodd*).

Very near *S. marginalis* described in this paper.

Sphodrotes marginalis, sp. n.

♀. Nigra; mandibulis, scapo, flagello dimidio basali, tegulis, segmento abdominali primo nonnunquam infuscato, segmento sexto, femoribus supra, tibiis tarsisque ferrugineis; segmentis dorsalibus 2-5 margine apicali brunneis, aureo-pilosis; alis hyalinis, venis testaceis.

Long. 9 mm.

♀. Clypeus covered with shining golden pubescence, very feebly convex; second joint of the flagellum equal to the third, more than twice as long as the first; posterior ocelli as far from each other as from the eyes. Head and thorax coarsely and closely punctured; scutellum longitudinally rugose-striate; pronotum covered on the upper margin with golden pubescence. Median segment very coarsely reticulate, narrowed and rounded posteriorly; the surface of the steep posterior slope covered with golden pubescence, with a median sulcus and with a small acute spine on each side near the middle. Abdomen more finely and shallowly punctured; second ventral segment rounded at the base, not angular or tuberculate; first segment narrow at the base. Pulvilli long, forked at the apex when extended. Third cubital cell distinctly longer on the radius than on the cubitus, first recurrent nervure received by the second cubital cell at a distance from the base equal to the length of the petiole of the second cubital cell.

Hab. Maryborough, S. Queensland; Brisbane (*Hacker*).

In the Brisbane specimen there is a distinct longitudinal carina on the median segment, which is present, though more indistinct, in the Maryborough specimen.

It is possible that this may be the female of *pilosellus*, but in that species the first recurrent nervure is interstitial with the first transverse cubital nervure, and the cubitus of the hind wing originates nearer to the transverse median nervure. The first abdominal segment is much more strongly narrowed to the base in this species than in *pilosellus*.

Sphodrotes rubricatus, Turn.

Sphodrotes rubricatus, Turn. Trans. Ent. Soc. London, p. 426 (1910).

♀ ♂.

♀. Nigra; mandibulis, tegulis, abdomine pedibusque rufo-ferrugineis; alis hyalinis, leviter infuscatis, venis fuscis, stigmatibus testaceo; antennis ferrugineis, infuscatis.

Long. 8 mm.

♂. *Feminæ similis*; abdomine apice infuscato.

♀. Coarsely and closely punctured; median segment very coarsely longitudinally rugose-striate, the surface of the posterior truncation coarsely transversely rugose-striate, with a short stout spine on each side near the middle, the sides of the segment obliquely striated. Abdomen broad at the base, second ventral segment rounded at the base, not angular or subtuberculate. Third cubital cell nearly half as long again on the radius as on the cubitus.

♂. As in the female, with a spine on the sides of the median segment as in the female, the abdomen more coarsely punctured.

Hab. Adelaide.

Genus SERICOPHORUS, Sm.

This genus is distinguished from *Sphodrotes* by the appendiculate radial cell, by the pointed, not petiolate, second cubital cell, by the absence of coarse puncturation, by the shorter and more or less clavate antennæ, and by the more conical form of the abdomen, also by the twelve-jointed antennæ of the male. From *Zoyphium* it can only be distinguished by the appendiculate radial cell, and it is very doubtful if the two can be permanently retained as separate genera. The very large pulvillus also distinguishes both of these from *Sphodrotes*.

The genus is confined to Australia.

Type of the genus, *S. chalybæus*, Sm.

In his description of this genus ('Gattungen der Sphegiden,' p. 385) Kohl says "Tubercula humeralia alarum tegulas attingunt." This is a mistake; probably "non" has been accidentally omitted.

Key to the Species of Sericophorus.

♀ ♀.

1. Abdomen testaceous red	<i>S. bicolor</i> , Sm.
Abdomen otherwise coloured	2.
2. Scutellum in the middle and first dorsal segment at the base strongly subtuberculate	<i>S. chalybæus</i> , Sm.
Scutellum and first dorsal segment without tubercles	3.
3. Apical joint of the antennæ broadly obliquely truncate at the apex; clypeus with two strong teeth on each side of the median lobe.	<i>S. viridis</i> , Sauss.

- Apical joint of the antennæ conical; teeth of the clypeus either absent or very small 4.
 4. Teeth of the clypeus wholly absent; colour greenish blue *S. claviger*, Kohl.
 Teeth of the clypeus very small, abdomen bronze. *S. relucens*, Sm.

♂ ♂.

1. Antennæ thirteen-jointed; median segment with a distinct semicircular basal area; a spine on each side of the median segment near the base; second ventral segment with a strong transverse carina. *S. abnormis*, Turn.
 Antennæ twelve-jointed; median segment without a distinct basal area or lateral spines; second ventral segment without a carina. . . . 2.
 2. Scutellum and base of first dorsal segment strongly subtuberculate *S. chalybæus*, Sm.
 Scutellum and base of first dorsal segment not subtuberculate 3.
 3. Club of antennæ very thick, obliquely truncate at the apex; joints 3-6 of the flagellum toothed beneath *S. viridis*, Sauss.
 Club of antennæ conical; joints of the flagellum not rounded or toothed beneath *S. relucens*, Sm.

Sericophorus chalybæus, Sm.

Sericophorus chalybæus, Sm. Ann. & Mag. Nat. Hist. (2) vii. p. 32 (1851). ♀.

Tachyrrhostus cyaneus, Sauss. Mem. soc. phys. & hist. nat. Genève, xiv. p. 26 (1854). ♀.

♀. Cyanea; antennarum flagello, femoribus apice, tibiis tarsisque rufo-testaceis; alis hyalinis, venis nigris.

♂. Feminæ similis; femoribus omnino rufo-testaceis.

Long., ♀ 11 mm., ♂ 7 mm.

♀. Clypeus broadly rounded at the apex, with two teeth on each side of the median lobe of the clypeus on the apical margin; penultimate joint of the antennæ very little broader than long, the apical joint a little longer than the breadth at the base, subconical, hollowed on the inner side at the apex. Front with a short longitudinal carina situated about halfway between the anterior ocellus and the base of the clypeus; posterior ocelli nearly twice as far from each other as from the eyes. Mesonotum with four distinct shallow grooves from the anterior margin reaching nearly to the middle of the segment; scutellum strongly convex and subtuberculate in the middle; median segment with a longitudinal sulcus from base to apex, in which lies a low carina. First dorsal segment subtuberculate in the middle at the base. The posterior truncation of the median segment rather irregularly transversely striated. Second cubital cell almost pointed on

the radial nervure, receiving the second recurrent nervure at one-quarter from its apex, the first recurrent nervure received nearly twice as far from the apex of the first cubital cell.

♂. As in the female; the teeth on the clypeus a little smaller; antennæ twelve-jointed, the apical joint obliquely truncate on the outer side; the joints of the flagellum not spinose beneath as in *viridis*; tubercles of the scutellum and first dorsal segment as in the female.

Hab. Australia (*Smith*); Eaglehawk Neck, S.E. Tasmania (*Turner*); Kalamunda, S.W. Australia (*Turner*).

Four females taken in Tasmania and one male in S.W. Australia. This species appears to be scarcer than *S. viridis*.

Sericophorus viridis, Sauss.

Tachyrrhostus viridis, Sauss. Mem. soc. phys. & hist. nat. Genève, xiv. p. 25 (1854). ♀.

Sericophorus viridis, Sauss. Mélang. Hymen. i. p. 69 (1854).

♀. Cyanea; abdomine viridi-æneo, nonnumquam cyaneo; clypeo, antennis, tegulis, segmento abdominali sexto pedibusque rufo-testaceis; alis hyalinis, venis nigris.

♂. Feminae similis; femoribus basi nigris, segmentis abdominalibus duobus apicalibus rufo-testaceis; clypeo nigro.

Long., ♀ 9–11 mm., ♂ 7 mm.

♀. Clypeus broadly subtruncate at the apex, with two small, but distinct teeth on each side of the median lobe, depressed from near the base and forming a large broad triangle. Antennæ thickened towards the apex, the apical joint very stout, as broad as long and obliquely truncate on the outer side; the eighth, ninth, and tenth joints of the flagellum broader than long. Posterior ocelli less than twice as far from each other as from the eyes. Front convex in the middle, with a very short longitudinal sulcus halfway between the anterior ocellus and the base of the clypeus. Thorax closely and finely punctured, the pronotum very steeply sloped, the mesonotum with two parallel longitudinal grooves reaching from the anterior margin to the middle; scutellum without a tubercle, median segment with a broad deep groove from the base to the apex. First dorsal segment shorter than in *chalybæus*, broad and vertically truncate anteriorly. Second cubital cell almost pointed on the radius, receiving the second recurrent nervure at one-quarter from the apex, the first recurrent nervure received at nearly twice the distance from the apex of the first cubital cell.

♂. Antennæ stouter at the apex than in the female, twelve-jointed, the third to sixth joints of the flagellum each with a small spine or tubercle beneath.

Hab. Woodford, New South Wales (*G. A. Waterhouse*); Perth, West Australia (*Turner*).

This species seems to be commoner than *chalybæus*. There is, however, only one male in the British Museum from Smith's collection, with the locality "Australia."

Sericophorus claviger, Kohl.

Tachyrhostus claviger, Kohl, Ann. natur. Hofmus. Wien, vii. p. 229 (1892). ♀.

Sericophorus claviger, D. T., Cat. Hym. viii. p. 578 (1897).

♀. Viridi-cyanea; mandibulæ ex parte, tibiæ, tarsi et segmentum anale ferruginea.

Long. 7 mm.

♀. Kohl compares this species with *chalybæus*, from which it differs in the absence of teeth on the clypeus, in the conical apical joint of the flagellum, and in the shape of the third to seventh joints of the flagellum, which somewhat resemble those of the male of *viridis*. Kohl does not mention any tubercle on the scutellum or first dorsal segment, so I conclude that they are not present in this species.

Hab. "Australia."

I have not seen this species, but Kohl's figures of the clypeus and antennæ show that it is distinct from *viridis* and *chalybæus*, to the first of which it seems to be most nearly allied.

Sericophorus relucens, Sm.

Sericophorus relucens, Sm. Cat. Hym. B.M. iv. p. 357 (1856). ♀.

? *Zoyphium rufipes*, Rohwer, Proc. U.S. Nat. Mus. xl. p. 585 (1911).

♀. Nigro-ænea, capite thoraceque opacis; segmento mediano abdomineque fulgentibus; pronoto utrinque pallide flavo; mandibulis, antennis subtus tegulisque fusco-ferrugineis; scutello, postscutello pedibusque ferrugineis.

♂. Feminæ similis; segmento abdominali primo ferrugineo, segmentis duobus apicalibus rufo-testaceis.

Long., ♀ 7-8 mm., ♂ 5 mm.

♀. Clypeus transverse at the apex, with two very small teeth on each side, not always distinct when the mandibles are closed. Antennæ very short, thickened towards the apex, the third to tenth joints of the flagellum broader than long, the apical joint conical. Front without a distinct sulcus, the posterior ocelli more than twice as far from each other as from the eyes. Pronotum transverse, not depressed below the mesonotum; a transverse foveolate groove at the base of the scutellum; median segment with a very broad

median depression which is fully half as broad as long, and in which lies a strong longitudinal carina, the depression distinctly margined, the posterior truncation of the segment with a strong median carina. First abdominal segment strongly rounded at the basal angles, not truncate. The whole insect finely and closely punctured, and clothed in many places with short sericeous pubescence. Second cubital cell pointed, receiving the second recurrent nervure at about one-third from the apex, first recurrent nervure received at a slightly greater distance from the apex of the first cubital cell.

♂. Antennæ twelve-jointed, the apical joint conical, slightly hollowed on the outer side; tibiæ much less spinose than in the female.

Hab. Cape York (*Turner*); Cairns (*Turner*); Townsville (*Dodd*); Mackay, Q. (*Turner*); Richmond River, N.S.W. (*G. A. Waterhouse*); Killalpanima, S.A. (*H. J. Hillier*); Adelaide (*Smith*, type); Yallingup, S.W. Australia (*Turner*).

The commonest species of the genus. Rohwer's description of *Zoyphium rufipes* answers to this species very well, but he does not mention the bronze colour of the abdomen or the appendiculate radial cell.

Sericophorus bicolor, Sm.

Sericophorus bicolor, Sm. Ann. & Mag. Nat. Hist. (4) xii. p. 405 (1873).

♀.

♀. Atro-cærulea; mandibulis, antennis, abdomine pedibusque rufo-testaceis; alis hyalinis, venis testaceis.

Long. 7 mm.

♀. Clypeus very broadly rounded at the apex, without lateral teeth. Head and thorax very closely and finely punctured, a shallow longitudinal sulcus on the front extending from the anterior ocellus more than halfway to the base of the clypeus; posterior ocelli nearly three times as far from each other as from the eyes. Pronotum almost vertical; the median segment with a broad longitudinal groove, which broadens from the base to the apex. Radial cell with a distinct appendix; second cubital cell pointed on the radius, receiving the second recurrent nervure at about one-fifth from the apex, first recurrent nervure received at the same distance from the apex of the first cubital cell.

Hab. Swan River, Western Australia.

The apical joints of the antennæ are missing in the type, which is unique.

Superficially the resemblance to *Zoyphium erythrosoma*, Turn., is very strong.

The median segment is margined laterally in this species by an enclosed narrow area, strongly striated.

Sericophorus abnormis, sp. n.

♂. Fusco-æneus; mandibulis basi, scapo, flagello articulo primo, tegulis, femoribus apice, tibiis tarsisque flavis; segmentis abdominalibus fascia angusta apicali sordide albida; femoribus supra fusco-ferrugineis.

Long. 6 mm.

♂. Mandibles strongly excised beneath; clypeus subtruncate at the apex, without teeth. Antennæ short, their length not equal to the breadth of the head, thirteen-jointed, the joints broader than long except the conical apical joint. Eyes diverging both towards the vertex and towards the clypeus; posterior ocelli more than twice as far from the eyes as from each other. Head and thorax minutely punctured, and clothed with very short golden pubescence, changing to silver on the front and clypeus. Postscutellum raised into a distinct tubercle in the middle. Median segment with a well-developed tubercle on each side near the base; most of the dorsal surface occupied by a well-defined semicircular basal area, which is longitudinally rugose-striate, divided by a broad but shallow longitudinal groove; abdomen opaque; the second ventral segment with a strongly raised transverse carina near the middle. Hind tibiæ with a row of spines on the outer margin, pulvilli well developed, but not abnormally large as in other species of the genus; a small tubercle on the mesosternum in front of the intermediate coxæ. Radial cell with an appendix; second cubital cell almost pointed on the radius, receiving the second recurrent nervure at one-fifth from the apex, first recurrent nervure received at the same distance from the apex of the first cubital cell.

Hab. Yallingup, S.W. Australia; December.

I took a single male of this curious species, for which a new genus will probably have to be erected when more material is available. The difference in the structure of the antennæ, median segment, second ventral segment, and pulvilli should be sufficient to separate it from *Sericophorus*, though the venuration is the same. The apical joint of the tarsi is not thickened as in both sexes of other species of *Sericophorus* and in some species of *Zoyphium*.

Genus ZOYPHIUM, Kohl.

This genus can only be separated from *Sericophorus* by the absence of an appendix to the radial cell of the fore wing. None of the other characters found in the species are common to all of the genus, and some of the species resemble *Sericophorus* very closely.

Type of the genus, *Z. sericeum*, Kohl.

The apical joint of the tarsi is thickened in most of the species, in both sexes in *Z. erythrosoma*, but not in *Z. rufonigrum* and *Z. doddi*, both of which are only known in the male sex. The spine on each side of the first abdominal segment, mentioned by Kohl in his description of the genus, seems to be a character confined to the type-species.

Key to the Species of Zoyphium.

♀ ♀.

1. Two cubital cells only, the second transverse cubital nervure obsolete; front as high as the middle of the inner orbit of the eye yellow..... *Z. frontale*, Turn.
- Three cubital cells; front black 2.
2. Abdomen entirely black 3.
- Abdomen not entirely black 5.
3. Clypeus convex, porrect at the apex; pronotum margined with whitish yellow .. *Z. funebre*, Turn.
- Clypeus not porrect at the apex, pronotum wholly black 4.
4. Antennæ black, clypeus with two small teeth on each side, first recurrent nervure almost interstitial with the first transverse cubital nervure *Z. iridipenne*, Turn.
- Antennæ testaceous brown; clypeus without teeth, first recurrent nervure received at a distance from the apex of the first cubital cell equal to more than half the length of the first transverse cubital nervure..... *Z. kohlii*, Turn.
5. First abdominal segment with a tubercle on each side *Z. sericeum*, Kohl.
- First abdominal segment without a tubercle on each side 6.
6. Thorax blackish blue; abdomen wholly testaceous red *Z. erythrosoma*, Turn.
- Thorax and basal and apical abdominal segments testaceous brown, remainder of abdomen black *Z. dipteroides*, Turn.

♂ ♂.

1. Abdomen wholly rufo-testaceous *Z. erythrosoma*, Turn.
- Abdomen wholly black 2.
2. Mesonotum and median segment ferruginous red *Z. rufonigrum*, Turn.
- Mesonotum and median segment black 3.

3. Hypopygium truncate at the apex, with a
 median spine *Z. doddi*, Turn.
 Hypopygium without a spine. *Z. crassicorne*, Ckll.

Zoyphium dipteroides, Turn.

Sericophorus dipteroides, Turn. Ann. & Mag. Nat. Hist. (7) xix. p. 275 (1907). ♀.

Zoyphium dipteroides, Turn. Ann. & Mag. Nat. Hist. (8) x. p. 66 (1912). ♀.

♀. Testaceo-brunnea; mandibulis apice, fronte, vertice, segmentis abdominalibus 2-5 pulvillisque nigris; alis hyalinis, venis ferrugineo-testaceis,

Long. 7 mm.

♀. Clypeus broadly subtruncate at the apex, without lateral teeth; antennæ gradually thickened to the apex, the apical joint conical, longer than broad, the three penultimate joints broader than long. Posterior ocelli nearly twice as far from each other as from the eyes. Pronotum vertical, depressed below the mesonotum; median segment short, with a transverse foveolate groove at the base which joins a longitudinal median groove. Abdomen conical, the basal segment very short and broad, abruptly truncate at the base. Radial cell without an appendix, second cubital cell pointed on the radial nervure, receiving the second recurrent nervure at one-third from the apex, first recurrent nervure received rather nearer to the apex of the first cubital cell, Pulvilli very large.

Hab. Cairns, Q. (*Turner*).

The type is still unique in the British Museum. In the shape of the abdomen the species approaches *Sericophorus viridis*, and is altogether much more robust than any other species of *Zoyphium*.

Zoyphium sericeum, Kohl.

Zoyphium sericeum, Kohl, Verh. zool.-bot. Ges. Wien, xliii. p. 571 (1898). ♀.

♀. Nigra; mandibulis basi, clypeo, scapo, pronoto linea transversa, callis humeralibus, tibiisque intermediis et posticis supra flavis; flagello articulis basalibus, pronoto, scutello, postscutello, tegulis, pedibusque rufo-ferrugineis; abdomine aurichalceo-sericeo.

Long. 11 mm.

♀. Clypeus with two distinct teeth on each side. Posterior ocelli nearly twice as far from each other as from the eyes; apical joint of the antennæ stout and conical, about twice as long as the penultimate. A tooth on each side of the first abdominal segment near the middle,

Hab. Adelaide.

There is no specimen of this in the British Museum. It is larger than other species of the genus, though not so robust as *Z. dipteroides*. The ferruginous colour spreads more or less on to the median segment and first abdominal segment.

Zoyphium erythrosoma, Turn.

Zoyphium erythrosoma, Turn. Proc. Zool. Soc. London, p. 493 (1908).
♀.

♀. Nigra, cærulescens; mandibulis basi, clypeo, scapo, femoribus apice, tibiis tarsisque flavis; abdomine flagelloque rufo-testaceis, tegulis fuscis; alis hyalinis, venis pallide ferrugineis.

Long., ♀ 8-9 mm., ♂ 7 mm.

♂. Feminae similis, clypeo nigro.

♀. Clypeus with two minute teeth on each side; antennæ inserted more than half as far again from each other as from the eyes, joints 6-11 broader than long, the apical joint stout and conical. Pronotum depressed below the level of the mesonotum; a deep foveolate transverse groove at the base of the scutellum. Sulcus of the median segment narrow, the carina in it not extending halfway to the apex, a few short oblique striæ at the base of the segment. Second recurrent nervure received just before two-thirds from the base of the second cubital cell, first at about the same distance on the basal side of the first transverse cubital nervure.

♂. Hypopygium pointed, with a spine on each side near the apex.

Hab. Townsville (*Dodd*); Mackay (*Turner*); Brisbane (*Hacker*).

In colour this resembles *Sericophorus bicolor*, though the clypeus in that species is blue-black and the legs the same colour as the abdomen. The first abdominal segment is much more rounded at the base in this species, the sulcus on the median segment much narrower and shallower, and the neururation different. The median segment in *bicolor* is margined at the sides and has a small striated area above the metapleuræ.

Zoyphium funebre, Turn.

Sericophorus funebris, Turn. Ann. & Mag. Nat. Hist. (7) xix. p. 276 (1907). ♀.

Zoyphium funebris, Turn. Ann. & Mag. Nat. Hist. (8) x. p. 60 (1912).
♀.

♀. Nigra; mandibulis, pronoto linea interrupta tegulisque flavis; tibiis, tarsis femoribusque apice brunneo-ferrugineis; alis hyalinis, venis fusco-testaceis,

Long. 6 mm.

♀. Clypeus much elevated in the middle and strongly porrect at the apex. Antennæ short, the joints (except the conical apical joint) broader than long; a very short longitudinal carina above the base of the antennæ. Posterior ocelli twice as far from each other as from the eyes. Median segment with a groove in which lies a carina running from the base to the apex; the pronotum not sunk below the mesonotum as much as in most species of the genus. First abdominal segment rounded at the base. Second cubital cell pointed on the radius, receiving the second recurrent nervure at one-third from the apex, first recurrent nervure received at about the same distance from the apex of the first cubital cell.

Hab. Mackay, Queensland (*Turner*).

There are two distinct longitudinal carinæ on the sides of the median segment in this species, the space between them is punctured, not striated as in the similar space in *Sericophorus bicolor*.

Zoyphium rufonigrum, Turn.

Zoyphium rufonigrum, Turn. Proc. Zool. Soc. London, p. 494 (1908).
♂.

♂. Niger; mandibulis, clypeo, pronoto, mesonoto segmentoque mediano rufo-ferrugineis; scapo, flagello articulo apicali, tibiis tarsisque flavo-testaceis; alis hyalinis, iridescentibus, venis fuscis.

Long. 4 mm.

♂. Clypeus narrowly depressed on the apical margin, without lateral teeth; apical joint of the flagellum conical, longer than broad, joints 6-10 broader than long, the antennæ twelve-jointed. Posterior ocelli about twice as far from each other as from the eyes; front with a very short shallow sulcus. Pronotum not sunk much below the mesonotum, the hind angles rather prominent. Median segment rounded at the apex, with a longitudinal sulcus in which lies a carina. Hypopygium subtruncate at the apex, with a minute spine. Second cubital cell pointed, receiving the second recurrent nervure at about one-third from the apex, first recurrent nervure received at a rather greater distance from the apex of the first cubital cell.

Hab. Port Darwin (*G. Turner*).

Zoyphium iridipenne, sp. n.

♀. Nigra; mandibulis basi pallide flavidulis; tegulis pedibusque ferrugineis; alis hyalinis iridescentibus, venis nigris.

Long. 5 mm.

♀. Head and thorax opaque, very minutely punctured; clypeus broadly truncate at the apex, with two small teeth on each side, subcarinate in the middle at the base; joints of the flagellum gradually increasing in thickness from the second to the twelfth; apical joint conical, as broad as long; ocelli in a broad triangle, the posterior pair twice as far from each other as from the eyes. Basal area of the median segment finely obliquely striated at the sides, with a median longitudinal carina not quite reaching the broadly rounded apex. Abdomen subconical, shining, very minutely punctured, the apical segment very narrowly rounded at the apex and more distinctly punctured. Hind tibiae with five short spines on the outer margin. Second cubital cell very short on the radial nervure, almost triangular, the third cubital cell half as long again on the cubitus as on the radius; first recurrent nervure received close to the apex of the first cubital cell, second at three-quarters from the base of the second cubital cell; radial cell without an appendix.

Hab. Eaglehawk Neck, Tasmania; February.

This is the first record of the genus from Tasmania. Three specimens were taken on *Leptospermum* blossom and one on a sandy road. Doubtless many small species of this genus yet remain to be discovered in Australia.

Zoyphium kohlii, Turn.

Zoyphium kohlii, Turn. Proc. Zool. Soc. London, p. 495 (1908). ♀.

♀. Nigra; mandibulis, antennis, tegulis pedibusque brunneotestaceis; alis hyalinis, iridescentibus, venis fuscis.

Long. 6 mm.

♀. Clypeus with a short tooth on each side. Antennae inserted only a little further from each other than from the eyes, the joints of the flagellum broader than long, except the large conical apical joint. Eyes somewhat convergent towards the vertex, the posterior ocelli very near to the eyes. Pronotum gradually sloped, sunk a little below the mesonotum. Median segment with a very shallow longitudinal sulcus in which lies a carina; first abdominal segment rounded at the base. Second recurrent nervure received at three-fifths from the base of the second cubital cell, first received at about an equal distance from the apex of the first cubital cell.

Hab. Mackay, Queensland (Turner).

Zoyphium doddi, Turn.

Zoyphium doddi, Turn. Ann. & Mag. Nat. Hist. (8) x, p. 59 (1912). ♂.

♂. Niger; clypeo, mandibulis, scapo pedibusque flavis; flagello
Ann. & Mag. N. Hist. Ser. 8. Vol. xiv. 24

tegulisque testaceis, alis hyalinis, venis testaceis; stigmate fusco.

Long. 4 mm.

♂. Clypeus broad, without lateral teeth; antennæ short, all the joints of the flagellum broader than long, except the second and eleventh (apical), the eleventh conical. Posterior ocelli more than twice as far from the eyes as from each other; the front covered with short golden pubescence. Pronotum not much below the mesonotum, gradually sloped. A deep foveolate groove at the base of the scutellum; median segment with a shallow longitudinal sulcus in which lies a carina, the base of the segment indistinctly obliquely striated. Second cubital cell pointed, receiving the second recurrent nervure at one-third from the apex.

Hab. Cairns, Queensland (*Dodd*).

Zoyphium crassicorne, Ckll.

Zoyphium crassicorne, Ckll. Canadian Entom. p. 271 (1914). ♂.

♂. Niger; pedibus aurantiacis; clypeo, mandibulis antennisque pallide ferrugineis; flagello supra infuscato; alis hyalinis, venis fusco-ferrugineis, basi pallidis.

Long. 5 mm.

♂. The antennæ are more strongly clubbed than in any other known species of the genus; the hypopygium is not produced into an apical spine as in the other known males. The apex of the abdomen "presents a broad slightly rounded truncation with obtuse but salient angles."

Hab. Brisbane (*Hacker*).

I have not been able to examine the type of this species closely, but it is quite distinct. Cockerell considers it more nearly allied to *Z. doddi* than to any other.

Zoyphium frontale, Turn.

Zoyphium frontale, Turn. Proc. Zool. Soc. London, p. 496 (1908).

♂ ♀.

♀. Nigra; clypeo, fronte scapoque flavis; flagello, tegulis pedibusque brunneo-testaceis; scutello postscutelloque fusco-ferrugineis; alis hyalinis, iridescentibus, venis fusco-ferrugineis.

Long. 5 mm.

♂. Clypeus very broad, truncate at the apex, without teeth; antennæ inserted twice as far from each other as from the eyes, all the joints of the flagellum, except the thick, conical, apical joint, broader than long. Posterior ocelli more than twice as far from each other as from the eyes. Pronotum sunk much below the level of the mesonotum;

median segment with a sulcus from the base in which lies a carina, delicately obliquely striated at the base. Second transverse cubital nervure missing, the first joining the cubitus about halfway between the two recurrent nervures.

Hab. Mackay, Queensland (*Turner*).

This species may be distinguished by the absence of the second transverse cubital nervure, by the very broad yellow front, and by the distance between the antennæ at the base.

Zoyphium rufipes, Rohw.

Zoyphium rufipes, Rohw. Proc. U.S. Nat. Mus. xl. p. 585 (1911).

I have not seen the type of this species, but the description answers so well to *Sericophorus relucens* that I suspect that the name will have to sink as a synonym.

XLII.—A new Species of *Tabanus* from India.

By GERTRUDE RICARDO.

IN a small collection of Tabanidæ sent me for identification by M. Surcouf from the Paris Museum the following new species, represented by two males and two females, occurred:—

Tabanus trichinopolis, sp. n.

Male (type), female (type), from Trichinopoly (*F. Caius*), 1911; and another male and female from the same locality.

A small species belonging to Group I. with the subcallus not showing. Eyes with cross-bands (see my table in 'Records Indian Museum,' iv. no. vi. p. 114, 1911). Frontal calli consisting of two separate calli. Abdomen reddish yellow, with four well-defined black stripes. Legs and antennæ yellow.

Length 8 mm. (male), 10 mm. (female).

Female.—*Face* covered with whitish tomentum, yellowish above, with white pubescence on the lower half. Beard white. *Palpi* stout, ending in a fine point, pale yellowish, some black pubescence above and white hairs below at base. *Antennæ* pale yellow, only the first joint left. *Forehead* covered with yellowish-grey tomentum, about five times as long as it is wide anteriorly, about a third narrower anteriorly. Frontal callus olive-coloured, almost square, almost reaching the eyes (in the other female it does so completely), the second callus darker in colour, being brown, irregular in