

NOTES ON PARASITIC HYMENOPTERA.

By JAMES WATERSTON, B.D., D.Sc.

Hymenopterous Parasites of Brassolid Butterflies.

During the past fifteen years the attention of Economic Entomologists in Central America and the West Indies has been increasingly directed to the damage done by species of the genus *Brassolis* to the foliage of coconut and other palms. In some of the scattered papers (*q.v.* Review of Applied Entomology, Series A, 1913-22) dealing with these ravages one finds references to the natural control exercised by Hymenopterous parasites. So far as I am aware the only writers to mention by name any of these enemies are C. Schrottky (1909) and G. E. Bodkin (1917), who list four species between them. Since the spring of 1920 I have examined two small collections of Hymenopterous parasites of *Brassolis* from Trinidad and British Guiana respectively. In each of these the same one of Schrottky's species is represented, and in all I am now able to list seven species. Two of these have not been seen by me, and two more (*Brachymeria* and *Spilochalcis*) are probably recognisable from extant descriptions. In the case of the *Telenomus* it is hoped that the figures given may facilitate recognition. Though Ashmead's description of this species is very incomplete, I have forborne for the present to supplement it, since the diagnosis of these minute parasites for any particular geographical area can be attempted best in a comparative key. Only the *Anastatus* has been fully described. Mr. F. W. Ulrich intends later to publish an account of the bionomics of the species he has reared in Trinidad. It should be noted that the egg and larva of the host have each yielded two and the pupa three of the parasites now enumerated.

Superfamily ICHNEUMONOIDEA.

Family BRACONIDAE.

Apanteles opsiphanis, Schrott.

Apanteles opsiphanis, Schrottky (C.), An. Soc. Cient. Argent., lxxvii, p. 211 (May, 1909).

"Folliculi albi plus minusve 130 in latere ventrali larvae *Opsiphanis crameri*, Feld., dispositi sunt."

PARAGUAY: Puerto Bertoni.

Superfamily CHALCIDOIDEA.

Family CHALCIDIDAE.

As Mr. A. B. Gahan has recently reminded us (U.S. Nat. Mus. Bull., 124, p. 31, 1923), *Chalcis*, F., is an older name for *Smiera*, Spin., and should be so used. In the rearrangement thus made necessary *Chalcis*, auct., is replaced by *Brachymeria*, Steph.

Brachymeria annulata, F.

Chalcis annulata, Fabricius, Syst. Ent., ii, p. 195 (1793).

Chalcis annulata, F., Bodkin, Trans. Ent. Soc., p. 320 (1917).

BRITISH GUIANA.

"A common parasite of *Brassolis sophorae*, L., and also *Caligo ilioneus ilioneus*, Cramer," according to Bodkin (*loc. cit.*), who adds that this species is widely distributed and the commonest Chalcid in the Colony.

Brachymeria incerta, Cress.

Chalcis incerta. Cresson, Proc. Ent. Soc. Philadelphia, iv, p. 101 (1865).

BRITISH GUIANA: Demerara East Coast, Mahaicony, Plantation Park, 5.ix.1922
(L. D. Cleare, Jr.).

♂ and ♀ (both defective), with fragments of three more ♂ ♀, from pupa of *Brassolis sophorae*, L., from Plantation Park, Mahaicony. I determined this material from Mr. J. C. Crawford's table in his "Description of certain Chalcidoid Parasites" (Technical Results from the Gipsy Moth Parasite Laboratory; U.S. Dept. Agric. Bur. Ent., Techn. Ser. no. 19, pt. 11, 1910), and Mr. A. B. Gahan tells me that the Demerara specimens are apparently the same as others standing under this name in the United States National Museum from Miami, Florida. The type locality of *B. incerta*, Cress., is Cuba, and Mr. Gahan thinks the type is probably in Havana.

Spilochalcis morleyi, Ashm.

Spilochalcis morleyi. Ashmead (W. H.), Mem. Carnegie Museum, i, no. 4, pt. 2, pp. 426 & 441 (i, 1904).

Spilochalcis brassolis, Schrottky (C.), An. Soc. Cient. Argent., lxvii, p. 210 (1909).

TRINIDAD: Chaguanas, i.1920, many ♂ ♂ and ♀ ♀ from pupa of *Brassolis* sp. (F. W. Ulrich). BRITISH GUIANA: Mahaicony, Plantation Park, 5.ix.1922, a series (♂ ♂) from one pupa of *Brassolis sophorae* (L. D. Cleare, Jr.).

Originally described from Bahia, Brazil, 19.iii.1883 (A. Koehel), without mention of a host.

Schrottky bred numerous examples of his *S. brassolis* from a chrysalis of *B. sophorae*, L., from Puerto Bertoni, Paraguay. Mr. A. B. Gahan, who has kindly compared some specimens with Ashmead's type for me, agrees in this determination and adds: "We have here (U.S. Nat. Mus.) a good series reared from *Opsiphanes invirae*, Hübn., at Bahia, Brazil." *O. invirae* is a Brassolid nearly related to *B. sophorae*.

Family EUPELMIDAE.

Though the following Eupelmid has ultimately proved to be a known species, it has seemed well to give a detailed account of the insect, partly to supplement the original description and partly because the Brassolid parasites are on the average about one-fourth or one-fifth shorter than the specimens on which Dr. Howard founded his *Eupelmus reduvii*, and have a proportionately lesser expanse.

I wish to thank most heartily Mr. A. B. Gahan, of the Bureau of Entomology, U.S. Dept. Agric., Washington, for the trouble he has taken in deciding the determination of the insect. Our joint opinion at first was that the Trinidad material represented a new species, since it agreed with none of the described species of *Anastatus* represented in the British Museum and the U.S. National Museum. A reperusal of the literature suggested the advisability of a comparison of Mr. Ulrich's insect with *Anastatus pleuralis*, Ashm. (1904), of which the type is at Pittsburg. This examination Mr. Gahan was enabled to make, thanks to the courtesy of the Director of the Pittsburg Museum. Apart from a considerable difference in size, he could find no tangible morphological distinction between the specimens compared. At the same time he came definitely to the conclusion that both were referable to an *Anastatus* already described as *Eupelmus reduvii*, How.

Mr. Gahan has also sent me eight lots of *Anastatus* (considered to be probably all *A. reduvii*) from various Lepidopterous and Hemipterous eggs. These show a considerable range in size, but up to the time of going to press I have been able to examine critically only a ♀, which is marked definitely "*reduvii*, How., compared with type." (from eggs of *Arilus cristatus*, Bladensburg, Maryland, U.S.A.). The agreement between this and the Trinidad specimens is very complete.

Anastatus reduvii, How.

Eupelmus reduvii, Howard (L.O.), Can. Ent., xii, p. 207-208 (1885).

A moderate-sized species, blackish brown,* with paler legs whose femora and tibiae are broadly darker streaked, belonging to the *bifasciatus*, Fonsc., group, and distinguished by the rather broad, pale median band of the forewing (♀) and the proportions of the antennal joints.

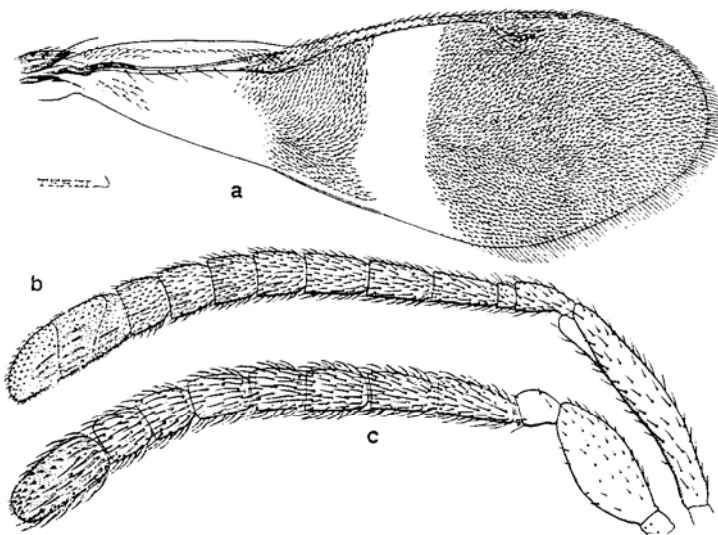


Fig. 1. *Anastatus reduvii*, How. : a, forewing of ♀; b, antenna of ♀; c, antenna of ♂.

♀. Head black, metallic reflections not very strong—mainly dark green, more violaceous on the lower face medianly above the toruli, with a coppery superimposed tinge, especially across the vertex. Trophi brown, first three joints of maxillary and all of the labial palpi pale; mandibles apically dark brown. Scape yellowish, pedicel paler beneath, otherwise with the funicle blackish brown to black. Thorax, entire meso- and metanotal surface, together with mesopleurae (anterior half) and sterna, very dark. Scutellum from above matt, but metallic and reirringent from other angles. The other dark regions of the thorax show more or less decided metallic reflections; thorax otherwise clear brown, non-metallic or practically so; protergites infuscated near spiracles. Abdomen blackish brown, with broad whitish sub-basal band extending over the posterior half of tergite i (3) and all of ii (4) and the first two sternites; at most submetallic dorsally. Ovipositor-sheath pale. Legs mainly brown; mid and hind coxae darker and submetallic; all femora and tibiae with more or less (anterior legs) distinct broad, dark dorsal stripe; tarsi pale, with fifth joint and claws darkened; in the mid tarsus the first three joints (with the tibial spur) are nearly white and the heavy spines black. Wings (see fig. 1 for pattern) strongly infumated, with two pale bands; a little lighter towards apex.

* After being in spirit, in which the metallic reflections suffer, some of the specimens are bleached.

Head broader than deep (6 : 5) ; eyes bare, at the level of the anterior ocellus separated by rather over one-third and at the base line by three-fourths of the breadth ; toruli about four-fifths below the base of the eyes ; pattern on vertex, upper face and orbits fine, strongly raised reticulate, the walls of the reticulation relatively thick ; impressed area above toruli finely coriaceous ; mouth-edge straight and smooth, entire surface with short but strong pile, the bristles near the orbits longer. Antenna (fig. 1, *b*) : scape (16 : 3) longer than pedicel (2 : 1), ring joint and first two normal joints of the funicle taken together ; funicle and club 34 : 32 : 34 : 28 : 28 : 25 : 25 and 30 : 25 : 32, with breadths 15 : 18 : 21 : 24 : 25 : 25 : 26 and 30 : 25. Labrum simple transverse narrow, with six bristles. Maxillary palpi, 7 : 9 : 9 : 24 ; labial palpi, 12 : 6 : 12. Mandibles bidentate, the lower tooth short and acute, the upper broad and straight-edged.

Thorax (fig. 2, *a*) distinctly narrower than the head (about 7 : 8), and with propodeum much longer than abdomen (4 : 3). Pattern and chaetotaxy of notal surfaces as in the figure ; basal scutellar abscissa occupying about one-fourth of the suture. Mesosternopleurae ; sternal and pleural areas separated by a clear (weakly chitinised), moderately broad line ; the oblong sternal area thus enclosed is 5 by 2, with large raised pattern for about one-fourth anteriorly and becoming smooth posteriorly ; on the smooth posterior three-fourths there are in all about 40 minute scattered bristles and twelve in a transverse posterior row, considerably longer. Pleural surface rougher (raised reticulate) anteriorly with short, stiff, glistening bristles over an area extending one-third dorsally and to one-half ventrally (*i.e.*, along the clear sterno-pleural line). Posteriorly closely and finely striate but not so smooth as the adjacent sternal area.

Wings : forewings (fig. 1, *a*) about 8 : 3 ; hind wings 17 : 5.

Legs : fore leg with femur (10 : 3) about one-sixth longer than the tibia (5 : 1) ; at apex of latter two short, heavy, peg-like spines dorsally and externally, and a comb of about nine spines ; tarsus long, two-thirds the femur and tibia combined ; comb of first joint about 20 spines, joints in ratio 70 : 42 : 32 : 27 : 42. Mid leg with femur (5 : 1) shorter (5 : 6) than tibia (7 : 1), with 3-4 peg-like spines at apical ventral angle ; tibial spur as long as the first tarsal joint dorsally ; plantar spines 25-30 : 9 : 4 : 2 : 0 ; proportions of tarsal joints 65 : 45 : 30 : 30 : 42. Hind leg with femur (5 : 1) longer (8 : 7) than the curved tibia (10 : 1), which, again, is distinctly longer (15 : 13) than the tarsus ; tibial comb with 12 spines ; longer spur two-fifths the first joint ; tarsus in ratio, 100 : 55 : 40 : 32 : 45.

Abdomen with 1st (3rd) and 2nd (4th) tergites broadly concave posteriorly, the first, in addition, being shortly split posteromedianly and chitinised only on its anterior half ; 2nd tergite membranous ; tergites iii-vi practically straight-edged posteriorly ; vii strongly convex ; surface of iii-vii with increasingly raised transverse reticulation (nearly striate), but behind the stylet more regular ; tergites approximately in ratio 23 : 23 : 16 : 14 : 12 : 16 : 5 ; sternites (mid line) approximately 13 : 12 : 10 : 11 : 8 ; only the last at all coloured or appreciably chitinised.

Length, 1.5-2.3 mm. ; alar expanse, 2.6-4 mm.

♂. Black, with very dark metallic reflections. Scape yellowish brown, with a darker streak towards the apex dorsally ; antennae otherwise nearly black. Trophi as in ♀, but all the joints of the palpi (except the faintly darker tip of the fourth maxillary) pale. Wings hyaline. Legs with coxae blackish brown (with apical third pale in fore legs) ; trochanters, knees and basal half of mid and hind tibiae and joints 1-2 of their respective tarsi, white ; all femora, apical half of tibiae in mid and hind legs, with joints 4-5 of their tarsi, blackish brown or black. In the fore legs the tibia is whitish, indefinitely infuscated at the apex ventrally (to about one-half) ; all the tarsus faintly infuscated, but not so dark as the two last segments of the mid and hind tarsi.

Head (6 : 5) : eyes with a few scattered bristles, at level of anterior ocellus separated by two-fifths and on the base line by nearly five-sixths the breadth ; malar space

about two-thirds the eye depth. Antenna (fig. 1, *c*): scape (15:7) a little longer than the pedicel (9:8), ring joint and the first funicular together; funicle, 14:11:11:10:10:8, and club 20, increasing gradually in width from $6\frac{1}{2}$ to 8 (club); there are no long sensoria. Mouth-parts as in $\bar{\sigma}$.

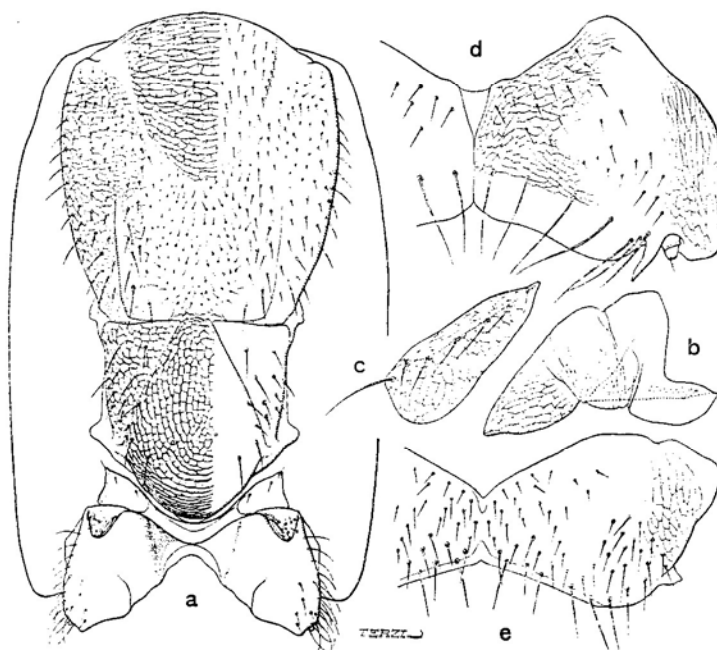


Fig. 2. *Anastatus redwii*, How.: a, mesothorax, metathorax and propodeum of ♀; b, prepectus of ♂; c, tegula of ♂; d, protergum of ♀; e, protergum of ♂.

Thorax much narrower than the head (5:6). Pronotum (fig. 2, *e*) with a distinct spiracular process, the two half tergites more closely united than in ♀. Mesonotal pattern strongly raised, especially on scutellum. Axillae nearly touching, separated by about only a tenth of the distance between the deeply impressed parapsidal furrows. Mesosternopleural surface nowhere smooth but less raised ventrally, coarser at sides, and on prepectora; middle area (post-scutellum) of metanotum strongly raised reticulate. Propodeum, normal, rather broad, with short median keel, nearly smooth; spiracle and sulcus much as in ♀.

Wings: forewings (2:1) definitely broader than in ♀; submarginal, marginal, radius, post-marginal, as 10:6:3:4; about 15 bristles on radius. Hind wings (10:3) practically as in ♀, with about 30 minute bristles on the submarginal cell, mainly at the edge.

Legs: fore legs with femur (3:1) one-seventh longer than the tibia (4:1); apical tibial comb with 5-6 spines; peg-like spines and tarsal comb as in ♀; tarsal joints, 60:27:23:21:33. Mid leg with femur (4:1) and the proximal part of the trochanter

together exactly equal to the tibia (7 : 1) ; spur and first tarsal joint subequal ; 8-9 sharp spines ventrally on first joint ; tarsal joints, 50 : 32 : 23 : 21 : 30. Hind legs with coxae (2 : 1) large and coarsely sculptured, two-thirds the femur (10 : 3), which is subequal to the tibia (11 : 2), the latter distinctly longer (7 : 6) than tarsus, the joints of which are as 50 : 30 : 25 : 21 : 33.

Abdomen distinctly shorter than rest of body and just longer than thorax ; petiole very short and rugulose. Tergites in ratio i (iii), 4 ; ii-vi, 3 ; vii, 2 ; and sternites i-vii in ratio (apparently) 60 : 40 : 30 : 50 : 45 : 45 : 45, measured along the mid line, where there is considerable overlapping. In reality sternites ii-vii (seen at sides) are subequal, while i is about one-fourth longer. The surface of the tergites is smoother medianly and more raised reticulate laterally, and tergite i is narrowly rugulose (to nearly one-half) behind the petiole ; tergites ii-vi bear on each side of the mid line three small, clear, oval sensory areas.

Length, 1.2-1.8 mm. ; alar expanse, 2.2-3.4 mm.

Type ♀ in the British Museum, one of a series of both sexes reared from eggs of *Brassolis* sp.

TRINIDAD : Chaguanas, i. 1920 (*F. W. Urich*).

Mr. A. B. Gahan (*in litt.* 9.iv.1923) writes : " I also find that in 1921 I received a single imperfect female specimen, reared by Mr. J. Zetek, April 8, 1921, at Ancon, Canal Zone, Panama, from *Brassolis isthmia*, which I determined at the time as *Anastatus* sp."

Family EULOPHIDAE.

Genus *Pseudomphale*, Schrott.

Mr. A. B. Gahan (*in litt.*) has drawn my attention to the fact that in Girault's opinion (Can. Ent., xvii, p. 234, 1915) *Pseudomphale*, Schrott. (1909) is a synonym of *Horismenus*, Wlk. After comparing the description of Schrottky's genus with the unique type of *Entedon cleodora*, Wlk. (1843) (the type of *Horismenus*, Walker, 1843), I am inclined to agree with Girault, and have here adopted the synonymy proposed. Though Walker subsequently (1846) sank his *Horismenus* as a synonym of *Entedon*, Dalm., Ashmead rightly (1904) treated the two as distinct genera.

Horismenus opsiphanis, Schrott.

Pseudomphale opsiphanis, Schrottky (C.), An. Soc. Cient. Argent., lxxvii, pp. 209-210 (v. 1919).

A female reared from a larva of *Opsiphanes crameri*, Feld. Appended to the generic diagnosis is the following note : " Biologia hujus generis valde singularis generibus Braconidarum *Apanteles* etc. similis. Larvae folliculum extra corpus hospitis [*sic*] faciunt." It is more probable, however, that the *Pseudomphale* is a hyperparasite of *Opsiphanes* through *Apanteles opsiphanis*, whose cocoons may have been mistaken for those of the Chalcid by the author. No locality is mentioned, but presumably it was Puerto Bertoni, Paraguay.

At least one other species of the genus, viz., *H. nigroaeneus*, Ashm., is known as a hyperparasite through an *Apanteles* (see Waterston, J., Proc. Ent. Soc. London, 1921, p. 2).

Superfamily SERPHOIDEA.

Family SCELIONIDAE.

Telenomus nigrocoxalis, Ashm.

Telenomus nigrocoxalis, Ashmead (W. H.), Journ. Linn. Soc. (Zool.), xxv, pp. 211-212 (1894).

TRINIDAD : Chaguanas, i. 1920 (*F. W. Urich*).

A series (♂, ♀) from eggs of *Brassolis* sp. These specimens agree well with the unique type in the British Museum, a ♀ taken in St. Vincent. The drawings are from the Trinidad material.

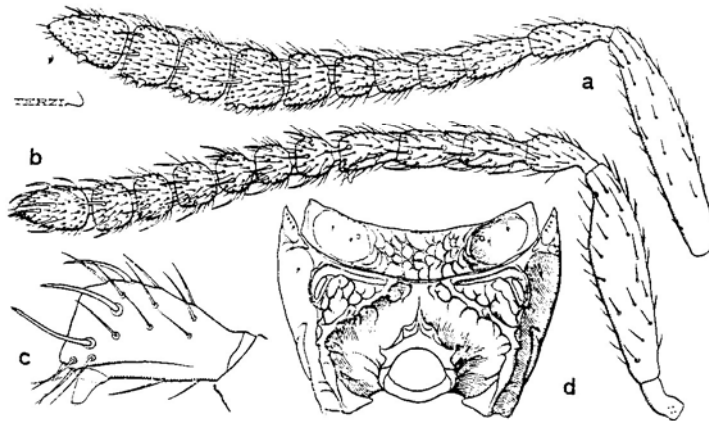
*List of Hosts and Parasites.***Brassolis sophorae**, L.*Brachymeria annulata*, F.
Brachymeria incerta, Cress.*Spilochalcis morleyi*, Ashm.**Brassolis isthmia**, Bates.*Anastatus reduvii*, How.**Brassolis** sp.*Spilochalcis morleyi*, Ashm.
Anastatus reduvii, How.*Telenomus nigrocoxalis*, Ashm.**Caligo ilioneus ilioneus**, Cram.*Brachymeria annulata*, F.**Opsiphanes crameri**, Feld.*Apanteles opsiphanis*, Schrott.*Horismenus opsiphanis*, Schrott.**Opsiphanes invirae**, Hb.*Spilochalcis morleyi*, Ashm.

Fig. 3. *Telenomus nigrocoxalis*, Ashm.: a, antenna of ♀; b, antenna of ♂; c, sensorium of third funicular joint of ♂; d, propodeon of ♂.

A New Psyllid Parasite.

Superfamily CHALCIDOIDEA.

Family PTEROMALIDAE.

The following description should be compared in detail with that of *Pachyneuron crassiculme*, Waterst. (Bull. Ent. Res., xiii, pt. 1, p. 51, fig. 5, 1922), to which the Californian species is very closely related. It should be noted that fig. 4, d, is a composite of two side-views, and is therefore not strictly comparable with fig. 5, d (*loc. cit.*), which was taken from directly above the mid line of the propodeon.

***Pachyneuron validum*, sp. n.**

♀. Similar in coloration to *P. crassiculme*, Waterst., but darker and duller with only the faintest metallic gleams on the propodeon, posterior coxae and dorsum of abdomen basally. On each side of the middle of the propodeon is a dull matt longitudinal streak running forward to and connecting with the more admedian of the anterior hollows behind the metathorax. Antennae entirely blackish brown, palpi (maxillary) infuscated, paler only on the fourth joint. All coxae, trochanters and femora (except the extreme tip of the latter) nearly black; in mid legs the junction of trochanter and femur obscurely paler; extreme base of all the tibiae pale; fore tibiae strongly infuscated (blackish) both dorsally (more narrowly) and ventrally (broadly) and paler between; mid tibiae (for one-tenth) and hind tibiae (about one-fifth) pale distally, otherwise nearly black; fore tarsus and fifth joint of mid and hind tarsus infuscated; hind and mid tarsus otherwise pale. Wing nervures blackish brown, distinct.

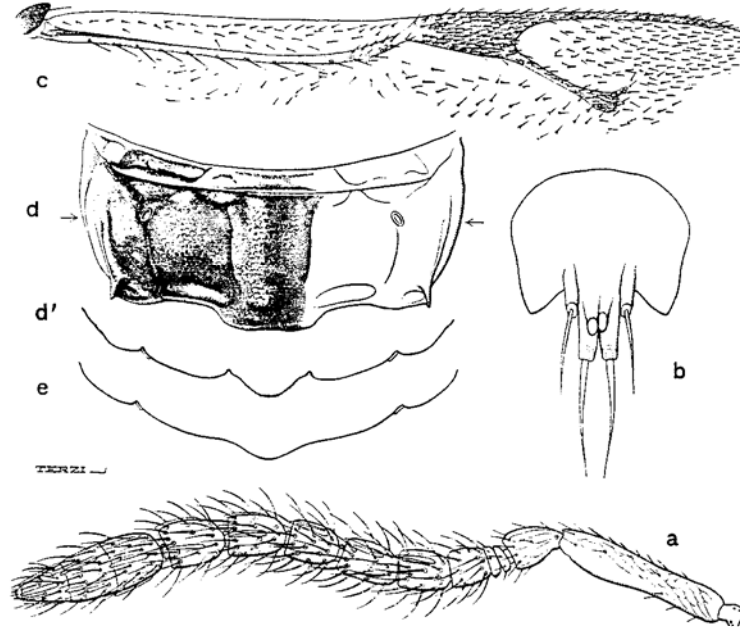


Fig. 4. *Pachyneuron validum*, sp. n.: a, antenna of ♂; b, labium of ♀; c, neuration of forewing of ♀; d, propodeon of ♀ (see text); d', optical section of d from in front across line of arrows; e, a similar section in *P. crassiculme*, Waterst., ♀.

Head and thorax as in *crassiculme*, except that the pattern is everywhere more raised, with the result that the parapsidal furrows can be traced back practically to the suture. Propodeon (fig. 4, d) relatively shorter than in *crassiculme* and smoother medianly, but with pattern much more strongly raised along the matt lines, between which and the spiracular folds the surface is smoother and more swollen than in *crassiculme*. Spiracle more outwardly directed and from above seen mostly in profile.

Antenna, length 0.67 mm.; scape and pedicel exactly as in *crassiculme*; the second funicular (beyond the two ring joints) shorter than (about three-fourths) the third, the fifth distinctly (about one-sixth) longer, while the sixth is just shorter than the fourth; club equal to the last three funicular joints taken together, with three equal segments; sensoria of funicle 0, 0-1, 2-3, 3-5, 6, 6-7, and of club 10, 11-12, 8-9. Labrum (fig. 4, b); maxillary palpi, 10 : 15 : 13 : 26, *i.e.*, the second joint distinctly longer than the third; labial palpi, 14 : 5 : 17.

Wings: forewings (fig. 4, c), length 1.1 mm., twice as long as broad; sub-marginal: marginal; radius: post-marginal, as 15 : 4 : 5 : 8; more exactly the radius is about one-fifth longer than the marginal, the latter being very greatly thickened and varying from about five (at its junction with the submarginal) to two and a half (at the base of the radius) times as long as broad; radial knob less than one-half and the radius basally about one-fifth the greatest width of the marginal. Chaetotaxy: 12 longer bristles on submarginal (up to the clear pustules) and about half a dozen (fig. 4, c) shorter ones between the pustules and the costa; on edge of marginal 8-9 stiff bristles and over 30 more on its surface arranged in 3-5 irregular rows, radius with 15-16 bristles, post-marginal with about 15 bristles at edge and 40 on surface in two rows. Hind wings (4 : 1), length 0.87 mm.

Legs: comb of first tarsal joint of fore legs with 15 spines, tibial comb of hind legs with 14 spines. In all the tarsi the first joint is relatively longer than in *crassiculme*; the proportions are:—

	Joint	i	ii	iii	iv	v
Fore	32	23	18	13	24
Mid	43	26	21	16	24
Hind	43	29	23	16	25

Length, 1.5 mm.; alar expanse, 2.7 mm.

♂. Differs as regards colour from the ♀ mainly in the paler legs, the pale apical area of the femora being more extensive; in the fore leg the tibia is pale at base and apex, ferruginous and more or less infuscated elsewhere; in the mid tibia there is a blackish band, extending for about one-fourth, beyond the narrowly pale base, the joint becoming gradually paler distally; hind tibia apically broadly pale, darker on basal band to about one half; tarsi as in *crassiculme* and in ♀, but those of the fore legs are ferruginous rather than infuscated; all junctions of trochanters and femora paler.

Antenna (fig. 4, a), length 0.78 mm.; scape (about 9 : 2) widest at one-third before the apex, three times the pedicel (5 : 3) and equal to the two ring joints, the first three and about one-fourth of the fourth funicular joints; club shorter than the three preceding joints taken together; proportions of the funicular joints, 15 : 20 : 23 : 22 : 24 : 23, and of club, 22 : 20 : 23; in the same ratio the breadths (without pressure) are 14 : 15 : 15 : 16 : 17 : 18, and 22 : 17 sutures; sensoria 0, 2, 2-3, 2-3, 3-4, 3-4, and club 5, 6-7, 3-4. The first funicular and the last two joints of the club have two transverse rows of bristles, the others three.

Sculpture of head and thorax as in ♀. Propodeon a little more produced posteriorly and more rounded between the matt admedian line and the spiracular fold than in ♀; petiole about as long as the hind coxae. Forewing, length 1 mm.; hind wing, length 0.85 mm. Proportions and chaetotaxy as in ♀. Legs with the tarsal proportions of joints iii-v as in ♀, and i and ii a little shorter. *Length*, 1.3 mm.; alar expanse, 2.4 mm.

Type ♀ in the British Museum, one of a pair (♂, ♀) bred from a Psyllid, *Euphyllura arbuti*, Schwarz.

CALIFORNIA, U.S.A.: Stanford, v.1922 (*Prof. G. F. Ferris*).

Two New Parasites of the Coffee-berry Scolytid.

Superfamily VESPOIDEA.

Family BETHYLIDAE.

Genus *Prorops*, nov.

♀. Head quadrate, produced anteriorly (ventrally) into a median beak, which is apically bifid and carries the toruli laterally; occiput not margined, though separated by a shortly rounded edge from vertex; eyes minutely pubescent, set low down and practically on the base of the mandible; the latter large, robust three-dentate and dependent. Antennae twelve-jointed; labial palpi with one, maxillary palpi with three joints. Pronotum campanulate; mesonotum simple; scutum only a little longer than scutellum without foveae or superficial furrows, though indications of parapsidal divisions can be made out anteriorly beneath the pronotum; propodeon simple without longitudinal or bordering carinae, a little widened in front of the laterally directed spiracles; fused prepectora forming a narrow band a little wider at each side, in front of the mesosternopleurae. Wings with a moderately long submarginal, very short marginal and long radial veins, only a trace of the anal vein at radix; no closed cell except the subcostal; hind wings without neuration, except for indications towards the radix of the subcostal and anal veins. Legs with all coxae somewhat broad and a little flattened, all femora slightly swollen; mid and hind tibial spurs double and, as on fore tibia, with frayed edges; tarsal claws simple. Abdomen with petiole short, about as broad as long, with six pairs of spiracles [segments ii (petiole and post-petiole)-vii]; the 3rd tergite shows anteriorly on each side an oblique, narrow, clear area. Ovipositor short and half the length of the second segment.

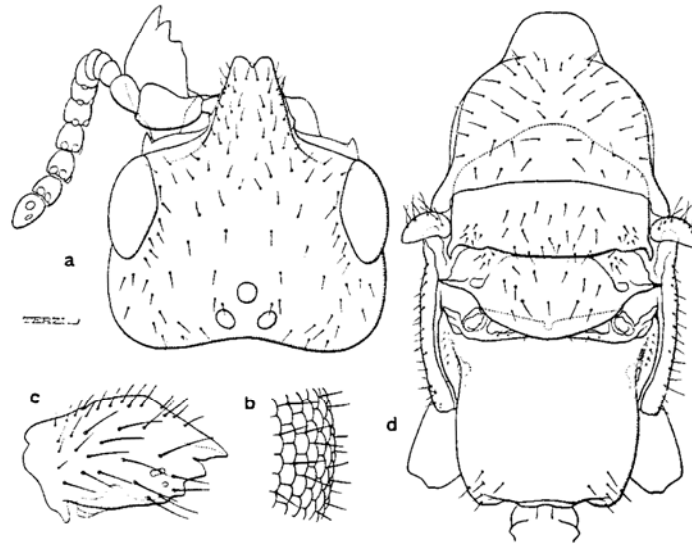


Fig. 5. *Prorops nasuta*, gen. et sp. n., ♀: a, head from above; b, pubescence of eye; c, mandible; d, thorax, propodeon and hind coxae.

***Prorops nasuta*, sp. n.**

♀. A blackish brown or piceous species, with paler honey-clear scape, pedicel, trochanters, tibiae and tarsi; hind tibiae slightly darker along mid dorsal line. Forewings faintly tinted, hind wings hyaline; veins smoky brown.

Head (fig. 5, *a*), breadth and length subequal if the "snout" is taken into account, but distinctly transverse otherwise; posterolateral angles rounded; occiput reentrant, occipito-vertical edge distinct but rounded, ocelli in equilateral triangle; eyes in length three-sevenths the breadth of the head, with the pubescence (fig. 5, *b*) very sparse and short, separated by about two-thirds the breadth; on vertex and upper frons smooth, then rugulose, and finally scaly reticulate on snout. Antennae (fig. 6, *a, b*) with the funicular joints, especially the more proximal, distinctly eccentric. Mandible (fig. 5, *c*) obliquely cut away distally on ventral edge; stipes triangular with up to a dozen small bristles; maxillary palpi, 2, 5, 3, apical bristle of third joint 7; labial palpi 3.

Thorax (fig. 5, *d*) with the protergum overlying nearly half the mesoscutum, completely enclosing the spiracle posterolaterally; prosternum hexagonal and truncated in front, posterior angles rounded. Propodeal spiracle small, circular. Thoracic surface dorsally nearly smooth, the pattern fine and not raised, that of metanotum and propodeon rougher and dull, the pattern distinctly raised.

Wings: forewings (fig. 6, *c*) (14:5), length 1.2-1.3 mm.; neurulation extending to just beyond two-thirds; submarginal and marginal radius, more exactly the three are in ratio 34:4:37; anal vein traceable anteriorly for a short distance from radix on its anterior margin, but practically all spurious. Hind wing (4:1), length 1.1 mm.; two hooks at four-sevenths from the radix; the longest bristles of the fringe rather less than one-third (five-eighths) the breadth of the wing, and five much longer ones (two-thirds longer than any in the fringe) on the posterior edge at the radix behind the stump of the anal vein.

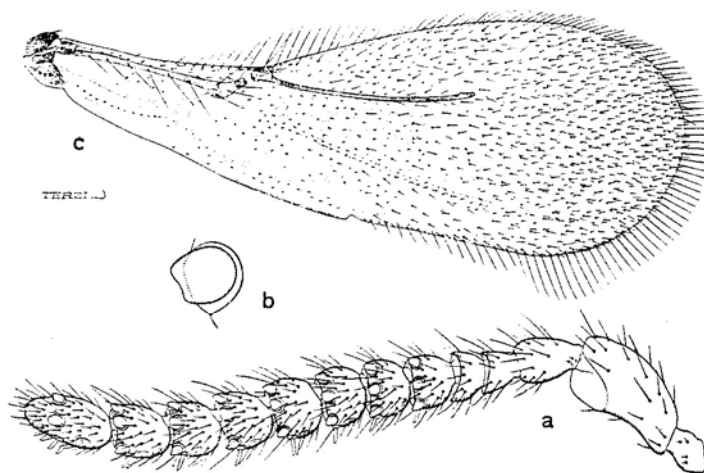


Fig. 6. *Prorops nasuta*, gen. et sp. n., ♀: *a*, antenna; *b*, middle sensorium on fifth joint of antenna; *c*, forewing.

Legs: fore legs with the coxae as broad as long, raised reticulate, with numerous hairs anteriorly, posteriorly smoother, with two hairs above trochanter; femora (14:5) more than half longer than coxae, a little longer than tibia (9:2) and subequal to tarsus; at apex of tibia posteriorly two spines (one thin) above the spur; comb of first tarsal joint with 25-27 spines; tarsus, 37:13:12:11:23. Hind legs with coxa (3:2) pear-shaped, projecting in front of its attachment; femur (5:2) one-sixth shorter than the tibia (11:2) and only two-thirds the length of the slender tarsus; the ventral fringing bristles of the tibia on the distal half spinose, and an irregular apical transverse row of similar bristles anteriorly and posteriorly above the spur, a stout spine and stiff bristle as in the other legs; longer tibial spur three-fourths the first tarsal joint measured ventrally; tarsus, 56:28:25:19:28. Mid legs, coxa (3:2); femur (5:2) just shorter than tibia (30:7) and two-thirds the tarsus; tibia with about 18 stout spines along the dorsal edge, arranged (beginning proximally) singly and doubly alternately, with the last three double; there are also some spines (3-4) below the dorsal edge on the apical fourth; tarsus 40, 21, 21, 17, 28. *Abdomen* with whole surface smooth; petiole very short, transverse (2:3) on rather more (five-ninths) than its anterior half, and across the nearly circular spiracles one-ninth wider than long; in front of the spiracles aciculate (14-15 striae); about half a dozen bristles on each side of the mid line behind the spiracles; the segments gradually decreasing, the first six being in ratio 12:11:10:10:9:8:7. The 2nd tergite has on each side a narrow pellucid area irregularly divided; sternite of petiole narrow (9:5), with an internal chitinous rod on each side; whole surface rough, strongly raised reticulate; the pellucid areas of the 2nd sternite are at the anterolateral angles. In segments ii-vii both tergites and sternites have apparently a short incision on the posterior edge on each side of the mid line, these "incisions" being really narrow unchitinised areas of the sclerites. Sheaths of the ovipositor short, bare except for a terminal tuft of short bristles (6-8).

Length about 2 mm.; alar expanse about 3 mm.

UGANDA: Najunga, 24.v.1922 (*H. Hargreaves*).

Type in the British Museum, one of 3 ♀♀ (two imperfect) bred from the coffee-berry Scolytid, *Stephanoderes hampei*, Ferr.

The complete absence of basal cells and the well-developed radius make the position of this insect a somewhat isolated one in the present classification of the family. The rostrate head is found in several groups centring round *Bethylus*, Latr., but it is doubtful whether *Prorops* falls in this section. Had the radius been shorter the genus might have been placed near *Cephalonomia*, Westw., to which the host relationship would also ally it.

Superfamily SERPHOIDEA.

Family CALLICERATIDAE.

Along with the Bethylid just described, Mr. Hargreaves bred an interesting Calliceratid, of which, fortunately, both sexes were preserved. I have assigned this species for the present to the genus *Calliceras*, Nees, to which it runs down easily in Kieffer's monograph of the family (*Das Tierreich*, 42 Lief., p. 69, Berlin, 1914). This Uganda species seems to be quite distinct from anything hitherto described from the Ethiopian region, while amongst the Palaearctic species its nearest relatives are probably in the *trissacanthus*, Kieff., *armata*, Kieff., group. Amongst its noteworthy features are (a) the single-jointed lateral palpus (♂ ♀); (b) the peculiar thoracic spiracles; (c) from above, behind the scutellum, two teeth are plainly visible, *i.e.*, the projecting posterolateral angles of a plate-like edge connecting the spiracles on the propodeon (fig. 7, c); in profile also the middle of the morphological metanotum ("post-scutellum") forms a short, blunt, inconspicuous tooth (fig. 7, b), this being apparently the condition indicated in descriptions where the "metanotum" is said

to be tridentate; (*d*) I have been unable to detect any spiracles on the abdomen of either sex, and the curious structure on tergite iv, whose effect in preventing the close application of this and the overlap of the preceding tergite can be seen in a specimen mounted in profile, may be correlated with this fact.

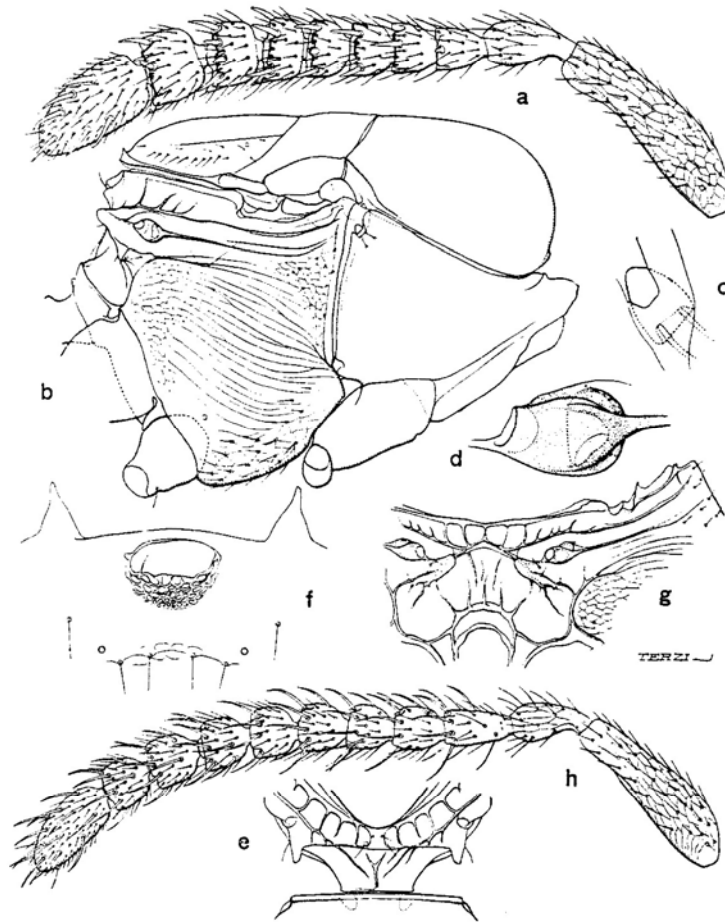


Fig. 7. *Calliceras dictynna*, sp. n.: *a*, antenna of ♀; *b*, thorax of ♀ in profile; *c*, prothoracic spiracle; *d*, propodeal spiracle; *e*, propodeon of ♀ from above; *f*, middle of fourth tergite of ♀; *g*, propodeon of ♂ from behind, flattened; *h*, antenna of ♂.

Calliceras dictynna, sp. n.

♂. Black, with the following parts paler: antennae blackish brown, the scape of a lighter tone, hind coxae yellow with a narrow blackish ring at base, and a little darker dorsally, trochanters white at base (about one-fourth) smoky yellow, all tarsi clear yellow. Wings hyaline, venation on costa brown, radius paler.

Head with length and breadth unequal; eyes minutely pubescent, occupying five-ninths of the depth, and divided across the middle of the face by their own length; genae half as long as eye, occiput distinctly but not carinate margined; ocelli almost in an equilateral triangle, dissimilar; the hind pair lenticular, the anterior broadly cordate; posterior separated by rather less than the distance of either from the orbit, anterior ocellum the orbits twice its distance from either of the posterior ocelli. Pattern of moderately fine, raised reticulate, with numerous short bristles.

Antennae (fig. 7, *h*): length 3 mm., eleven-jointed, hardly expanded distally, the club only one-sixth wider than the first funicular. Scape just equal to the pedicel and first two funicular joints, 1 shorter than the first funicular, which again is exceeded by the club. Mandible, rather narrow from in front with two acute teeth, the lower more robust, face outer aspect about two and a half times, from above about twice as long as wide. Stipes smooth, bare, one sensory pustule, maxillary palpi 9, 9, 10, 12 with a bristle 11, labium with 2 pustules, palpi 7. Six stout parallel spines in row per aspect of labium at each side.

Thorax: pronotum consists of two lateral triangular sclerites narrowly united by a median collar, which is finely rugulose with posteriorly a row of 5-6 foveae; side-pieces nearly smooth, witherous (about 20) hairs on upper half, spiracle minute, thimble-shaped and is enclosed, situated at upper posterior (i.e., morphologically the posterolateral) angle; episternites oblong, united, enclosing the sternite. Mesonotum (fig. 8, *b*) surface and chaetotaxy as on head; mid scutal line distinct, axillary suture funicular; scutellum on each side with a narrow smooth flange, which under a lever looks like a line; mesopleurae striate above, reticulate below. Metanotum-pleon (fig. 7, *g*) very short, with about four complete cells below the apex of the humerus, formed by short rugae meeting a transverse keel, which forms a small tooth on side; spiracle protected by a rounded knob-like projection; above the insertion of petiole are six or seven incomplete keels.

Wings: forewings (fig. 8, *a*5), length 0.7 mm.; venation extending to six-sevenths from the radix; costa, marginal and radius in ratio 11 : 2 : 6; post-marginal practically absent, replaced by a stump only large enough to hold three clear pustules. Hind wings (al : 1), length 0.6 mm.; hooks at about two-fifths from radix; venation reduced to minute costal stump at radix.

Legs: forelegs with coxae boldly transversely striate-reticulate, with one preapical bristle; trochanters thin; femora (10 : 3) longer (12 : 11) than tibia (5 : 1) or tarsus, which are of equal length; tibia with seven stiff parallel spines above the anteroventral edge on its distal half, two spines at posteroventral angle above the deeply frayed spur; first tarsus bent, with about 25 spines in comb; tarsus, 24 : 7 : 6 : 6 : 12. Mid leg with femur (4 : 1) and tibia (6 : 1) equal and just shorter than tarsus; the latter 25 : 10 : 8 : 13; tibia with 4-5 stronger spines across apex. Hind legs with coxae (2 : 1) trochanter swollen dorsally; femur (11 : 4) shorter than tibia, which is barely 6 : 1 equals the tarsus; tibial comb with five spines; tarsus, 42 : 11 : 9 : 8 : 16.

Abdomen with the segments coped, 1st tergite much the largest (two and a half to over three times as long as 2nd, according to the extension of the segments); all tergites and sternites smooth shining with two, generally widely spaced, clear sensory pustules, which do not bear bristles and with a tendency to show a faint transverse reticulation on posterior half. Tergite 1 with sharp straight edge anteriorly,

and on each side of the mid line above this edge a large pellucid thickening of the chitin divided indistinctly into one or two cells; beyond each of these clear areas anterolaterally is a boss with a much finer pattern and 10-12 minute stiff bristles; tergite iv with anteromedianly the remarkable reticulated chitinous ring shown in fig. 7, f; tergite vii trilobed, the lateral areas triangular, with about ten short bristles, the mid lobe forming the pygidial area (about 5 : 1) bearing the two sensory pustules, which are here closely approximated and not wide apart as on the preceding tergites, with two bristles posteriorly. Chaetotaxy: apart from the bristles already mentioned, tergite i is bare posteriorly; tergite ii bears a posterior row of four bristles (2 : 2); tergites iii-v, 4, 1, 4; tergite vi, 1, 1. Genitalia (fig. 8, c): sternite i bordered and crenulate anteriorly, with two clear areas and bosses as on the corresponding tergite, and covered with short bristles (33-35) in a posteromedian triangular patch; sternite ii with seven bristles in posterior row 3, 1, 3; sternite iii, 2, 1, 2; sternite iv-v, 2, 2; the last sternite has probably about 14 bristles.

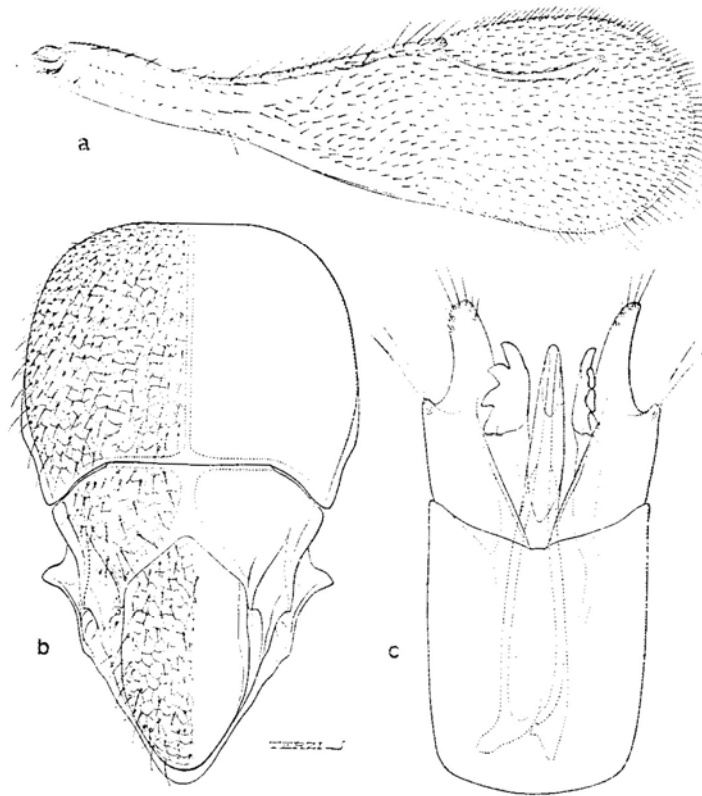


Fig. 8. *Calliceras dictynna*, sp. n., ♂: a, forewing; b, mesonotum; c, genitalia.

Length, 1 mm. ; alar expanse, about 1·6 mm.

♀. Coloured almost exactly like the ♂, but the scape of the antennae paler and almost clear yellow ; the tibiae, too, are much lighter in tone than the femora, being clear brown, obscurely paler for a short distance at base.

Similar to the ♂. Head, across vertex, transverse ; ocelli in a perfect equilateral triangle ; taking the distance between the ocelli as one, the anterior ocellus stands from the orbit at one and four-fifths, while the lateral ocelli are one and two-fifths from the orbits. Lateral teeth of propodeon more pronounced than in ♂. Forewings narrower (10 : 3) than in ♂ ; length, 0·7 mm. Legs : forelegs with femur broader (8 : 3) than in ♂ ; tibia also broader (22 : 5) ; tarsus shorter than tibia, 1st tarsal joint longer (28) ; the rest as in ♂. Mid legs with femur also broader (11 : 3) ; 1st tarsal joint longer (30). Hind legs with femur broader (about 10 : 4) ; first tarsal joint longer (46).

Length, 0·1-1·2 mm. ; alar expanse, 1·6-1·8 mm.

Type ♀ in the British Museum, one of a series (1 ♂, 3 ♀♀, and broken ♀) from *Stephanoderes hampei*, Ferr.

UGANDA : Najunga, 24.v.1921 (*H. Hargreaves*).
