

The African Species of Hadronotus (Hymenoptera, Proctotrupoidea, Subfam. Scelioninæ). By G. E. J. NIXON, B.A.

[Plate VII.]

EXCEPT where otherwise stated, the material on which this paper is based was collected by Mr. R. E. Turner in South Africa. Through the courtesy of Dr. Ferrière of the Imperial Institute of Entomology, the author has been enabled further to examine bred series of two species, both of which are here described as new.

The types of all new species are in the British Museum.

The task of preparing this short review has not been altogether easy. The species of *Hadronotus* are difficult, and, though some forms dealt with here are very distinct and easily recognizable by good structural characters, there are also others that are far less easy and of which determination depends on a fine appreciation of sculpture that is not always adequately assisted even by the most careful description.

Where it has been possible to supplement the descriptions by means of outline figures giving a clear idea of obvious differences in structure, this has been done. With regard to the four photographs of wings (Pl. VII.), it should be noted that (a) and (b) are representative of groups of species, while (c) and (d) depict the peculiarities of particular species.

The genus *Hadronotus* has been accepted in rather a wide sense, as a consideration of the characters used in the major divisions of the key to the species will perhaps suggest. The motive for this has been to avoid the indiscriminate multiplication of generic or subgeneric names.

The twelve African species discussed below are covered by the following description :—

Head always transverse, at least about twice as wide as its shortest length. Frons with or without a margined impression. Antennæ 12-segmented in both sexes, always with a thick, though not always clearly differentiated, club in the ♀, in the ♂ with the funicle very short, hardly longer than the head and thorax together, except in

festivus K. Eyes bare or densely clothed with extremely short hairs. Posterior ocelli close to the eye-margin, except in *festivus*. Mandibles unidentate in *festivus*, bidentate in *pisus* and *hiberus*, spp. n., or with three teeth (the middle one small) in the other species. Head never smooth and polished, usually more or less reticulated, and never obviously punctured. Cheeks behind the genal sulcus never striated except in *festivus*, in which species microscopic striations are present. Vertex just behind the posterior ocelli with or without a margin—that is to say, in those species which have the margin, this is continuous with the lateral occipital margin, and forms with it a continuous unbroken ridge; in those species in which the margin is not present, the lateral occipital margin is continued up to the temples, where it turns abruptly inwards forming an obtuse angle, the upper arm of which is normally very short except in *saxatilis* K., in which species it is extended to form a more or less continuous ridge right across the occiput. Sometimes a ridge connects the posterior ocelli. Clypeus inconspicuous and more or less semicircular, except in *festivus* and *pisus*.

Thorax: Mesonotum, in the majority of species, in no sense punctate; only in *festivus* and *pisus* is there some indication of microscopic puncturation. The mesonotum possesses no trace of a specialised area* in front. Scutellum usually transverse; if not markedly transverse, it tends to be gibbous posteriorly as in *charon*, sp. n., and the gibbous part bulges beyond its posterior margin. Fore-wings: subcostalis always well separated from the edge of the wing, except in *hiberus*; marginalis sometimes more or less punctiform and always shorter than the stigmalis, except in *hiberus*; the limits of the post-marginalis are sometimes ill-defined, but it is never shorter than the stigmalis. Postscutellum sometimes simple, sometimes with a feeble transverse swelling as in *charon*, or sometimes with a small and relatively inconspicuous emarginate process as in *janus*, sp. n.

Abdomen not obviously longer than wide, except in *cous*, sp. n., and *hiberus*. In the ♀ there are seven segments visible dorsally; the 6th is 4- not 3-sided as in

* See Nixon, "A further Contribution to the Study of South African Scelionidæ," Ann. & Mag. Nat. Hist. ser. 10, vol. xii. p. 289 (1933).

most other Scelionine genera, and its apical margin is straight or feebly emarginate as in the *naevius*, sp. n., group or very feebly bisinuate as in *festivus*. These characters belonging to the shape of the apical margin of the 6th tergite are slight. They are accordingly not mentioned in the descriptions, and it would be unwise to assign classificatory value to them.

Key to the Species, ♂♀.

1. Vertex very sharply margined just behind the posterior ocelli, the sharp edge forming with the lateral occipital margin a continuous unbroken ridge 2.
 Vertex not thus margined, so that there is no clear separation between its anterior and posterior (declivous) part 7.
2. Eyes completely bare 3.
 Eyes thickly clothed with very short hairs 5.
3. Occiput on its upper part with two or three fine transverse ridges on a smooth surface which originate from the occipital margin itself, but which tend to fade out medially. Sometimes only the lowest of these ridges is present and this always makes an angulation with the occipital margin at the point (on the temples) where it joins the latter *saxatilis* Kieffer.
 Occiput without a trace of transverse ridges, its surface not easily visible, everywhere smooth. (Species having head and thorax with a very fine even sculpture which gives these parts a dull leathery appearance; the clypeus with acutely pointed lateral angles; the marginalis punctiform.) 4.
4. Posterior ocelli remote from the eye-margin, as far distant from this as they are from the anterior ocellus. The subcostalis, at its apical quarter, takes an abrupt and conspicuous downward bend before reaching the marginalis. Mandibles narrow and acutely pointed. *festivus* Kieffer.
 Posterior ocelli close to the eye-margin, being separated from this by a distance hardly half as great as that separating them from the anterior ocellus. Subcostalis taking only a very slight, inconspicuous, downward curve before reaching the marginalis. Mandibles with two very large, pointed, apical teeth .. *pisus*, sp. n.
5. Marginalis more or less punctiform. Head closely and evenly reticulate 6.
 Marginalis long, fully as long as the stigmalis. Head vaguely or hardly reticulate *hiberus*, sp. n.
6. Frons with a well-defined and completely margined impression. Scutellum feebly notched at its apex and in lateral aspect completely overlapping the postscutellum *cous*, sp. n.

- Frons with a shallow ill-defined impression, which is margined only above, and the margin itself weak. Scutellum not notched at its apex and in lateral aspect not overlapping the postscutellum *janus*, sp. n.
7. Eyes completely bare 9.
 Eyes thickly clothed with very short hairs. (Species with the *marginalis* only a little, or hardly, shorter than the *stigmatis*.) 8.
8. Head evenly convex across the vertex in the region of the anterior ocellus; mesonotum with two longitudinal rows of minute, dull black, raised points which are most clearly visible when the insect is viewed slightly from behind. Abdomen of the female black *gnidus*, sp. n.
 Head somewhat flattened above in the region of the anterior ocellus; mesonotum without such raised points; abdomen of the female more or less honey-yellow *antestix* Dodd.
9. Frons with a deep well-defined impression, which is completely margined. (Large, robust species 1.9–2.3 mm. in length.) 10.
 Frons with only a feebly defined, often shallow impression, which is never completely margined. (Small species, at most 1.5–1.6 mm. in length.) 11.
10. Side of the head between the genal sulcus and the occipital margin with a distinct ridge, which extends from the temples to the mandibles. Postscutellum in lateral aspect not, or hardly, projecting beyond the apex of the scutellum .. *charon*, sp. n.
 Side of the head between the genal sulcus and the occipital margin without such a ridge. Postscutellum in lateral aspect distinctly projecting beyond the apex of the scutellum. (A species with the abdomen unusually hairy.) *letus*, sp. n.
11. Seen from the side, the thorax and the abdomen are very nearly in the same plane. The mesonotum and the scutellum are somewhat flattened. Head a little under twice as wide as its shortest length *myndus*, sp. n.
 Seen from the side, the thorax and the abdomen are by no means in the same plane. Mesonotum and scutellum quite strongly convex. Head nearly two and a half times as wide as its shortest length *nævius*, sp. n.

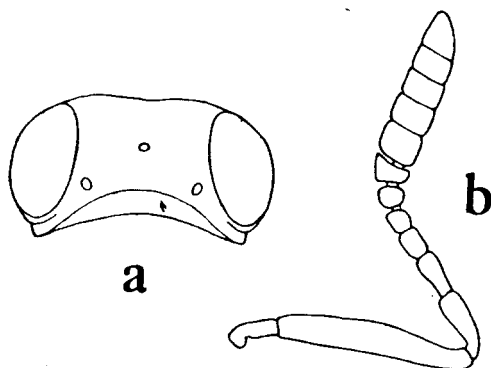
Hadronotus saxatilis Kieffer. (Fig. 1.)

Hadronotus saxatilis Kieff. Bull. Soc. Ent. France, p. 293, ♂♀ (1910).

The species was originally described from the Seychelles Is. It is a small, very dark insect with the antennal scape infuscated in both sexes, but less so in the Seychellian examples. Kieffer's description of the species is fairly good, but he does not mention either of the characters given in the key. Also, he describes the thorax as "matt und

grob lederartig"; in the author's opinion this is not strictly accurate, and to bring the description of the thoracic sculpture into line with his treatment of sculpture throughout this paper he would describe it as very fine and more or less indeterminate; the anterior half or two-thirds of the mesonotum under a high magnification shows minute raised points on a dull surface; posteriorly the mesonotum and also the scutellum are faintly to quite strongly longitudinally striated. In thoracic sculpture *saxatilis* resembles both *gnidus*, sp. n., and *antestiae* Dodd, but is at once separated from either of these species

Fig. 1.

*Hadronotus saxatilis* Kieffer, ♀.

a, head, from above; b, antenna.

by its possessing glabrous eyes and a more or less punctiform marginalis, as also by the characters given in the key.

SEYCHELLES; CAPE PROVINCE (Somerset East, Mossel Bay, Port St. John, Lion's Head, Worcester, Ceres, Queenstown); S.W. AFRICA (Okahandja).

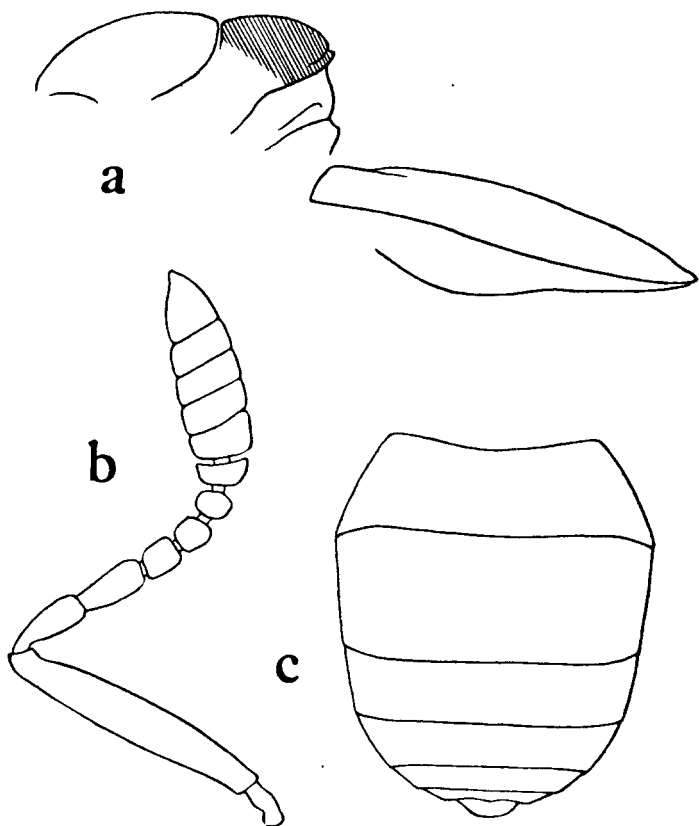
Hadronotus festivus Kieffer. (Fig. 2.)

The species was described from one male, the type of which is in the British Museum.

♀.—Colour dark brownish-black, the abdomen sometimes paler than the thorax. Scape of antennæ, first few segments of the funicle, mandibles, legs, excluding

the coxæ, which are more or less the same colour as the abdomen, pale brownish-yellow. The head and the thorax are without a conspicuous clothing of erect hairs, the vestiture consisting of only microscopically fine adpressed hairs.

Fig. 2.

*Hadronotus festivus* Kieffer, ♀.

a, thorax, lateral ; b, antenna ; c, abdomen.

Head strongly transverse. Frons evenly convex or sometimes weakly impressed, and in this case showing a weak central ridge. Sculpture of frons varying according to the size of the individual ; the surface of its middle

part weakly shining and with very delicate, sometimes hardly visible, semicircular striations. Frons against the eyes and the vertex, everywhere dull, with a very fine, even, leathery sculpture. Eyes bare, a little longer than their distance from the mandibles. Posterior ocelli fully as far distant from the eye as from the anterior ocellus. Clypeus with acutely pointed lateral angles. Mandibles short, strongly curved, and tapering to a fine point. Head weakly hollowed out behind, so that the thorax fits into it as into a socket; the vertex is hence very sharply margined, the margin having a knife-like edge. Antennæ: segment 1 of the funicle from but little longer than wide to a little over one and a half times as long as wide; 3 and 4 small, as long as wide; 5 transverse, nearer in size to 6 than to 4; 5-10 forming a moderately thick club, which is not more than twice as wide as 1. Cheeks behind the genal sulcus nearly smooth, with some microscopic striations.

Thorax: Mesonotum uniformly dull, its sculpture similar to that of the vertex, but somewhat stronger, and showing more clearly contiguous, microscopically fine punctures, but still very even and leathery. Scutellum sculptured like the mesonotum, seen from the side, raised high above the level of tergite 1 and completely overlapping the rest of the thorax, which falls away perpendicularly beneath it. Postscutellum medially with a smooth or nearly smooth, shining, transverse area. Fore-wings yellowish, extending (see Pl. VII. fig. c) only a little, or sometimes hardly, beyond the apex of the abdomen; the venation is brownish and for the most part distinct; the subcostalis at its apical quarter takes an abrupt and conspicuous downward bend before reaching the marginalis; marginalis punctiform; post-marginalis not very clearly defined, but apparently fully $2\frac{1}{2}$ times as long as the stigmalis; the pubescence of the wings is very fine and the fringe very short.

Abdomen somewhat flattened; tergite 1 somewhat depressed over its greater medial part, its ridges very close, fine, regular, and more or less parallel to each other; they do not fade out apically, but tend to become slightly widened, so that the grooves between them are closed apically; 2 finely striated in the middle, but becoming very finely rugose towards the sides; the ridges

of 2 are very regular and nearly straight; remaining tergites together longer than 2.

Length 1.3–1.6 mm.

CAPE PROVINCE, Pondoland (Port St. John), *Jan.*, *Feb.*, and *May*, 5 ♀♀ (Ceres), *March*, 1 ♀.

The type-male is from the Seychelles. It has the body, except the head and the apical half of the abdomen, which are blackish, together with the legs, entirely honey-brown. The antennæ are slender, about as long as the body; the segments of the funicle are cylindrical and 2–9 are about one and a half times as long as wide; the segments do not fit closely together, their articulations being distinct, and are clothed with very short, semi-erect, stiff, bristling hairs.

The species is very distinct, and is characterised by the position of the posterior ocelli, by the shape of the mandibles, and by the sharp bend in the subcostalis.

Hadronotus pisus, sp. n. (Fig. 3.)

This species is very similar to *festivus* Kieff. in shape and particularly sculpture. It differs from that species as follows:—

Darker, the body being dull black, the legs with usually only the tibiæ and tarsi brownish-yellow.

Head less transverse, but variable in shape. Frons often with quite a deep impression; generally, the presence of a fairly deep to deep impression is correlated with a less to much less transverse head. Posterior ocelli close to the eye-margin, from which they are very much less distant than from the anterior ocellus. Mandibles shorter, wider, and terminating in two large teeth, which are slightly divergent towards their apex. Antennal club slightly less thick.

Thorax: In the fore-wings (see Pl. VII. fig. *d*) the subcostalis takes only a slight and gradual downward curve before reaching the marginalis; there is a faint cloud around the marginalis, and this cloud sometimes extends as a band across the wing to its lower margin; also, the apical part of the wing is sometimes faintly darker, thus leaving a narrow hyaline band between itself and the dark band which arises at the marginalis. The scutellum overlaps the rest of the thorax even more

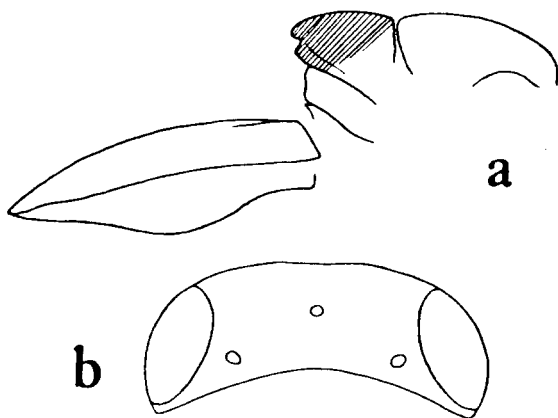
completely than in *festivus*, and sometimes projects quite strongly beyond it.

Abdomen: Tergite 2 less conspicuously striated, the greater part of its surface being the more often finely scaly-reticulate, usually the striations being restricted to the extreme base of the segment.

The male differs from that of *festivus* as follows:—

Antennæ shorter, hardly as long as the head and the thorax together, and tapering slightly towards the apex; the segments fit closely into one another; 2-9 of the funicle are sometimes nearly transverse, sometimes even

Fig. 3.



Hadronotus pisus, sp. n., ♀.

a, thorax, lateral; b, head, from above.

a little longer than wide; the vestiture is closely adpressed and extremely fine, hardly visible; the segments are also thickly beset with minute, silvery, seta-like hairs.

Length 1-1.4 mm., ♂♀.

CAPE PROVINCE (Somerset East), Dec., Jan.; (Port St. John), March-June; (Mossel Bay), Jan.-Feb., June-July, Nov.-Dec.; (Swellendam), Feb.; (Ceres), March, 27 ♂♂, 24 ♀♀.

This stout, dumpy species is subject to a good deal of structural variation, especially in the shape of the head and the depth of the frontal impression. It is possible

that two closely allied species are mixed under this name, but, owing to the lack of bred series, the writer prefers to regard all variations referred to as individual, since intermediate forms occur which would render any separation into more than one species arbitrary.

Their sculpture makes this species and *festivus* very distinct from all the other species dealt with in this paper.

Hadronotus hiberus, sp. n. (Fig. 4.)

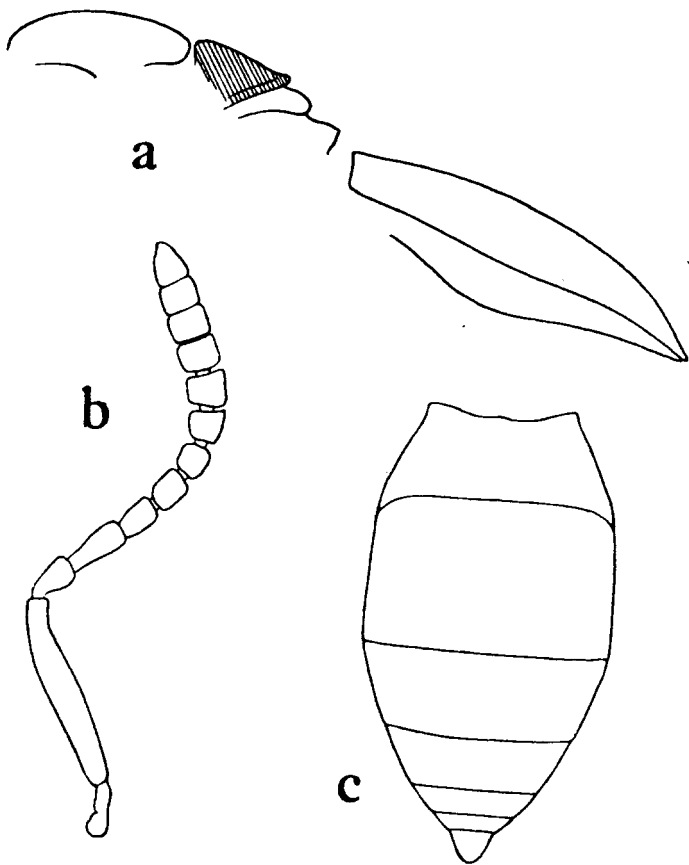
♀.—Colour very dark brownish-black. Scape, pedicel, first five segments of the funicle, and legs (except the darker coxæ) more or less clear honey-brown, though the colour is sometimes obscure.

Head seen from above a little less than, or about, twice as wide as long, thickly clothed with rather long, more or less upstanding, pale hairs. Frons with a fairly deep, more or less oval impression which is sharply and completely margined. Sculpture of frons outside the impression and of the vertex variable; sometimes very finely and vaguely reticulate, the meshes being a little larger than the anterior ocellus (the three specimens which have this sculpture have the head less than twice as wide as long); sometimes finely scabrous, with tiny raised lines, which form a very incomplete reticulation (one specimen, the largest, with the head twice as wide as long; in this individual a complete ridge, which is only feebly indicated in the others, joins the frontal impression with the anterior ocellus). Posterior ocelli separated from the eye-margin by a distance about equal to, or a little greater than (in largest specimen), their own diameter. Eyes densely clothed with short upstanding hairs. Cheeks behind the genal sulcus extremely finely scaly-reticulate, without striations. Clypeus with its lateral corners rounded. Mandibles narrowed towards the apex, with two tiny teeth, the upper one the longer. Occiput completely and sharply margined, the occiput itself falling more or less perpendicularly away from this margin. Antennæ somewhat slender, the funicle unusually hairy; first four segments of the funicle together about two-thirds as long as the following segments; 1 narrow, cylindrical, a little more than twice as long as its greatest width; 2 a little shorter, or hardly shorter, than 1; 3 a little longer than wide; 5 intermediate in size between

4 and 6 ; 6 fits closely into 5, but not 5 into 4, so that the weak club appears to be 6-segmented.

Thorax: Mesonotum weakly shining, very finely granulate towards the front, but showing posteriorly a

Fig. 4.



Hadronotus hiberus, sp. n., ♀.

a, thorax, lateral ; b, antenna ; c, abdomen.

tendency to become finely but indistinctly longitudinally rugose. Scutellum somewhat dull, exceedingly finely and closely scaly-reticulate, almost granulate ; when seen

from the side the scutellum does not overlap the rest of the thorax at all. Propodeum very short, truncated; the two sharp ridges, which enclose a median space, do not quite meet in the middle, but diverge towards the posterior margin of the postscutellum. Fore-wings faintly brownish, the pubescence somewhat rough; subcostalis very close to the edge of the wing, not curved, and forming with the marginalis a straight line; marginalis thicker than the subcostalis and slightly longer than the stigmalis; postmarginalis fully three times as long as the stigmalis. Legs very slender.

Abdomen nearly twice as long as wide. Segment 1 quite simple at the base; 2 about twice as long as 3, with fine, very irregular wrinkles on a scaly-reticulate surface; in one specimen the scaly-reticulate sculpture predominates; in another (the largest) the longitudinal wrinkles are stronger and more regular.

Length 1.6–1.8 mm.

CAPE PROVINCE (Pondoland, Port St. John), *July*, 3 ♀♀; *Aug.*, 1 ♀ (the largest).

A very distinct species, characterised by the margined occiput and the long marginal vein of the fore-wing. On account of this last character and its slender form, the insect is by no means typical of the genus, and is placed here only provisionally.

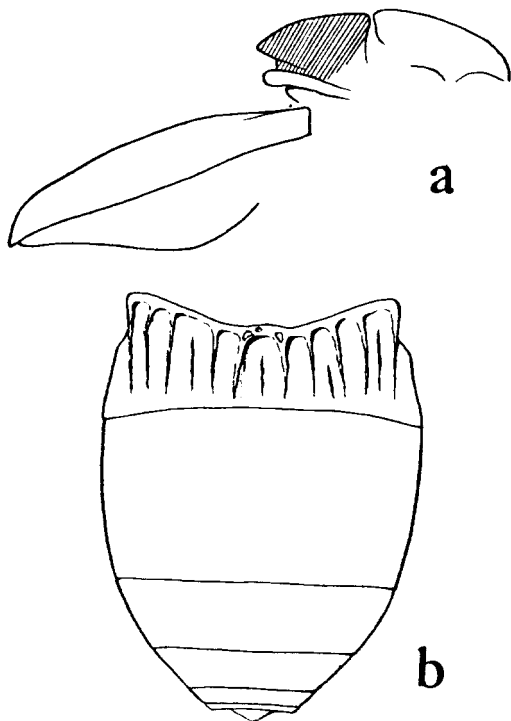
Hadronotus cous, sp. n. (Fig. 5.)

Dull black. Scape and first four segments of the funicle pitchy brown. Legs with the coxæ and the femora in greater part nearly black; tibiæ and tarsi reddish-brown.

Head hardly wider than the thorax, somewhat dull, beset with extremely short semi-erect, rather bristly hairs. Frons with a deep, well-defined impression which is completely margined; this impression is quite strongly widened towards the mouth of the insect; its distance from the anterior ocellus is about equal to that of the anterior ocellus from the eye; there is no trace of a ridge joining the frontal impression with the anterior ocellus. Frons otherwise, right down to the genal sulcus and the vertex, very sharply, closely, and evenly reticulated, the meshes are about as large as the anterior ocellus; they tend to become smallest along the occipital margin and

largest towards the genal sulcus. The occiput is very sharply margined, so that it is separated from the vertex by a knife-like edge; the occipital region is somewhat strongly transversely rugose or striate; the head behind is not so concave and hence not so socket-shaped as in *festivus* and *pisus*. Clypeus so undeveloped as to appear

Fig. 5.



Hadronotus cous, sp. n., ♀.

a, thorax, lateral; b, abdomen.

more or less absent. Eyes densely clothed with very short upstanding hairs. Mandibles with three small teeth, the middle one minute, the upper one the longest. Antennæ short and stout; segment 1 of the funicle about one and a half times as long as its greatest width;

3 and 4 about as long as broad ; 5 much nearer in size to 6 than to 4, and forming first segment of only a moderately thick club. Posterior ocelli almost touching the eye-margin.

Thorax : Mesonotum finely, but quite strongly, longitudinally rugose, the rugosities close and finely wrinkled. Scutellum completely covering the rest of the thorax when seen from the side, though not projecting markedly beyond it ; it is feebly notched at the apex and is reticulated like the head, but more coarsely so. Postscutellum longitudinally costate throughout, and with a tiny medial projection. Fore-wings short, brownish, the fringe very short ; the subcostalis takes only a slight and gradual downward curve before reaching the punctiform marginalis ; stigmalis somewhat short ; postmarginalis more or less wanting. Legs with the spur of the hind tibiæ reddish-brown and unusually strong, being nearly half as long as the first segment of the tarsus.

Abdomen distinctly longer than broad, somewhat flattened, and everywhere very strongly sculptured ; segment 1 with strong longitudinal wrinkles, which are rather wide apart and sometimes ill-defined ; 2 sculptured all over like 1, and with the intervals between the strong wrinkles indefinitely rugose ; 3 and 4 similarly, but less definitely, sculptured. The abdomen of this species is longer and narrower than any of the other species discussed in this paper except *hiberus*, sp. n.

The male differs from the female as follows :—Antennæ short, slender ; segments 2 to 9 almost square in outline ; the funicle is thickly clothed with very short, pale, semi-erect hairs. Distance of the frontal impression from the anterior ocellus but little more than half that of the anterior ocellus from the eye.

Length, ♂♀, 1·8 mm. approx.

CAPE PROVINCE (Port St. John), *March*, 2 ♂♂ ; *Dec.*, 1 ♀.

A very distinct species, characterised by its rather elongate form, hairy eyes, and strong sculpture. The long spur of the hind tibiæ is a difficult character to appreciate, unless comparison be made with some of the other South African species. This insect could be confused only with the following species.

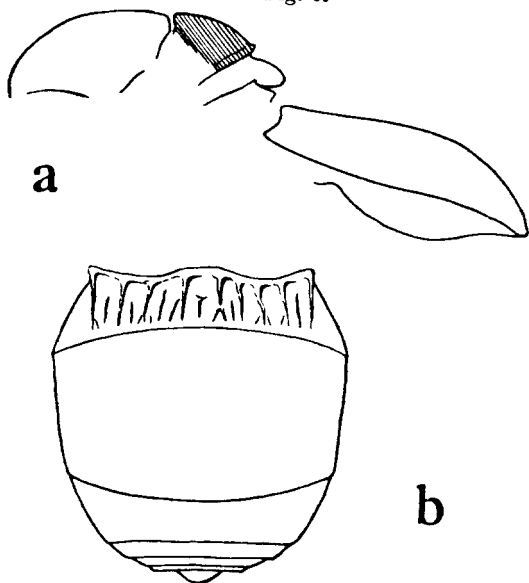
Hadronotus janus, sp. n. (Fig. 6.)

A species closely related to *H. cous*, sp. n., but smaller, less elongate, less strongly and less characteristically sculptured, especially with regard to the abdomen. It differs from *cous* as follows:—

Colour: The legs are obscure yellowish-brown rather than reddish-brown.

Head: Frons with a shallow, not completely margined impression; above it is delimited by a feeble margin. Mandibles slightly narrowed towards their apex and with

Fig. 6.

*Hadronotus janus*, sp. n.

a, thorax, ♂, lateral; b, abdomen, ♀

two tiny teeth. Antennæ stouter, the funicular segments more closely set; first four segments of the funicle less than half as long as the club; 4 strongly transverse; club thicker, less elongate, at its widest it is fully three times as wide as 1.

Thorax: Mesonotum less distinctly longitudinally rugose, but still quite strongly rugose. Scutellum slightly less transverse, less strongly reticulate, and not notched at its apex. Postscutellum medially with a small

emarginate process, which in lateral aspect projects beyond the scutellum.

Abdomen less elongate, about as long as broad; segment 2 considerably longer in proportion to the following segments together, everywhere finely and irregularly striate-reticulate, but towards the base the striate element in the sculpture predominates.

The antennæ are more or less similar to those of *cous*, sp. n.

Length, ♂♀, 1.3 mm. approx.

CAPE PROVINCE (Port St. John), *July*, 1 ♀, *Dec.*, 1 ♂; (*Ceres*), *March*, 1 ♂.

This and the preceding species would appear to belong to a conveniently separable group of the genus, characterised by the sharply margined vertex and the hairy eyes. With regard to these two characters, they agree with *H. hiberus*, sp. n., but otherwise have little in common with it.

Hadronotus gnidus, sp. n.

This species is extremely like *antestiæ* Dodd, and the structural and sculptural differences which separate the two species are subtle and difficult to appreciate. The females of the two forms can, however, be separated at once by the striking difference in the colour of the abdomen. It is largely on the strength of this colour-character, which appears to be constant throughout a number of bred series of both species, that the writer separates *gnidus* from *antestiæ*. *Hadronotus gnidus*, sp. n., differs from *Hadronotus antestiæ* Dodd as follows:—

♂♀.—Legs with all the femora in greater part infuscated, the tibiæ and tarsi obscure brownish-yellow. Abdomen entirely black.

Head slightly less transverse and evenly convex across the vertex in the region of the anterior ocellus.

Thorax: Like *antestiæ*, the sculpture of the mesonotum is, in greater part, extremely fine and indeterminate. Dodd's description of the mesonotum and scutellum of *antestiæ* as being "moderately longitudinally rugose" is misleading; only on its posterior third or quarter has *antestiæ* distinct, though extremely fine, longitudinal rugosities or striations. If *gnidus* shows such rugosities, they are, by comparison with the rest of the sculpture, much less conspicuous. When viewed from behind, the mesonotum usually shows two longitudinal rows of minute

raised points ; these points appear dull and blacker than the rest of the mesonotal sculpture, with which they form a slight contrast ; sometimes there are as few as five or six of them in each row, but more frequently they form a narrow band. Fore-wing (see Pl. VII. fig. *a*).

Length 1 mm., ♂♀.

ANGLO-EGYPTIAN SUDAN (Wad Medani), *A. B. Johnston*: a series of 15 ♀♀, 4 ♂♂, bred from eggs of a Hemipteron on *Cajanus indicus* at the Wellcome Tropical Research Laboratories ; (Khartoum), *H. M. Bedford*: series of 10 ♀♀, 4 ♂♂, bred from eggs of Pentatomid bug of *Abutilon* sp. UGANDA (Kampala), *H. Hargreaves*: series of 10 ♀♀, 4 ♂♂, bred from Coccid eggs.

In the last-mentioned series the females have the antennæ distinctly less hairy than those of the other two series.

Hadronotus antestiae Dodd.

Hadronotus antestiae Dodd, Trans. Ent. Soc. London, p. 351 (1919).

Distribution.—KENYA COLONY (Nairobi), *T. J. Anderson*: series bred from eggs of the coffee bug, *Antestia orbitalis* West. (= *variegata* St.). TANGANYIKA TERRITORY (Moshi), *A. N. Ritchie*: series of 18 ♀♀, 4 ♂♂, bred from eggs of *Antestia lineaticollis* St. SUDAN (Wad Medani), *W. P. L. Cameron*: series of 6 ♀♀, bred from eggs of *Agonoscelis versicolor* Fab. S. INDIA (Coimbatore), *P. S. Nathan*: 8 ♀♀, 2 ♂♂, from Coreid eggs on leaves of *Cajanus*.

This species is mentioned in connection with *H. gnidus*, sp. n., and *H. saxatilis* Kieffer.

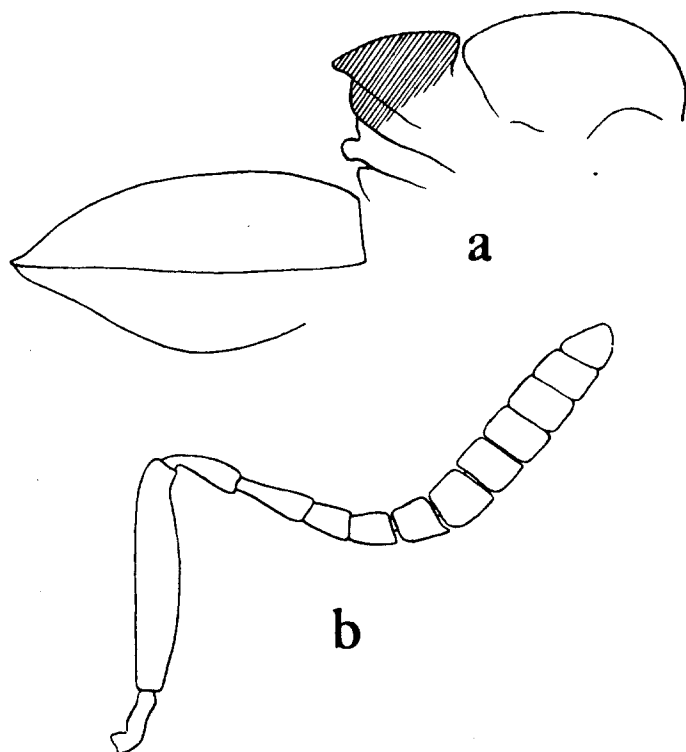
Hadronotus charon, sp. n. (Fig. 7.)

♀.—Colour black or nearly black. Scape of the antennæ, the pedicel, and first four segments of the funicle, although these latter are sometimes infuscated, and the legs (except the coxæ) bright reddish-yellow.

Head from above about two and a half times as wide as its shortest length. Frons with a completely and sharply margined impression, which is about twice as long as wide and is slightly narrowed in the middle ; this impression is somewhat vaguely transversely striated ; above, it is connected by a short carina with the anterior ocellus. Frons otherwise and the vertex weakly shining, their general sculpture finely scabrous, with tiny or minute, irregularly placed, and scattered raised lines, which on

the frons towards the genal sulcus form themselves into indistinct reticulations. Vertex produced to form a feeble to strong ridge between the posterior ocelli; this ridge sometimes passes in front of the posterior ocelli and comes to touch the eye-margin; behind the ridge the vertex falls obliquely away and becomes merged with

Fig. 7.

*Hadronotus charon*, sp. n., ♀.

a, thorax, lateral; b, antenna.

the occiput; here the surface is transversely rugose or simply rugose. Posterior ocelli separated from the eye-margin by about their own diameter. Eyes bare. Clypeus semicircular. Face behind the genal sulcus with a distinct ridge, which extends upwards from the mandibles to the eye midway between the genal sulcus and the occipital margin. Mandibles with three tiny teeth, the upper one

the biggest and longest. Antennæ slender; funicle very gradually thickened towards the apex; funicle 1 fully twice as long as wide; 2 a little longer than wide; 4 intermediate in size between 3 and 5; 4 fits almost as closely into 3 as 5 into 4, so that the club is 7-segmented; club itself slender, its middle segments hardly twice as wide as 2.

Thorax: Mesonotum very strongly convex, strongly and evenly rugose, the sculpture consisting of irregularly shaped points; the sides of the mesonotum behind are distinctly and strongly compressed, as are also the sides of the scutellum, giving the thorax a very distinctive appearance; at the point where the compression is strongest the surface becomes entirely smooth; the scutellum otherwise is coarsely reticulate-rugose, feebly notched at its apex, and sometimes shows a vaguely defined, central, longitudinal groove; in some specimens the scutellum is but little transverse; seen from the side it completely overlaps the rest of the thorax and is raised high above the level of the abdomen. Postscutellum costate throughout, without a distinct medial process. Pleuræ everywhere with very strong sculpture. Forewings with a yellowish tint, and extending well beyond the apex of the abdomen; the pubescence is not close nor fine; the venation is very pale; subcostalis hardly curving downwards before reaching the marginalis; marginalis nearly punctiform; postmarginalis nearly twice as long as the stigmalis. Propodeum with a transverse semicircular carina.

Abdomen strongly convex, but little longer than wide; segment 2 with close longitudinal wrinkles on a finely rugose surface.

The male differs from the female as follows:—

♂.—Antennæ short, yellowish-brown, darker towards the apex; the funicle is slightly clavate—that is, segment 9 is slightly narrower than 6; segment 1 of funicle about one and a half times as long as wide; 4–9 nearly square in outline; the entire funicle is clothed with pale, very short, semi-erect hairs, which do not obscure the shining surface of the segments.

Length about 2.2 mm.; one small ♂ measures 1.7 mm.
CAPE PROVINCE (Port St. John), *March–Aug.*, 3♂♂, 3♀♀; (Mossel Bay), *June–July*, 1♀. S.W. AFRICA (Okahandja), *March*, 1♂, 1♀.

The species is characterised chiefly by the compressed sides of the mesonotum and by the extra ridge on the side of the head.

Hadronotus letus, sp. n.

This species is very similar to *charon*, sp. n. It differs as follows :—

♀.—Colour darker, all the femora nearly black or dark brown. The scape, first four segments of the funicle, obscure reddish-brown, funicular 4 the palest, 5 pale beneath. Tibiæ and tarsi obscure reddish-brown.

Head: There is no distinct ridge between the genal sulcus and the occipital margin, extending from the mandibles to the temples. The vertex is less produced between the posterior ocelli and does not form such a sharp separating ridge; sometimes there is no ridge at all present; if one does exist, it is but little stronger than any of the transverse ridges of the declivous part of the vertex. Antennæ with segment 1 of the funicle more slender, about three times as long as wide.

Thorax: Mesonotum less compressed at the sides. Scutellum strongly transverse. Postscutellum with a small, medial, emarginate process, which in lateral aspect projects beyond the apex of the scutellum. Wings darker (see Pl. VII. fig. b), the venation brownish and hence more sharply defined; the marginalis is about twice as long as wide.

Abdomen much more hairy. To the naked-eye the hairs give the abdomen, when this is seen from the side, a faint greyish appearance, which contrasts with the blackness of the thorax.

♂.—The antennæ have the funicle much more slender; funicular 1 is about two and a half times as long as wide; 4–9 cylindrical, nearly one and a half times as long as wide.

GOLD COAST (Aburi), *W. H. Patterson*: series of 20 ♀♀, 2 ♂♂, bred from eggs which were laid in chains, and which were probably those of a Hemipteron belonging to the family Coreidæ.

Both this and *charon*, sp. n., are fine large insects, compared with most other African species of the genus, and are of very stout robust build.

Hadronotus myndus, sp. n. (Fig. 8.)

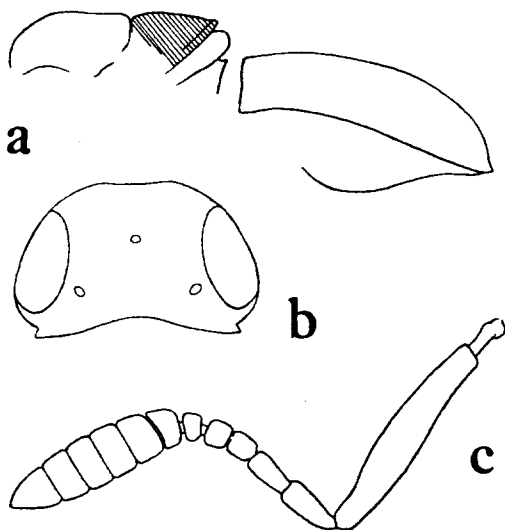
This species is closely related to *naevius*, sp. n., but evidently quite distinct from it. It is a diminutive

insect, smaller than *nævius*, in size about equal to *H. saxatilis* Kieffer. It differs from *nævius* as follows:—

♀.—*Colour*: the light parts are on the whole darker; the scape of the antennæ has its apical half or two-thirds strongly infuscated; the proximal five segments of the funicle are almost as dark as the club.

Head less transverse, about 7:4; when seen from above, it appears quite strongly produced between the eyes, almost subconical. The frons outside the feeble unmarginated impression is as delicately reticulated as *nævius*, but more clearly.

Fig. 8.



Hadronotus myndus, sp. n., ♀.

a, thorax, lateral; b, head, from above; c, antenna.

Thorax: The mesonotum and the scutellum are somewhat flattened, the sculpture is less raised and appears slightly finer than in *nævius*. When seen from the side, the scutellum, in comparison with that of *nævius*, is not raised high above the abdomen, with which it is nearly on the same level. The postscutellum has a small transverse swelling in the middle, which projects a little beyond the apex of the scutellum. Wings with the venation slightly darker than in *nævius*; the marginalis is slightly longer, sometimes nearly two-thirds as long as the stigmalis.

Abdomen less strongly convex ; tergite 2 with its ground-sculpture distinctly scaly-reticulate, the delicate wrinkles being restricted to the basal half of the segment. Following tergites finely scaly-reticulate.

♂.—Antennæ with the funicle entirely dark, nearly black. Otherwise like the ♀.

Length 1.2 mm. approx.

CAPE PROVINCE (Mossel Bay), Feb., 5 ♂♂, 4 ♀♀ ; June, 1 ♀.

This species is also closely related to *H. leptocorisæ* Nixon*, from Java. The head is different in shape and *leptocorisæ* has the radicle of the antennæ much longer in proportion to the length of the scape than *myndus*.

Hadronotus nævius, sp. n. (Fig. 9.)

♀.—Black. Scape, pedicel, and first five segments of the funicle and legs, except the coxæ, pale reddish-yellow.

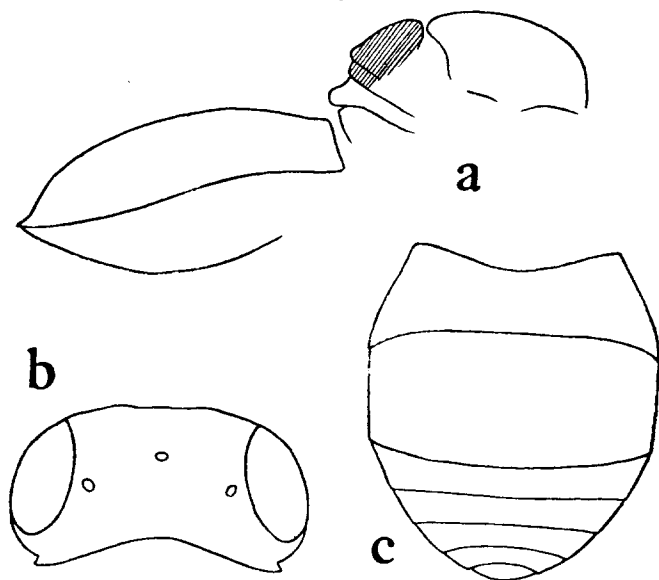
Head appearing strongly transverse, a little over twice as wide as long. Frons with only a very feeble impression, which is nowhere margined and which is indicated by delicate, very irregular, transverse lines on a shining surface ; the frons elsewhere and the vertex up to the posterior ocelli are delicately and somewhat vaguely reticulated ; around the frontal impression the reticulations become confused with the transverse raised lines. Posterior ocelli sometimes connected by a very feeble ridge. Occiput not margined above. Eyes completely bare. Posterior ocelli separated from the eye-margin by a distance a little greater than their own diameter. Clypeus short, more or less semicircular. Mandibles with three tiny teeth, the upper one the longest. Antennæ: segment 1 of the funicle about one and a half times as long as its apical width ; 2 and 3 about as long as wide ; 4 transverse, slightly saucer-shaped ; 5 nearer in size to 6 than to 4, so that the club is 6-segmented. The club has 5 black segments, of which 2–5 are strongly transverse. The occipital margin turns inwards at the temples to form a tiny angulation.

Thorax : Mesonotum strongly convex, evenly and somewhat finely rugose, the rugosities consisting of tiny, irregularly shaped, raised points ; posteriorly these rugosities tend to become longitudinal, and between them

* 'Stylops,' vol. iii. pt. 1, p. 3 (1934).

the surface is glistening. At the sides, behind, the mesonotum is slightly compressed in the manner of *H. letus*, sp. n., but this is not so conspicuous a feature as in that species. Scutellum quite strongly transverse, not notched at the apex, its sculpture similar to that of the mesonotum, but with a weak tendency towards reticulation; seen from the side, the scutellum is raised high above the level of the abdomen, but does not completely overlap the postscutellum. Postscutellum costate throughout, with only a very feeble medial process on

Fig. 9.

*Hadronotus nævius*, sp. n., ♀.

a, thorax, lateral; b, head, from above; c, abdomen.

its apical margin. Fore-wings large, about twice as long as the abdomen; colour, venation, and vestiture as in *H. charon*, sp. n.

Abdomen a little longer than wide, 5:4, strongly convex. Tergite 2 either with very delicate wavy wrinkles over nearly all its surface or with the wrinkles restricted to the base of the segment, and the rest of the surface finely scaly-reticulate; the writer has before him intermediate forms.

♂.—Antennæ short, yellowish-brown, darker towards the

apex ; segments 4-9 of the funicle hardly as long as wide ; funicle clothed with very short, pale, semi-erect hairs.

In all other respects the male resembles the female.

Length, ♂♀, about 1.4 mm.

CAPE PROVINCE (Mossel Bay), Aug., 3 ♀♀ ; Nov., 1 ♂ ; (Port St. John), March, 1 ♂ ; July, 1 ♀.

This species is closely related to both *H. letus*, sp. n., and *H. charon*, sp. n., but it can be distinguished from them by its smaller size and its unmargined frontal impression.

Another, and doubtful, species from South Africa, represented by four individuals from different localities, is very like *nævius*, sp. n., except that it has a more or less completely margined frontal impression and is slightly larger in size. It would appear to be intermediate between *nævius* and *letus*, spp. n. Nevertheless, the writer prefers not to describe these specimens as new, partly owing to lack of sufficient material, and partly because he is not altogether satisfied that the presence of a complete margin bordering the frontal impression is always a character of reliable specific value, for in one of the examples, a ♀ from S.W. Africa (Okahandja), this margin is only feebly developed. On the other hand, this intermediate form may represent a further, and closely allied, species. The examination of further material would no doubt settle the point. *H. nævius*, *letus*, *charon*, spp. n., and the preceding species, together with the above-mentioned forms, are closely related to *H. homæoceri* Nixon* and *H. oophagus* Nixon*, species from Java, and with them form a natural species-group of *Hadronotus*. The four individuals discussed above, which are intermediate between *nævius* and *letus*, spp. n., are very close to the two Javanese species on account of their possessing a margined frontal impression. To separate them from their Javanese relatives would be a matter of some difficulty.

EXPLANATION OF PLATE VII.

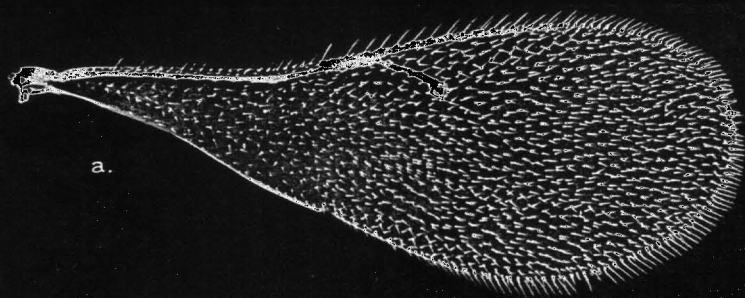
Fig. a. *Hadronotus gnidus*, sp. n.

Fig. b. — *letus*, sp. n.

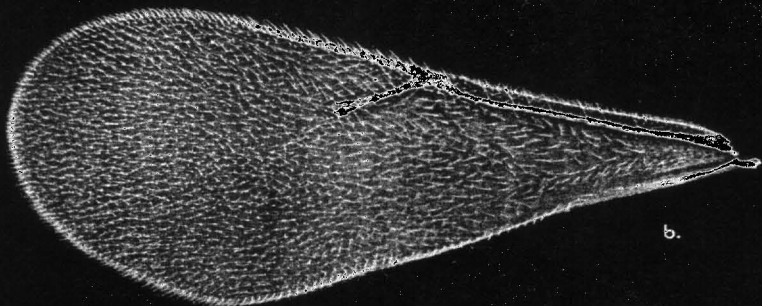
Fig. c. — *festivus* Kieffer.

Fig. d. — *pisus*, sp. n.

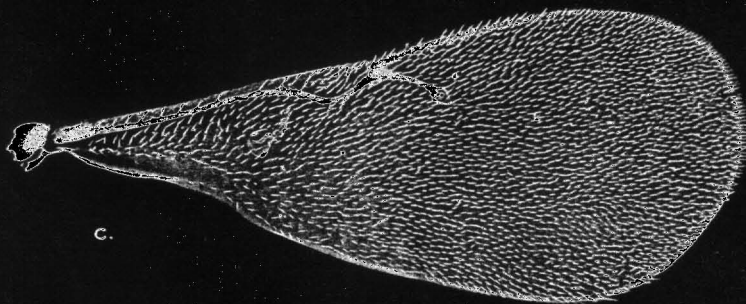
* 'Stylops,' vol. iii. pt. 1, p. 3 (1934).



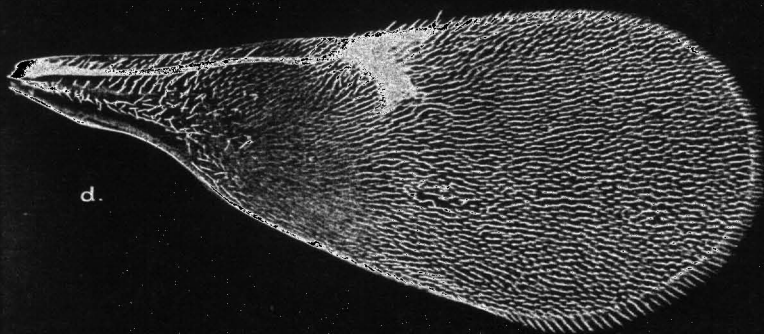
a.



b.



c.



d.