THE TEETH OF *CENTETES ECAUDATUS* AND ITS ALLIES

## 6. Mallophaga from the Tinamidæ.

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(Plates I.-IV.\*; Text-figures 1-14.)

A revision of the genera and species of the Tinamidæ Mallophaga was practically completed by the present author when M. A. Carriker's extensive paper (1936) appeared which necessitated considerable modification of the present paper. This now deals only with certain Mallophaga unknown to M. A. Carriker and with those points in which the present writer is not in agreement with that author.

The material used in the writing of this paper consisted of a small number of specimens collected in the field and a large number collected from dried skins which are partly in the collection of the British Museum and partly in that of the author.

It has been possible to examine Piaget's types in the British Museum, and information concerning certain of the Nitzsch and Giebel types has kindly been supplied by Dr. S. Kéler. No trace can be found of Radow's types of Tinamidæ Mallophaga, which, unless further information regarding them is forthcoming, must be taken as lost.

M. A. Carriker (1936) has pointed out the unusual number of genera of Mallophaga on this family of birds, due, no doubt, to the great age of the family. It is possible, however, that when more material is available some of these genera, which are apparently distinct, may grade into each other and become inseparable, e. g., *Heterogoniodes* and *Megaepostus*, *Pterocotes* and *Heptapsus*.

## PHILOPTERIDÆ Burmeister.

## PSEUDOLIPEURUS Carriker.

## PSEUDOLIPEURUS LONGIPES Piaget.

On comparing Piaget's type from *Crypturellus obsoletus* with Carriker's figure (pl. iii. fig. 2, 1936) of *Pseudolipeurus* from *Crypturellus obsoletus panensis* it is found that in Piaget's type-specimen the hyaline frontal margin is bilobed, not entire as in Carriker's figure. Whether this is a varietal or subspecific difference it is impossible to say without more material.

## PSEUDOLIPEURUS MACROGENITALIS Monteiro de Barros.

*Esthiapterun macrogenitale* Monteiro de Barros, 1933, p. 43, pls. viii. & ix.

This species, described from *Crypturellus undulatus vermiculatus* and apparently unknown to Carriker (1936), differs from *P. genitilis* Carriker from *Crypturellus u. undulatus* in the greater width of the temples, the longer and narrower pterothorax, and in the details of the male genitalia. Since these differences are subspecific Carriker's species becomes *P. macrogenitalis genitilis*.

## PSEUDOLIPEURUS SUBSIMILIS MACCONELLI, subsp. n. (Text-fig. 1.)

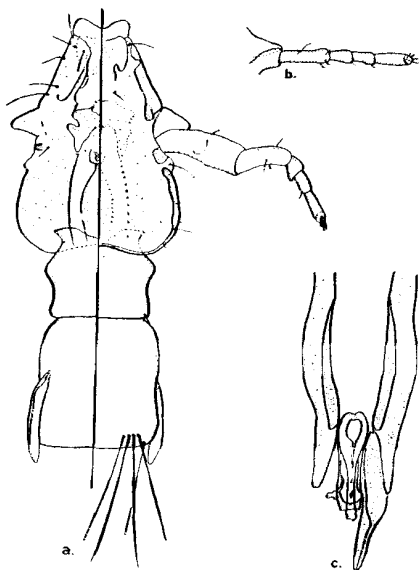
This subspecies is distinguished from *P. s. subsimilis* Carriker by the following characters:—

1. The pre-antennal region is wider.
2. The signature is of the same type as in *P. s. subsimilis*, but differs in detail (text-fig. 1 a).

\* For explanation of the Plates, see p. 159.

3. The trabeculae are shorter and more rounded, and the first segment of the male antennae is considerably longer and the prolongation of the third segment, beyond the point of articulation with the fourth, is shorter.

Text-figure 1.



*Pseudolipeurus subsimilis macconelli*, subsp. n.  
a, ♂; b, ♀ antenna; c, ♂ genitalia.

4. The male genitalia differ slightly in detail (text-fig. 1 c). No specimens of *P. s. subsimilis* Carriker have been seen; the above comparison is made from Carriker's description and figures.

## Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	.52	.38	.52	.41
Prothorax.....	.18	.28	.18	.28
Pterothorax.....	.28	.36	.28	.36
Abdomen.....	1.24		1.27	
Total.....	2.28		2.30	

Described from 1 male and 1 female from skin of *Crypturellus berlepschi macconelli*, British Guiana.

Type.—Male in the British Museum collection.

## HEPTAPSOGASTRIDÆ Carriker.

This family is defined by having only seven segments in the abdomen, but it appears to the author that both in *Strongylocotinae* and *Ornicholacinae* segment VII is present, although reduced to a greater or less extent. In *Nirmocotes*, which are apparently primitive *Strongylocotes* (or immature specimens of this latter genus), Carriker's so-called "tubercular body" lying between segments "VI" and "VII" can only be segment VII somewhat reduced. In *Strongylocotes* it is further reduced, and in *Ornicholacinae* appears as a mere tubercle. In all these cases the normal chatotaxy of the lateral part of the segment is present to a greater or less extent. This and similar problems are difficult to settle without work on the embryology of the family.

## HEPTAPSOGASTER Carriker.

Having compared the species contained in Carriker's genera *Heptapsogaster* and *Rhynchothura*, together with further material containing new species, it was found difficult to separate these species into genera. A typical species of *Heptapsogaster*, i. e., *H. mandibularis* Carriker, and a typical species of *Rhynchothura*, i. e., *R. sexpunctata*, show certain differences as enumerated by Carriker (p. 127, 1936), but if all the species are compared there is so much overlapping of these characters that it becomes difficult to divide them into genera. As examples may be taken *H. tessellatus* Carriker and *R. teres*, sp. n., which are between these two genera as regards the shape of the thorax and thickening of the pleurites, while the former species has the head as in *Heptapsogaster* and the latter as in *Rhynchothura*. Again, if *H. (Rhynchothura) minutus* Carriker is compared with *H. stultus*, sp. n., and *H. subdilatatus* Piaget, it becomes difficult to separate it generically from these latter species, as there is much overlapping of characters.

Until further evidence is forthcoming, therefore, it is proposed to place *H. (Rhynchothura) minutus* in *Heptapsogaster* and *R. teres*, sp. n., and *R. carrikeri*, sp. n., in *Rhynchothura*. *R. sexpunctata* Piaget, *R. teres*, sp. n., and *R. carrikeri*, sp. n. (*R. crenulata* Carriker and *R. tumulata* Carriker have not been examined), resemble each other, and differ from *Heptapsogaster* in the absence of regular internal projections from the antennal band, in the shape of the prothorax, and in the chatotaxy of the abdomen. The genitalia, which should give the most certain clue to the division of species into genera, present a problem in these three species. Those of *R. sexpunctata* and *R. teres* are of the same general type, while those of *R. carrikeri* differ to such an extent that on considering the genitalia alone this species appears generically distinct. In its other characters, however, it is so close to *R. teres* that it is difficult to place it in another genus.

In discussing these species two species have not been considered, namely, *H. platycephalus* Carriker and *H. petersi* Carriker, as it appears to the author that these should not be placed in *Heptapsogaster* but in *Megapeostus*. Both these species agree with the latter genus in the characters of the head, thorax, and abdomen and in the male genitalia, differing in this last character in that the paramera are equal in length, not unequal as in *Megapeostus*.

HEPTAPSOGASTER TEMPORALIS ACUTIVENTRIS, subsp. n. (Pl. I. figs. 1 & 2; text-fig. 4 a.)

This subspecies is distinguished from *H. t. temporalis* Carriker by the more flattened anterior margin of the head, by the shape of the mesothorax and segment VII of the abdomen in the male; by the pointed, not truncated, ends of the temples and by segment VII of the abdomen in the female.

*Description of the Male.*—Shape of the head as shown in figure (Pl. I. fig. 1), with bands and chatotaxy of the head as described for *H. s. stultus*, except that the hairs on the end of the temples consist of 2 long (1, 1) and 2 shorter hairs (1, 1).

Prothorax with diverging sides and concave posterior margin. Mesothorax with antero-lateral margins flatter and lateral margins straighter and more divergent than in *H. t. temporalis*. Metathorax with straight diverging sides and flatly convex posterior margin.

Abdomen as described for *H. s. stultus*, but differing in the internal markings of the pleurites and in segment VII of the abdomen, which is rounded on the anterior margin and projects beyond segment VI for over half its length, with the lateral sides narrowing to a rounded point. Chatotaxy as in *H. s. stultus*, except that on the ventral surface segments II and III have 6 spines (3, 3); segment IV has 2 spines (1, 1), 2 hairs (1, 1), and 2 central hairs (1, 1); segment V has 4 lateral hairs (2, 2) and 2 central hairs (1, 1); segments VI and VII as in *H. s. stultus*.

Male genitalia differ slightly from those of *H. t. temporalis* (text-fig. 4a).

The female differs from the male in the shape of the head (Pl. I. fig. 2), in having filiform antennae, and in segment VII of the abdomen, which is elongated and narrow, with lateral margins less convex than in *H. t. temporalis*. The chatotaxy of the abdomen is as in the male, except that the ventral surface of segment IV has 6 fine lateral hairs (3, 3) and 2 small central hairs (1, 1); segment V has 2 medium hairs (1, 1) and 2 small hairs (1, 1) near the lateral margins and 2 central hairs (1, 1); segment VII on the ventral surface has 8 small (4, 4) and 4 long submarginal hairs (2, 2), and on the dorsal surface 4 submarginal hairs near the middle of the segment (2, 2) and 2 lateral submarginal hairs (1, 1), and 4 small (2, 2) and 2 long (1, 1) anterior to the above hairs.

#### Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	.30	.49	.32	.50
Prothorax.....	.10	.22	.12	.22
Meso-metathorax..	.21	.50	.22	.49
Abdomen.....	.64		.82	
Total.....	1.30		1.40	

In the British Museum collection there is a certain amount of material labelled "*Perdri*, Mexico" containing different species of Tinamidae Mallophaga. In every case these are identical with specimens from *Crypturellus cinnamomeus mexicanus*; it is assumed, therefore, that "*Perdri*" is this species.

Described from 1 male from skin of *Crypturellus c. mexicanus* and 3 males and 5 females from "*Perdri*."

*Type.*—Slide no. 2882 in the British Museum from *Crypturellus c. mexicanus*.

HEPTASOGASTER STULTUS STULTUS, sp. n. (Pl. I. figs. 3 & 4; text-figs. 2c & 4b.)

This species resembles closely *H. mandibularis* Carriker, of which no specimens have been examined, but apparently differs considerably in the male genitalia, which necessitates making it a new species. It can be distinguished from Carriker's species by the flatter anterior margin of the head, by the presence of 2, not 4, hairs on the mesosternum, and by the male genitalia.

*Description of the Male.*—Front of head flatly convex; trabeculae small; sides of head swollen behind antenna, becoming divergent and slightly concave; temples produced backwards to level of middle of prothorax, with narrow rounded ends. Antennae with first segment enlarged and third produced beyond point of articulation with the fourth, the whole segment being short and rounded distally. Antennal bands continuous round anterior margin of head, with six backward projections, the central pair being the longest, the lateral pair the shortest; these bands turn in at the level of the trabeculae to form a pear-shaped thickening. Superior and inferior ocular blotch present, the former circular in shape and joined by an indefinite thickening to antennal band; bands of temple lightly chitinized, with one internal projection below inferior ocular blotch. Occipital signature half-moon-shaped.

*Chatotaxy of the Head.*—On the dorsal surface are 2 fine short hairs (1, 1) on the outer side of the base of the central projection of the antennal band and 2 long hairs (1, 1) in a similar position on the second projection, 2 hairs (1, 1) in the centre of the pre-antennal region, 1 small hair on the eye, 2 hairs (1, 1) lateral to the base of the mandibles, 4 small hairs (2, 2) on the sides of hind head, 2 long stout hairs (1, 1) and 2 short bristles (1, 1) on point of temples, 2 small (1, 1) and 2 longer (1, 1) on convex portion of posterior margin of head, and 2 submarginal central hairs (1, 1). On the ventral surface are 4 anterior submarginal hairs (2, 2) in the same position as those of dorsal surface, 2 fine hairs (1, 1) at lateral corners of preantennal region and 4 longer hairs (2, 2) central to these, 2 marginal hairs (1, 1) on trabeculae and 2 hairs (1, 1) lateral to upper level of the mandibles.

Prothorax with sides slightly divergent, with small postero-lateral protuberance carrying stout hair and straight posterior margin with small central concavity. Mesothorax with rounded diverging sides; postero-lateral angle with two stout dorsal hairs and 1 fine ventral hair and stout spine; posterior margin with 4 hairs (2, 2) and dorsal surface with 2 small hairs (1, 1). Metathorax with the whole of lateral margin exposed, this being straight and divergent; posterior margin flatly convex, bearing 2 short (1, 1) and 2 long hairs (1, 1); dorsal surface with 2 hairs (1, 1).

Abdomen oval, with seven segments, the first being the longest; segment VII with flatly convex anterior margin, widely flattened posterior ventral margin, and with narrow, pointed, posterior dorsal margin. Pleural plates wide, not deeply coloured; tergal plates interrupted medianly in segments I-IV and continuous in segments V-VII.

*Chatotaxy of the Abdomen.*—A single hair on the margins of the postero-lateral angles of segment I-VI. On the dorsal surface segment I with 6 hairs (3, 3), becoming progressively smaller towards centre; segments II-V with 4 hairs (2, 2), the inner pair on segment V being minute; segment VI with 4 fine hairs (2, 2); segment VII with 8 submarginal hairs (4, 4) and 2 long (1, 1) and 2 shorter and finer internal hairs (1, 1). On the ventral surface segment I has apparently no hairs; segments II and III with 2 hairs (1, 1) near outer edge of posterior margin of pleurites and 2 spines (1, 1) near inner edge of posterior margin of pleurites; segments IV and V with 4 hairs (2, 2) and 2 spines (1, 1) on the posterior margin of pleurites and 2 hairs (1, 1) near the centre of the segment which are small in segment IV, long in segment V; segment VI with 4 long hairs (2, 2) near lateral margin of segment; segment VII with 6 marginal and submarginal hairs (3, 3).

Male genitalia as shown in text-fig. 4b.

The head of the female differs somewhat from the male as shown in text-fig. 2c, especially in the possession of square-ended trabeculae and filiform antennae.

Segment VII has anterior margin conical and posterior margin rounded with median indentation. The chaetotaxy of the abdomen differs considerably from that of the male. The hairs of the lateral margins and of the dorsal surface of segment I are as in the male. On the dorsal surface of segments II-IV are 2 outer long hairs (1, 1), 2 spines (1, 1), and 2 inner fine hairs (1, 1) on the posterior margin of the tergites, with the outer pair becoming progressively smaller between segments II-IV; segment V with 6 hairs (3, 3), the two outer pairs being short and stiff and the inner pair being fine; segment VI with 4 fine hairs (2, 2); segment VII with 2 fine marginal hairs (1, 1) each side of the median indentation, 6 submarginal hairs (3, 3) in a horizontal row and 2 fine hairs (1, 1) near the lateral margin of the segment, and 2 stout, short hairs (1, 1) in the upper part of the segment. On the ventral surface segment I has 6 hairs (3, 3) on the posterior margin of the pleurites; segments II and III have 10 similar hairs (5, 5); segment IV has 12 similar hairs (6, 6) and 2 fine central hairs (1, 1); segment V has 10 similar hairs (5, 5) and 4 central hairs (2, 2); segment VI has 6 hairs (3, 3) on posterior margin of pleurite and 2 small spines (1, 1) near centre of segment; segment VII with two submarginal clusters of 6 (3, 3) and 4 long hairs (2, 2), and 12 short hairs (6, 6) in a horizontal submarginal line.

Crescent-shaped "scent glands" present on segment I of the female and segment V of the male.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	.34	.54	.32	.47
Prothorax.....	.13	.27	.12	.28
Meso-metathorax ..	.24	.50	.23	.47
Abdomen.....	.68		.74	
Total.....	1.26-1.32		1.30	

Described from 2 males and 1 female from skins of *Crypturellus o. obsoletus*, Argentine.

Type.—Slide no. 3174 in author's collection.

HEPTAPSOGASTER STULTUS NOCTIVAGI, subsp. n. (Text-fig. 2d.)

This subspecies is separated from *H. s. stultus* by the following characters:—

1. In the male the head is narrower and the anterior margin somewhat more convex and the temples slightly longer and narrower.
2. In the female the head is wider and more flattened and the trabeculae are of a different shape (text-fig. 2d).
3. Segment VII of the abdomen of the female is as that of *H. mandibularis* Carriker, having the anterior margin conical, with bifurcated tip posteriorly and a lateral emargination each side of this bifurcation, thus forming a lateral hook on each side.
4. The chaetotaxy of the female differs from the male, which is as in *H. s. stultus*, and from that of the female of *H. s. stultus*. Marginal hairs of postero-lateral angles of segments I-VI as in *H. s. stultus*. On the dorsal surface segments I-IV have 2 long (1, 1) and 2 short fine hairs (1, 1) on the posterior margin of the tergites, the outer pair becoming progressively shorter and finer from segments I-IV; segment V with 6 marginal hairs (3, 3);

segment VI with 2 hairs (1, 1); segment VII with 2 small lateral marginal hairs (1, 1), 6 hairs (3, 3) in a horizontal submarginal line, and 2 small (1, 1) and 2 longer hairs (1, 1) in a similar line anterior to the above. On the ventral surface segment I has apparently no hairs; segment II has 2 hairs (1, 1) and 4 spines (2, 2) on the posterior margin of the pleurites; segment III has 4 hairs (2, 2) and 2 spines (1, 1) in a similar position; segment IV has 6 hairs (3, 3) in the same position; segment V has 6 hairs (3, 3) on the pleurites and 2 short (1, 1) and 2 long (1, 1) nearer the centre; segment VI has 6 hairs (3, 3) on the pleurites and 2 small spines (1, 1) nearer the centre; segment VII is as in the female of *H. s. stultus*, except that in addition it has 10 minute hairs (5, 5) arranged in a triangular pattern, which are apparently absent in the other subspecies.

Described from 4 males and 4 females from skins of *Crypturellus noctivagus noctivagus*, Brazil, and 3 females from *Crypturellus n. dissimilis*, British Guiana.

Type.—Slide no. 2880 in the British Museum from *Crypturellus n. noctivagus*.

HEPTAPSOGASTER SUBDILATATUS Piaget. (Text-figs. 2b, 3a, 4c.)

In Piaget's collection in the British Museum there are three specimens labelled *Goniodes dilatatus* and 10 specimens labelled *G. subdilatatus*, from *Crypturellus variegatus*. All these specimens are the same species, and are, apparently, not *Heptapsogaster dilatatus* Giebel.

Carriker (1936, p. 126) suggests that this species may be conspecific with his species *H. temporalis*; it does not, however, resemble this latter species, but is near *H. (Rhynchothura) minutus* Carriker. It differs from *H. minutus* in the following points:—In the male the anterior margin of the head is wider and only slightly crenulated; sides of the head more divergent and temples more pointed and reaching further posteriorly; trabeculae somewhat more pointed; prothorax sides straighter and somewhat more divergent. In the female the head is different in shape and possesses small but definite trabeculae, and does not have the thick temple-bands as shown in Carriker's figure of *H. minutus*.

Male.—Head and thorax as described by Piaget and shown in figure drawn from Piaget's specimen (text-fig. 3a).

Abdomen with segment I the longest and segment VII with anterior margin flatly convex and posterior margin with central emargination dorsally, and narrowly rounded ventrally. Segments I-VII with continuous tergal plates and median sternal plates.

Chaetotaxy of the Abdomen.—Postero-lateral angles of segments I-VI with 2 marginal hairs (1, 1). On the dorsal surface segments I-III with 4 hairs (2, 2) on the posterior margin of tergite; segments IV-VI with 2 small outer hairs (1, 1); segment VII with 2 small lateral submarginal hairs (1, 1) and 4 small marginal hairs (2, 2), 2 longer, more central submarginal hairs (1, 1) and 2 long hairs (1, 1), anterior to the above. On the ventral surface segment I with no hairs; segments II and III with 2 hairs (1, 1) on the posterior margin of the pleurites; segments IV-VI with 4 hairs (2, 2) on the pleurites, in addition segment V has 2 central hairs (1, 1); segment VII with 4 fine marginal hairs (2, 2), 2 long (1, 1) and 2 small (1, 1) submarginal hairs.

The male genitalia as shown in text-fig. 4c.

The female differs from the male in the shape of the head (text-fig. 2b), in the abdomen, which is broader and more rounded, and in segment VII, which has anterior margin conical and posterior margin rounded, with slight indentation. Chaetotaxy of the abdomen as in male except that in segment VII

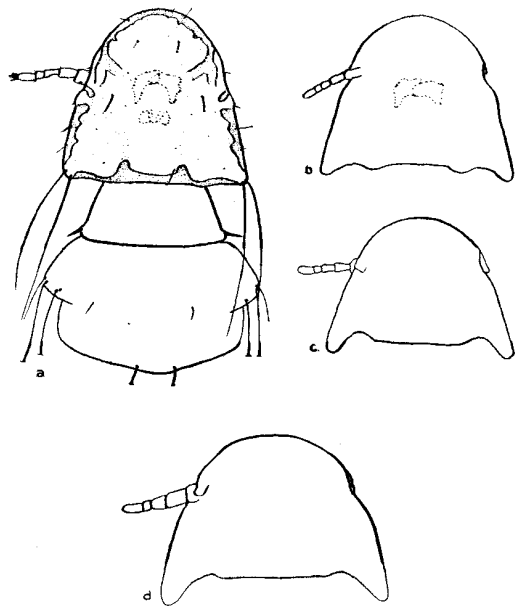
the dorsal surface has 6 submarginal hairs (3, 3), 2 long, more anterior hairs (1, 1), and 2 small hairs (1, 1) anterior to the long pair. On the ventral surface there are 2 long (1, 1) and 2 shorter (1, 1) marginal hairs, 16 short hairs (8, 8), and 4 longer hairs (2, 2) in the posterior part of the segment.

"Scent glands" are apparently absent both in the male and the female.

*HEPTAPSOGASTER TESTUDO*, sp. n. (Pl. I. fig. 5; text-figs. 2*a*, 3*b* & *c*, 4*d*.)

This species is distinguished from all other known species by the shape of the head and the form of the antennal band and by the thickened lateral margins of the sternal plates.

Text-figure 2.

Heads (♀) of *Heptapsogaster* spp.

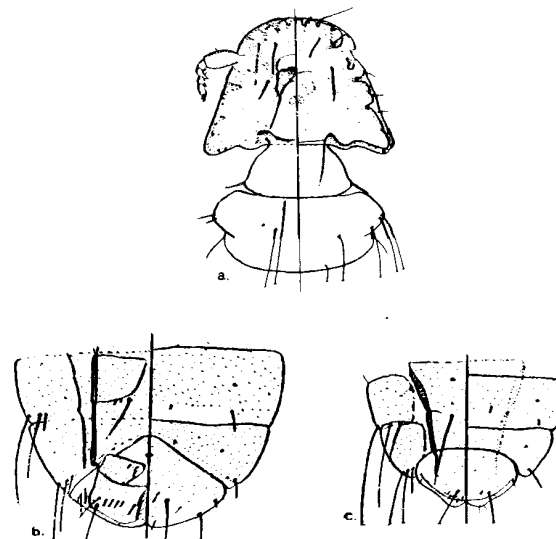
*a*, *H. testudo*, sp. n.; *b*, *H. subtilatus*; *c*, *H. s. stultus*, sp. n.;  
*d*, *H. s. noctivagi*, subsp. n.

*Description of the Male.*—Shape of head as shown in figure (Pl. I. fig. 6). Trabeculae well developed for this genus; antennae dimorphic, with first segment, in the male, swollen and elongate and third stout and produced beyond the point of articulation with the fourth, the whole segment being strongly recurved; sides of head straight, slightly divergent, temples bluntly

rounded and not extending beyond line of occiput, posterior margin of the head sinuate. Antennal band thick and continuous round the anterior margin of head, with minute irregular projections, bands turning in at the level of the trabeculae, each dividing into two branches, one of which passes to the mandibles, the other curves round the antennary fossa and joins the superior ocular blotch; marginal bands of the temples well chitinized, with irregular internal projections and interrupted at the temple angles.

Prothorax broader than long, with sides only slightly diverging and with postero-lateral angles produced but little laterally and bearing bristle. Mesothorax not as wide as head, with rounded, slightly divergent sides. Metathorax

Text-figure 3.

*a*, head (♂) of *H. subtilatus*;

*b*, *H. testudo*, posterior segments of abdomen, ♀; *c*, of ♂.

narrower than mesothorax, with sides nearly straight and posterior margin flatly convex.

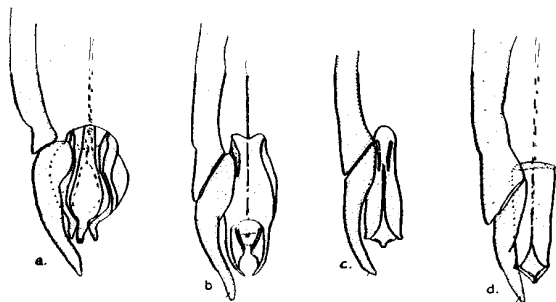
Abdomen somewhat elongated, with segment I the longest; segment VII with flat anterior margin, sides rounded, and posterior margin flatly convex on the ventral surface and bilobed on the dorsal surface (text-fig. 3*c*). Pleurites with faint internal markings; tergites I-VII transversely continuous; sternal plates with thickened lateral margins, giving the appearance of two dark lines down each side of abdomen.

*Chaetotaxy of the Abdomen.*—Postero-lateral angles of segments I-VI with

single marginal hair. On the dorsal surface segments I-II with 4 long hairs (2, 2) and 2 fine setae (1, 1) on the posterior margin of the tergites; segment III with 2 long outer (1, 1) and 4 fine inner (2, 2) hairs; segments IV and V with 4 fine inner hairs (2, 2); segment VI with 2 lateral hairs (1, 1); segment VII as in text-figure 3c. On the ventral surface segments I-III with 4 central setae (2, 2), in addition segments II and III have 2 hairs (1, 1) on posterior margin of pleurites; segments IV-VI with 4 hairs (2, 2) on the pleurites, in addition segment IV has 4 setae (2, 2) and segment V has 2 long central hairs (1, 1); segment VII as in text-fig. 3c.

The male genitalia as in text-fig. 4d.

Text-figure 4.

♂ genitalia of *Heptapsogaster* spp.

a, *H. t. acutiventris*, subsp. n.; b, *H. s. stultus*, sp. n.;  
c, *H. subdilatus*; d, *H. testudo*, sp. n.

The female differs from the male in the shape of the head (text-fig. 2a), in the presence of small pointed trabeculae, and in the filiform antennae. In the abdomen segment VII is wider than that of the male, with conical anterior margin, sides rounded, and posterior margin slightly indented. Chaetotaxy of the abdomen as in the male except that on the dorsal surface segments IV and V have 4 extra setae (2, 2) and on the ventral surface segments II-IV have 2 extra setae (1, 1) and segment V has 4 extra setae (2, 2); segment VII is shown in text-fig. 3b.

## Measurements.

	Male.		Female.	
	Length.	Breadth.	Length.	Breadth.
Head.....	40	44	44	48
Prothorax.....	18	31	18	34
Meso-metathorax ..	30	45	35	48
Abdomen.....	90		1-22	
Total.....	1-63		2-02	

Described from 36 females and 13 males from skins of *Nothura maculosa peruviana*, Peru.

Type.—Slide no. 3197 in the author's collection from *Nothura m. peruviana*.

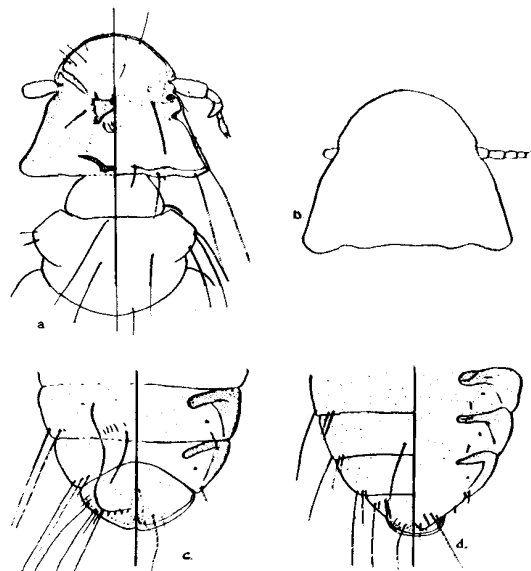
## RHYNCHOTHURA Carriker.

*RHYNCHOTHURA TERES*, sp. n. (Pl. II. figs. 1 & 2; text-fig. 6c.)

This species resembles *R. carrikeri*, sp. n., from which it is distinguished by the terminal segments of the abdomen in both sexes and by the genitalia in the male and the shape of the head in the female.

*Description of the Male.*—Shape of the head as shown in figure (Pl. II. fig. 1). Small, pointed trabecular tubercles; antennae dimorphic, with first segment in the male swollen and elongate and third segment produced beyond

Text-figure 5.

*Rhynchothura carrikeri*, sp. n.

a, ♂ head; b, ♀ head;  
c, posterior segments of abdomen, ♀; d, of ♂.

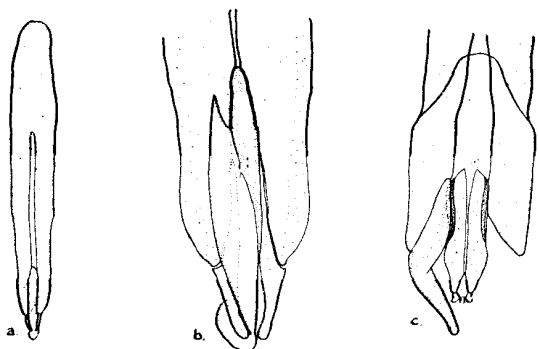
point of articulation with fourth, the whole segment being somewhat recurved. Antennal band continuous round anterior margin of head, narrow, with no internal projections, at the anterior level of the trabeculae passes in towards the mandibles, being deeply coloured here only in its median portion, inferior and superior ocular blotch present, with faint indefinite band from superior ocular blotch to antennal band; marginal band of temple slightly thickened, with one lateral internal projection below the inferior ocular blotch.

*Chaetotaxy of the Head.*—6 small anterior marginal hairs (3, 3). On the dorsal

surface are 2 short (1, 1) and 2 long (1, 1) central submarginal hairs, 2 hairs (1, 1) in the centre of the pre-antennal area, 2 small hairs (1, 1) anterior to the antennary fossæ, 2 hairs (1, 1) lateral to the centre of the mandibles, 1 short hair on each eye, 4 short hairs (2, 2) on the sides of the temples, 4 long hairs (2, 2) on the blunt-ended points of the temples, 4 small hairs (2, 2) on the protuberances of the posterior margin of the head, and 2 longer, submarginal hairs (1, 1) at sides of occiput. On the ventral surface are 4 fine hairs (2, 2) in the anterior part of pre-antennal area, 2 long hairs (1, 1) in centre of this area, and 2 fine (1, 1) and 2 thick (1, 1) at lateral corners of pre-antennal region, 2 hairs (1, 1) lateral to the anterior margin of mandibles.

Prothorax short and wide, with rounded diverging sides, postero-lateral angles somewhat produced laterally and bearing a spine; posterior margin concave. Mesothorax wider than prothorax, but not as wide as temples, sides rounded and divergent, with 2 long hairs on the dorsal surface of the postero-lateral angle and 1 fine ventral hair and spine; posterior margin flatly

Text-figure 6.

*R. carrikeri*, sp. n.♂ genitalia a × 47, b × 214; c, *R. teres*, sp. n.

convex and visible to acetabular bar on each side, with 2 long submarginal hairs (1, 1) and 2 shorter, dorsal anterior hairs (1, 1). Metathorax narrower than mesothorax, with posterior margin convex and bearing 2 central hairs (1, 1). Meso- and metasternum each with 2 long hairs. Abdomen oval, of seven segments, with segment I the longest and segment VII with anterior margin convex and posterior margin bilobed dorsally and convex ventrally. Pleural plates with faint internal markings and tergal plates continuous in segments I, VI, and VII, and separated in segments II-V.

*Chaetotaxy of the Abdomen.*—A single marginal hair on the postero-lateral angle of segments I-VI. On the dorsal surface segments I-III with 4 long hairs (2, 2) on the posterior margin of the tergites and 2 fine setæ (1, 1) between the above hairs; segments IV and V with 6 fine hairs (3, 3) in the same positions as the above; segment VI with 2 lateral fine hairs (1, 1); segment VII with 6 fine (3, 3) and 2 long submarginal hairs (1, 1). On the ventral surface segments I-VI with a line of small setæ on the posterior margin of the sternites,

in addition to which segments IV-VI have 2 fine (1, 1) and 2 thicker hairs (1, 1) near the lateral edges of the segment, segment V has also 2 long central hairs (1, 1); segment VII with 4 fine (2, 2) and 2 longer and thicker (1, 1) lateral marginal hairs, 4 fine posterior marginal hairs (2, 2), and 2 long and thick (1, 1) and 2 fine (1, 1) submarginal hairs.

Male genitalia as shown in text-fig. 6 c.

The female differs considerably from the male in the shape of the head (Pl. II. fig. 2), in the absence of trabecular tubercles or trabeculæ, and in the presence of filiform antennæ. The abdomen is considerably larger, and segment VII has anterior margin conical and posterior margin convex, with central indentation; genital plate semilunar in shape. Chaetotaxy of segments I-VI as in the male; on the dorsal surface segment VII has 2 fine lateral marginal hairs (1, 1), 2 small submarginal hairs (1, 1) each side of central indentation, 6 short and fine (3, 3) and 2 long hairs (1, 1) in line across lower part of segment. On the ventral surface segment VII has 4 thick marginal hairs (2, 2) and 2 similar hairs (1, 1) immediately above the inner marginal hair, 4 fine submarginal lateral hairs (2, 2) and 12 (6, 6) hairs in the posterior part of the segment.

*Measurements.*

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	.46	.66	.54	.74
Prothorax.....	.15	.35	.18	.38
Meso-metathorax..	.34	.58	.37	.64
Abdomen.....	.98		1.30	
Total.....	1.64		2.16	

Described from 3 males and 12 females from skins of *Nothura maculosa peruviana*, Peru, and 6 males and 3 females from skins of *Nothoprocta p. perdicaria*, Chile.

*Type.*—Slide no. 3197 in the author's collection from *Nothura maculosa peruviana*.

*RHYNCHOTHURA CARRIKERI*, sp. n. (Text-figs. 5, 6 a & b.)

The characters by which this species is distinguished from *R. teres* are given above under that species.

*Description of the Male.*—Shape of head, bands, and chaetotaxy of head as shown in text-fig. 5 a.

Prothorax wider than long, with diverging rounded sides and postero-lateral angles bearing a stout bristle. Mesothorax narrower than head, with sides flatly convex and posterior angle rounded. Metathorax narrower than mesothorax, with lateral sides rounded and exposed and posterior margin semicircular. Chaetotaxy of the thorax as shown in text-fig. 5 a.

Abdomen of seven segments, segments I and VII the longest; segment VII of unusual form (text-fig. 5 d). Tergal plates transversely continuous.

*Chaetotaxy of the Abdomen.*—Postero-lateral angles of segments I-VI with 2 marginal hairs (1, 1). On the dorsal surface segments I-III with 4 long hairs (2, 2) and 2 setæ (1, 1); segment IV with 4 small hairs (2, 2); segments V and VI with 2 small hairs (1, 1). On the ventral surface segments I-IV with a number of setæ on the posterior margin of the sternites, segment IV in addition has 4 lateral hairs (2, 2); segments V and VI with 4 lateral hairs

(2, 2), in addition segment V has 2 central hairs (1, 1). Chaetotaxy of segment VII as shown in text-fig. 5*d*.

Male genitalia shown in text-fig. 6*a* & *b*.

The female is larger than the male and differs slightly in the shape of the head (text-fig. 5*b*) and in segment VII of the abdomen (text-fig. 5*c*).

Measurements.

	Male.		Female.	
	Length.	Breadth.	Length.	Breadth.
	mm.	mm.	mm.	mm.
Head.....	.52	.70	.58	.76
Prothorax.....	.17	.40	.18	.41
Meso-metathorax..	.36	.61	.40	.65
Abdomen.....	1.22		1.45	
Total.....	20.7-21.2		2.36	

Described from 7 males and 2 females from *Nothoprocta cinerascens*, which died in the Gardens of the Zoological Society of London. Through the kindness of Mr. Seth-Smith, of the above Society, it was found that the bird originated from Western Argentina.

*Type*.—A male in the British Museum collection.

TINAMICOLA Carriker.

This genus differs from *Heptapsogaster* in that the antennae are similar in the two sexes. In other respects it resembles typical species of the latter genus.

TINAMICOLA ALATOFASCIATA Piaget.

Piaget's types of this species, one male and two females, have been compared with Carriker's figure and description of *T. rotundata* Rudow (pp. 159, 162, 1936). The type-host of both these species is *Rhynchotus rufescens*, and as far as can be seen from the figures and descriptions *T. alatofasciata* Piaget is a synonym of *T. rotundata* Rudow. The apparent differences are in the size, not a specific character, and in the fact that the sexes differ in the shape of the head. This difference is so slight that it cannot be classed as a specific character. The prothorax and the tergal and pleural plates are as shown in Carriker's figure of *T. rotundata* (1936). It is possible that *T. alatofasciata* is a subspecies of *T. rotundata* from another subspecies of *Rhynchotus rufescens*. Specimens in the author's collection from *Rhynchotus rufescens pallescens* are as Piaget's types in all characters except in the size, in which character they are between *T. rotundata* and *T. alatofasciata*.

GENIOCOTES Burmeister.

GENIOCOTES COXATUS Piaget.

Piaget's types of this species, two males, were examined and found to be true *Goniocotes*, presumably stragglers from some Gallinaceous bird on to *Tinamus solitarius*, where they were found. The specimens have a true pterothorax angulated over the abdomen, eight abdominal segments, and the genitalia as in typical *Goniocotes*.

MEGAPEOSTUS Carriker.

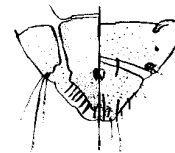
MEGAPEOSTUS FUSCUS, sp. n. (Pl. III. fig. 1; text-figs. 7, 8*a*, 9*d*.)

This species differs from *M. a. asymmetricus* Carriker in the flatter anterior margin of the head, the wider, less elongated temples, and in the male genitalia.

*Description of the Male*.—Shape of the head as shown in figure (Pl. III. fig. 1). Trabeculae well developed, with rounded ends; antennae with first segment elongated and swollen, second segment stout and less than half the length of the first, and third segment short, with rounded distal end, bearing the fourth segment at its centre. Antennal bands continuous round the anterior margin of the head, with internal projections as shown in text-fig. 9*d*; at the level of the trabeculae this band turns in on each side to form a dark-coloured blotch which passes into an indefinite thickening reaching almost to the mandibles. Well-marked lateral "lips" each side of the oral fossa, the posterior margin of the latter being bordered by a thickened rim bearing 8 small hairs (4, 4). Superior ocular blotch well chitinized, with indefinite band round antennary fossa; temporal band and inferior ocular blotch lightly chitinized, the former without internal projections.

*Chaetotaxy of the Head*.—On the dorsal surface 2 hairs (1, 1) between second and third, and 2 larger hairs (1, 1) between first and second anterior internal

Text-figure 7.



*Megapeostus fuscus*, sp. n. Terminal segments of ♀ abdomen.

projections of antennal band; 2 hairs (1, 1) each side of pre-antennal area; 2 hairs (1, 1) lateral to level of base of mandibles; a small hair on the weakly-developed eye; 4 hairs (2, 2) on bands of temples; 4 stout hairs (2, 2) at points of temples, the inner being nearly twice as long as outer; posterior margin of head with 2 fine (1, 1) and 2 longer (1, 1) hairs; 4 small hairs (2, 2) parallel to sides of occiput and 4 similar hairs (2, 2) on surface of occiput, 2 larger marginal hairs (1, 1) on postero-lateral corners of occiput. On the ventral surface are 6 small submarginal hairs (3, 3) in a horizontal line in upper part of pre-antennal region; 2 hairs (1, 1) lateral to upper margin of mandibles.

Prothorax with sides straight and divergent, with spine on postero-lateral angle and posterior margin concave. Mesothorax short, with rounded diverging sides, postero-lateral angles with 2 long (1, 1) and 2 shorter (1, 1) dorsal hairs and 2 fine ventral hairs (1, 1) and 2 ventral spines (1, 1); posterior margin with 4 long hairs (2, 2) and the dorsal surface with 2 fine hairs (1, 1). Metathorax with convex sides, one-third of which are exposed, postero-lateral angles slightly hooked; posterior margin with 2 small hairs (1, 1) and dorsal surface with 4 small hairs (2, 2). Meso- and metasternum each with two long hairs.

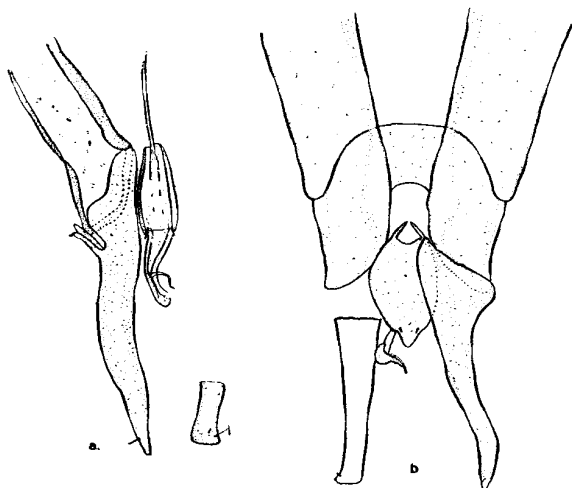
Abdomen elongated, with segments I and VII the longest; segment VII with flattened anterior margin, well-marked lateral angles, and posterior margin



with central concavity dorsally, and narrowly rounded ventrally, with a thickened marginal strip on the ventro-lateral and postero-lateral margins. Tergal plates transversely continuous.

**Chatotaxy of the Abdomen.**—Postero-lateral angles of segments I–VI with 2 long hairs (1, 1). On the dorsal surface segments I and II with 4 long (2, 2) and 2 fine (1, 1) hairs on the posterior margin of the tergites; segment III with 6 long (3, 3) and 2 fine short (1, 1) hairs; segment IV with 2 outer long hairs (1, 1) and 2 inner fine hairs (1, 1); segment V with 4 fine hairs (2, 2); segment VI with 4 hairs (2, 2); segment VII with 6 submarginal hairs (3, 3), one pair of which is long, and 2 lateral submarginal hairs (1, 1). On the ventral surface segment I has 2 long hairs (1, 1) near the centre of segment; segments II and III

Text-figure 8

♂ genitalia of: a, *M. fuscus*, sp. n.; b, *M. alterus*, sp. n.

have 2 spines (1, 1) on the inner edge of the posterior margin of pleurites and 2 stout hairs (1, 1) on the outer edge, in one specimen the latter pair of hairs on segment II are replaced by spines; segments IV and V have 6 hairs (3, 3), one pair of which is long and two pairs shorter and finer, and 2 long hairs (1, 1) near centre of segment; segment VI has 4 stout long hairs (2, 2) and 2 finer shorter hairs (1, 1) on pleurites; segment VII has 20 marginal and submarginal hairs (10, 10) and 2 long (1, 1) and 2 shorter (1, 1) hairs on the posterior part of the segment.

Male genitalia as shown in text-fig. 8a.

The female is smaller than the male and differs in the shape of the head (Pl. II. fig. 3), in the possession of filiform antennæ, and in segment VII of the abdomen (text-fig. 7).

## Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	.47	.94	.48	.90
Prothorax	.22	.50	.20	.44
Meso-metathorax	.42	.76	.38	.68
Abdomen	1.54		1.40	
Total	2.34–2.54		2.12–2.34	

Described from 5 males and 4 females from skins of *Crypturellus variegatus*, British Guiana.

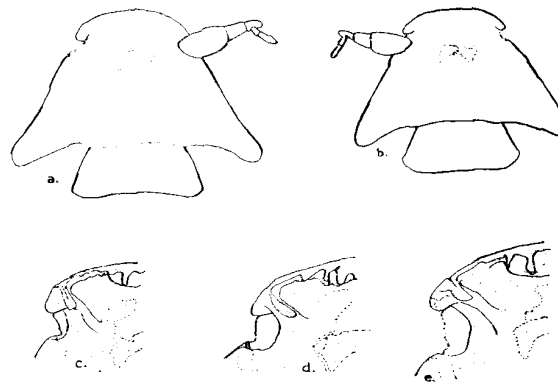
**Type.**—Slide no. 3175 in the author's collection.

*MEGAPEOSTUS ALTERUS*, sp. n. (Text-figs. 8b, 9a.)

This species is near *M. a. paringentalis* Carriker, from which it may be distinguished by the more flattened anterior margin of the head, the less elongated and attenuated temples, absence of hooked postero-lateral angle of metathorax, and the male genitalia.

**Description of Male.**—Shape of head as shown in text-fig. 9a. Bands and chatotaxy of the head as in *M. fuscus*.

Text-figure 9.

♂ heads of: a, *M. alterus*, sp. n.; b, *M. m. secundus*, subsp. n. Antero-lateral region of ♂ heads of: c, *M. m. multiplex*, sp. n.; d, *M. fuscus*, sp. n.; e, *M. a. ruficipitis*, subsp. n.

Prothorax with sides straight and divergent, bearing a spine on the postero-lateral angle, and with posterior margin concave. Mesothorax with rounded diverging sides; metathorax with convex sides, and postero-lateral angle not hooked. Chatotaxy of thorax as in *M. fuscus*.

Abdomen as in *M. fuscus*, but with thickening of pleural plates more complex and with differently shaped seventh segment. This has a flattened anterior margin, antero-lateral angles hooked, and posterior margin broadly rounded dorsally and ventrally. Chatotaxy as in *M. fuscus*, but segment

VII has apparently a greater number of hairs (material inadequate for description).

The male genitalia as shown in text-fig. 8*b*.

The female is unknown.

Measurements.

	Male.	
	Length. mm.	Breadth. mm.
Head.....	.52	1.0
Prothorax.....	.21	.48
Meso-metathorax.....	.38	.77
Abdomen.....	1.52	
Total.....	2.38-2.44	

Described from 3 males from *Tinamus major latifrons*. Type in the British Museum.

MEGAPEOSTUS MULTIPLEX MULTIPLEX, sp. n. (Pl. III. fig. 2; text-figs. 9*c*, 10*a*.)

This species is distinguished from those mentioned above by the shorter temples and by the male genitalia. For differences between this species and *M. m. secundus* see below.

*Description of the Male.*—Shape of head as shown in figure (Pl. III. fig. 2). Trabeculae small, with rounded ends; antennae with first segment enlarged and third segment long, with fourth segment arising at the proximal end, the distal end being free and broadly rounded. Chaetotaxy as in *M. fuscus*.

Prothorax with straight diverging sides and concave posterior margin. Mesothorax with rounded diverging sides. Metathorax with convex lateral sides and postero-lateral angle not hooked. Chaetotaxy as in *M. fuscus*.

Abdomen as in *M. fuscus*.

Genitalia large and complex (text-fig. 10*a*).

Female unknown.

Measurements.

	Male.	
	Length. mm.	Breadth. mm.
Head.....	.43	.82
Prothorax.....	.22	.46
Meso-metathorax.....	.34	.74
Abdomen.....	1.22	
Total.....	2.06	

Described from 1 male from skin of *Crypturellus boucardi boucardi*, Nicaragua. Slide no. 3179 in the author's collection.

MEGAPEOSTUS MULTIPLEX SECUNDUS, subsp. n. (Text-figs. 9*b*, 10*b*.)

This subspecies is distinguished from *M. m. multiplex* by the following characters:—

1. Anterior margin of head narrower; temples less divergent and narrower in male (text-fig. 9*b*).
  2. The male genitalia differ in detail.
- The female differs from the male in the shape of the head (Pl. II. fig. 4)

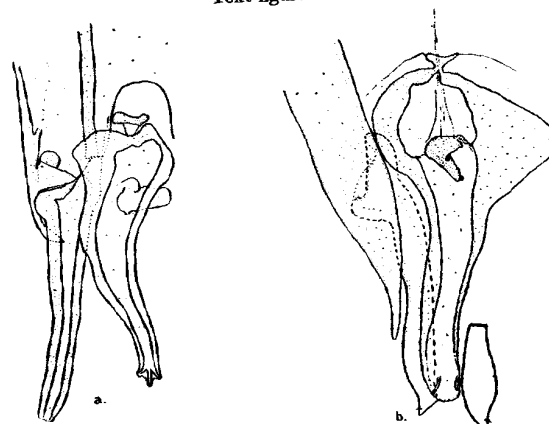
and segment VII of the abdomen, which has anterior margin conical, sides rounded, and posterior margin deeply bilobed. The genital plate has 6 spines (3, 3) on the lateral margin in segment VII, not 12 spines (6, 6) as in *M. fuscus*.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	.47	.82	.50	.86
Prothorax.....	.22	.48	.20	.43
Meso-metathorax.....	.32	.74	.34	.72
Abdomen.....	1.22		1.32	
Total.....	2.06-2.12		2.18-2.26	

Described from 1 male from *Crypturellus cinnamomeus mexicanus*, Mexico, 7 males and 4 females from "Perdris" (see p. 136), and 1 female from *Crypturellus cinnamomeus idoneus*, Columbia.

Text-figure 10.



♂ genitalia of: a, *Megapeostus m. multiplex*, sp. n.;  
b, *M. m. secundus*, subsp. n.

*Type.*—Male from "Perdris," Mexico, in the British Museum. As has been explained above (p. 136), after comparison of many specimens of different species of Mallophaga, it is found that "Perdris" is almost certainly *Crypturellus c. mexicanus*.

MEGAPEOSTUS ASYMMETRICUS RUFICIPITIS, subsp. n. (Pl. III. fig. 3; text-fig. 9*e*.)

This subspecies is distinguished from *M. a. asymmetricus* Carriker by the following characters:—

1. The anterior margin of the head is flatter and the temples somewhat less attenuated (Pl. III. fig. 3).

2. The pattern of the marginal part of the antennal band is different (text-fig. 9 c).

3. The antero-lateral angles of the mesothorax are rounded, not pointed as in *M. a. asymmetricus*.

The female is unknown.

*Type* and only specimen, 1 male from skin of *Tinamus serratus ruficeps*, Peru. Slide no. 3161 in the author's collection.

#### HETEROGONIODES Carriker.

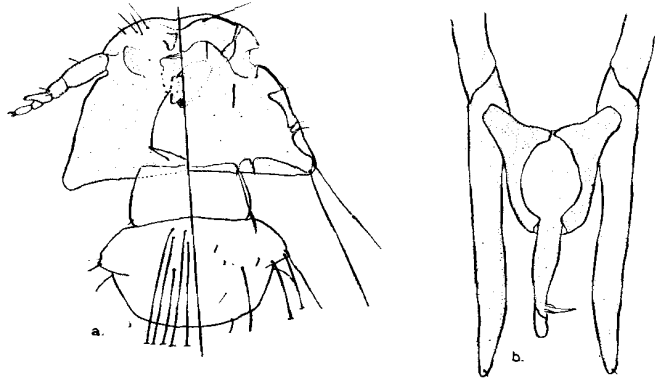
##### HETEROGONIODES ARCÆCEPS, sp. n. (Text-fig. 11.)

This species is distinguished from *H. clypeiceps* Giebel, as figured by Carriker (1936), by the shallow central concavity in the anterior margin of head, by the shorter and wider temples, and by the male genitalia.

*Description of the Male*.—Shape, bands, and chaetotaxy of the head as shown in text-fig. 11 a.

Prothorax with flatly convex sides and concave posterior margin. Mesothorax not as wide as head, with flat diverging sides. Metathorax shallow,

Text-figure 11.



*Heterogoniodes arcæceps*, sp. n. a, ♂ head; b, ♂ genitalia.

with sides but little exposed and concave posterior margin. Chaetotaxy as shown in text-fig. 11 a.

Abdomen with segment I the largest and segment VII with anterior margin rounded and posterior margin bilobed dorsally and broadly flattened ventrally. Strongly thickened pleurites; tergal plates continuous across the segments, narrowing centrally in segments III-VI.

*Chaetotaxy of the Abdomen*.—Postero-lateral angles of segments I-III with 2 marginal hairs (1, 1) and segments IV-VI with 4 hairs (2, 2). On the dorsal surface segments I-VI with 4 hairs (2, 2) on the posterior margin of the tergites, with the inner pair of hairs small on segments IV-VI; segment VII with

6 marginal hairs (3, 3) and 6 small (3, 3) and 2 longer (1, 1) hairs in a line diagonally across the posterior part of segment. On the ventral surface segment I with apparently no hairs; segments II-IV with 2 hairs (1, 1) and 2 spines (1, 1) on the posterior margin of the pleurite, segment IV has also 2 central hairs (1, 1); segment V with 2 small (1, 1) and 2 larger (1, 1) hairs on the pleurites and 2 central hairs (1, 1); segment VI with 4 long lateral hairs (2, 2); segment VII with 2 lateral marginal hairs (1, 1), a bunch of 12 long (6, 6) and 2 fine (1, 1) marginal hairs, and 2 central submarginal hairs (1, 1).

The male genitalia bear a certain resemblance to those of *Megapeostus fuscus* and *M. alterus* (text-fig. 11 b).

The female resembles the male, but differs slightly in the shape of the head, the temples being somewhat shorter and thicker and the trabeculae longer and more pointed, and in the antennae, which are filiform. In the abdomen tergal plates on segments I, VI, and VII are complete and those on segments II-V are widely separated in the middle line. Segment VII wide, with anterior margin flatly conical and posterior margin bilobed. The genital plate is emarginated posteriorly, the sides of the emargination being produced into a sharp, pointed projection on each side. Chaetotaxy of the abdomen as in male except that of segment VII. On the dorsal surface segment VII has 2 hairs (1, 1) at sides of central emargination, 8 marginal (4, 4) and 2 submarginal (1, 1) hairs, and 8 hairs (4, 4) running diagonally across posterior part of segment. On the ventral surface segment VII with 2 long, lateral, marginal hairs (1, 1), posterior margin of genital plate with number of spines varying in different specimens from 22-28.

#### Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	.58	.94	.61	1.02
Prothorax.....	.22	.46	.22	.48
Meso-metathorax ..	.35	.72	.40	.72
Abdomen.....	1.18		1.42	
Total.....	2.14		2.38	

Described from 1 male from *Crypturellus cinnamomeus mexicanus*, and 2 females from "Perdrix" (*Crypturellus c. mexicanus*, see p. 136).

*Type*.—Male, in the British Museum.

#### HEPTAPSUS Carriker.

HEPTAPSUS TERGALIS CYLINDRATUS, subsp. n. (Pl. IV. figs. 1 & 2; text-fig. 12.)

This species is distinguished from *H. t. tergalis* Carriker by details in the form of the head and by the elongated pointed not truncated paramera.

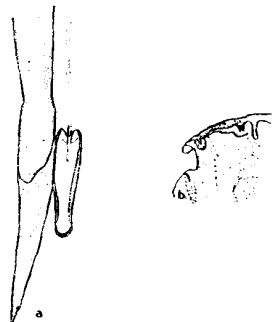
*Description of the Male*.—Shape of the head as shown in Pl. IV. fig. 1; head differs from *H. t. tergalis* in the following points:—

1. Anterior margin more flattened.
2. Sides of head immediately posterior to antennary fossæ are convex, not concave, and posteriorly are more divergent.
3. Projection of third segment of antennae smaller and less pointed.

Prothorax wide, with rounded sides and with concave posterior margin. Mesothorax not as wide as head, with rounded, slightly divergent sides, and with 2 strong hairs (1, 1) on dorsal surface and 2 fine hairs (1, 1) and 2 short spines (1, 1) on the ventral surface of postero-lateral angle, and 2 strong (1, 1) and 2 finer (1, 1) hairs on the posterior surface. Metathorax narrower and shorter than the mesothorax, with no free lateral edge, sides rounded and posterior margin somewhat sinuate. On the dorsal surface 2 medium hairs (1, 1), posterior margin with 2 shorter and finer hairs (1, 1), and the ventral surface with 2 central hairs (1, 1). Mesosternum with 2 long (1, 1) and 2 finer, more lateral (1, 1) hairs, metasternum with 2 long hairs (1, 1).

Abdomen as in *H. t. tergalis*, but with hairs apparently more numerous. Segment VII with anterior margin flatly convex and the posterior margin with central concavity dorsally, broadly rounded ventrally, with a chitinous thickening on the postero-lateral ventral margins.

Text-figure 12.



*Heptapsus tergalis cylindricus*, subsp. n.  
a, ♂ genitalia; b, antero-lateral region of ♂ head.

**Chaetotaxy of the Abdomen.**—Postero-lateral angles of segment I with 2 marginal hairs (1, 1), segments II–V with 4 hairs (2, 2), and segment VI with 6 hairs (3, 3). On the dorsal surface segments I and II with 8 hairs (4, 4) on the posterior margin of tergites; segments III and IV with 6 hairs (3, 3); segment V with 4 hairs (2, 2); segment VI with 2 lateral hairs (1, 1) and 2 longer central hairs (1, 1); segment VII with 2 small marginal hairs (1, 1), 2 long (1, 1) and 2 finer (1, 1) hairs in the posterior part of the segment. On the ventral surface segment I with 2 central hairs (1, 1) on the posterior margin of sternite; segments II–IV with 8 hairs (4, 4); segment V with 2 central hairs (1, 1); segment VI with 2 fine lateral hairs (1, 1); segment VII with 8 short marginal hairs (4, 4), 4 submarginal hairs (2, 2) and 2 longer hairs (1, 1) anterior to these.

The male genitalia as shown in text-fig. 12a.

The female differs somewhat from the male in the shape of the head (Pl. IV, fig. 2), in the broader abdomen, and in segment VII. This segment is broader than in the male, and has the anterior margin conical, sides rounded, and

emarginate tip. Posterior margin of the genital plate is rounded and set with short spines. The chaetotaxy is as in the male, with the addition of certain ventral hairs. Segments II–IV with 10 hairs (5, 5), segment VI with 8 hairs (4, 4) near the lateral margin of the segment. Segment VII with 12 marginal hairs (6, 6) of varying sizes on the dorsal surface and 4 marginal hairs (2, 2) on the ventral surface.

## Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	.40	.68	.44	.72
Prothorax	.16	.45	.18	.46
Meso-metathorax	.25	.60	.28	.62
Abdomen	.92		1.0	
Total	1.52–1.61		1.48–1.81	

Described from 3 males and 2 females from skins of *Crypturellus noctivagus noctivagus*, E. Brazil.

Type.—Slide no. 3187 in the author's collection.

## PECTENOSOMA Ewing.

PECTENOSOMA VERRUCOSA VERRUCOSA Taschenberg. (Text-fig. 13.)

Carriker (1936) states that he has seen no male specimens of *Pectenosoma* from the type-host, a subspecies of *Crypturellus variegatus*, and presumes that specimens from *Crypturellus undulatus yapura* are *Pectenosoma v. verrucosa*, from a comparison of the females from this latter host and from *Crypturellus variegatus salvini*. The author has examined 1 male and 2 females from

Text-figure 13.



*Pectenosoma v. verrucosa*, ♂ genitalia.

*Crypturellus v. variegatus*, and 4 males and 2 females from *C. v. salvini*, which are presumably *Pectenosoma v. verrucosa*, and found that the male genitalia (text-fig. 13) differ from those of specimens from *Crypturellus undulatus yapura*

as figured by Carriker (1936). Specimens from *Crypturellus u. yapura* should apparently be placed in a new subspecies. Owing to lack of material this subspecies cannot be described in the present paper.

STRONGYLOCOTES Taschenberg.

STRONGYLOCOTES COMPLANATUS COMPLANATUS Piaget.

Carriker (p. 86, 1936) states that the principal difference between *S. c. complanatus* and *S. c. variegatus* Carriker lies in the fact that the female of the latter has a "complicated series of fine, short, curving hairs on the sternal plate of the 6th abdominal segment, arranged in two series, one vertical and one horizontal on each side of the segment." In Piaget's type of *S. c. complanatus*, a female, the series of hairs described above are present as in Carriker's figure (1936) of *S. c. variegatus*.

STRONGYLOCOTES COMPLANATUS FIMBRIATUS, subsp. n. (Pl. IV. fig. 3.)

This subspecies is distinguished from *S. c. complanatus* Piaget by the greater width of the head, both at the anterior margin and at the temples (see under measurements of *S. c. noctivagi* below), and by the presence of a decided gap between the postero-lateral angles of segment IV and the antero-lateral angles of segment V.

*Description of Male*.—Shape of head as shown in figure (Pl. IV. fig. 3). Trabeculae pointed and antennae filiform. Bands and chaetotaxy of the head as in *S. c. noctivagi* (see below).

Prothorax with slightly concave sides and posterior concave margin. Pterothorax with somewhat rounded, slightly divergent lateral sides and with posterior margins concave, meeting in median point.

Abdomen as in *S. c. complanatus* except for the gap between the lateral margins of segments IV and V and the larger size of segment VII, which, posteriorly, practically surrounds segment VIII.

Male genitalia as in *S. c. complanatus*.

The female differs but little from the male except in the shape of the head, which is longer and narrower and nearer to that of *S. c. complanatus*. The abdomen is as in *S. c. complanatus* except for the chaetotaxy of segment VII. In *S. c. fimbriatus* the horizontal and vertical series of hairs on the ventral surface of segment VI have the hairs shorter in the horizontal series and fewer in number in the vertical series, and the ventral hairs on the posterior part of the segment are fewer in number.

Described from 1 male from skin of *Crypturellus c. cinnamomeus* Nicaragua, and 4 males and 2 females from "Perdis" (*Crypturellus c. mexicanus*, see p. 136).

*Type*.—Slide no. 3181 in author's collection, male from *Crypturellus c. cinnamomeus*.

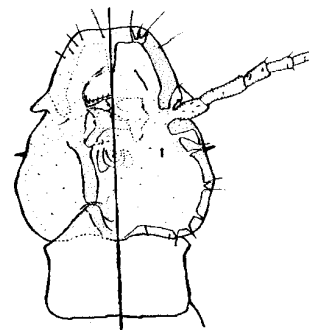
STRONGYLOCOTES COMPLANATUS NOCTIVAGI, subsp. n. (Text-fig. 14.)

This subspecies is distinguished from *S. c. complanatus* Piaget by the shorter pre-antennal area and wider anterior margin of the head, and from *S. c. fimbriatus* by the greater width at the temples (see below).

*Description of the Male*.—Shape of the head as shown in text-fig. 14. In other respects the head is as in *S. c. complanatus*.

The thorax as in *S. c. fimbriatus*, except that the lateral sides of the prothorax are more concave and those of the pterothorax more rounded and divergent. Abdomen and genitalia as in *S. c. fimbriatus*. Female unknown.

Text-figure 14.



*Strongylocotes complanatus noctivagi*, subsp. n.

Measurements.

	I.	II.	III.
Breadth: Length, Male head:—			
1. At anterior margin of head.	.57	.62	.61
2. At temples . . . . .	.81	.88	.94

I.=*S. c. variegatus* C.; II.=*S. c. fimbriatus*; III.=*S. c. noctivagi*.

Described from 1 male from skin of *Crypturellus n. noctivagus*, Brazil. *Type*.—Slide no. 2876 in the British Museum.

STRONGYLOCOTES COMPLANATUS INTERRUPTUS Carriker.

Carriker (1936, p. 85, pl. vii. fig. 1) described this species from *Crypturellus atrocipillus* and recorded it also from *Crypturellus u. undulatus*. Guimarães (1936, p. 48, fig.) described a species, *S. limai*, from *Crypturellus u. vermiculatus*, recording it also from *C. u. undulatus*. From a comparison of descriptions and figures it is found that *S. limai* is apparently the same as *S. c. interruptus*. The exact date of publication of Guimarães' description is not known, and so at the moment it is not possible to say which name has priority\*.

STRONGYLOCOTES LIPOGONUS SETOSUS Piaget.

Piaget's type of this subspecies, a female from *Crypturellus variegatus*, has been compared with his figure (1880) and with specimens of *S. l. lipogonus* Nitzsch from *Rhyncotus rufescens*. Piaget's specimen and figure differ somewhat in the following characters:—The sides of the pre-antennal area are not so rounded and the anterior margin of the head not so wide as in figure; occipital margin of the head concave as in *S. l. lipogonus*; the pterothorax is not

\* Since going to press it has been ascertained that Carriker's name takes priority.

rounded postero-laterally but has a definite point, and the posterior margin is only slightly concave; segment VII of the abdomen is as in *S. l. lipogonus*. The only apparent differences between *S. l. lipogonus* and Piaget's specimen is a greater concavity in the lateral sides of the prothorax and a slightly wider anterior margin of the head, this latter character being not apparent in all specimens from *Rhynchotus rufescens*. Until further material is available it is not possible to decide whether *S. l. setosus* Piaget is a synonym of *S. l. lipogonus* Nitzsch.

## ORNICHOLOX Carriker.

## ORNICHOLOX ALIENUS Giebel.

Carriker placed this species under *Strongylocotes* (p. 93, 1936), but had no information regarding the type. Dr. S. Kéler has kindly compared drawings of *Ornicholax* from *Tinamus major robustus* with the type of *alienus* and says:—"The type of *alienus* (a male) is very similar to your male from *T. major robustus*, but it differs distinctly in the shape of the prothorax, which in *alienus* type is distinctly trapezoidal, the points lying behind the middle of the sides (figure given), as well as in the form of the last segment, which in the type *alienus* is a little longer than wide (336×288 microns)." In the author's collection is a single male *Ornicholax* from *Tinamus major major* which answers the above description. At the moment there is insufficient material to work out the subspecies of *Ornicholax alienus* but it appears that *Ornicholax a. alienus* Giebel stands, and that Carriker's two subspecies become *O. a. robustus* and *O. a. taoi*.

## SUMMARY.

1. The following species and subspecies are described:—

<i>Pseudolipeurus</i> Carriker.	
<i>subsimilis macconelli</i> , subsp. n. ....	<i>Crypturellus berlepschi macconelli</i> .
<i>Heptapsogaster</i> Carriker.	
<i>temporalis acutiventris</i> , subsp. n. ....	<i>Crypturellus cinnamomeus mexicanus</i> .
<i>stultus stultus</i> , sp. n. ....	<i>Crypturellus o. obsoletus</i> .
<i>stultus noctivagi</i> , subsp. n. ....	<i>Crypturellus n. noctivagus</i> .
<i>testudo</i> , sp. n. ....	<i>Nothura maculosa peruviana</i> .
<i>Rhynchothura</i> Carriker.	
<i>teres</i> , sp. n. ....	<i>Nothura maculosa peruviana</i> .
<i>carrikeri</i> , sp. n. ....	<i>Nothoprocta cinerascens</i> .
<i>Megapeostus</i> Carriker.	
<i>fuscus</i> , sp. n. ....	<i>Crypturellus variegatus variegatus</i> .
<i>alterus</i> , sp. n. ....	<i>Tinamus major latifrons</i> .
<i>multiplex multiplex</i> , subsp. n. ....	<i>Crypturellus boucardi boucardi</i> .
<i>multiplex secundus</i> , subsp. n. ....	<i>Crypturellus cinnamomeus mexicanus</i> .
<i>asymmetricus ruficipitis</i> , subsp. n. ....	<i>Tinamus serratus ruficeps</i> .

<i>Heterogoniodes</i> Carriker.	
<i>araceps</i> , sp. n. ....	<i>Crypturellus cinnamomeus mexicanus</i> .
<i>Heptapsus</i> Carriker.	
<i>tergalis cylindricus</i> , subsp. n. ....	<i>Crypturellus noctivagus noctivagus</i> .
<i>Strongylocotes</i> Taschenberg.	
<i>complanatus fimbriatus</i> , subsp. n. ....	<i>Crypturellus cinnamomeus cinnamomeus</i> .
<i>complanatus noctivagi</i> , subsp. n. ....	<i>Crypturellus noctivagus noctivagus</i> .

2. The following species of Piaget, Giebel, and Taschenberg are discussed:—

*Heptapsogaster subdilatus* Piaget.  
*Tinamicola alatafasciata* Piaget.  
*Gonicocotes coxatus* Piaget.  
*Pectenosoma v. verrucosa* Taschenberg.  
*Strongylocotes complanatus* Piaget.  
*S. setosus* Piaget.  
*Ornicholax alienus* Giebel.

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## EXPLANATION OF THE PLATES.

## PLATE I.

- Fig. 1. *Heptapsogaster temporalis acutiventris*, subsp. n., ♂. × 35.  
 2. *Heptapsogaster t. acutiventris*, subsp. n., ♀. × 35.  
 3. *Heptapsogaster s. stultus*, sp. n., ♂. × 35.  
 4. *Heptapsogaster s. stultus*, sp. n., ♀. × 35.  
 5. *Heptapsogaster testudo*, sp. n., ♂. × 35.

## PLATE II.

- Fig. 1. *Rhynchothura teres*, sp. n., ♂. × 35.  
 2. *Rhynchothura teres*, sp. n., ♀. × 35.  
 3. *Megapeostus fuscus*, sp. n., ♀. × 35.  
 4. *Megapeostus multiplex secundus*, subsp. n., ♀. × 35.

## PLATE III.

- Fig. 1. *Megapeostus fuscus*, sp. n., ♂. × 35.  
 2. *Megapeostus m. multiplex*, sp. n., ♂. × 35.  
 3. *Megapeostus asymmetricus ruficipitis*, subsp. n., ♂. × 35.

## PLATE IV.

- Fig. 1. *Heptapsus tergalis cylindricus*, subsp. n., ♂. × 35.  
 2. *Heptapsus tergalis cylindricus*, subsp. n., ♀. × 35.  
 3. *Strongylocotes complanatus fimbriatus*, subsp. n., ♂. × 35.



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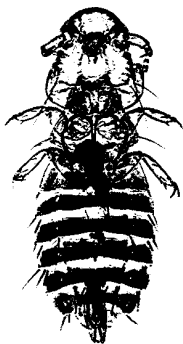
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*Clay, P. Z. S. 1937. Pl. I. 11.*

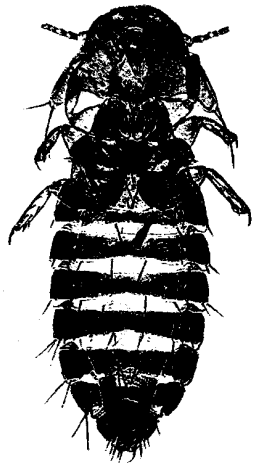
MALLOPHAGA FROM THE TINAMIDAE.



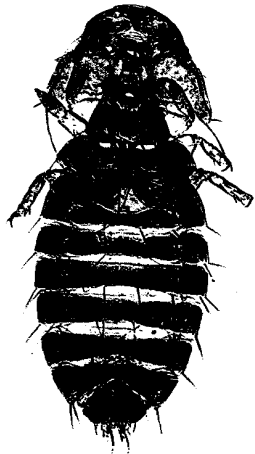
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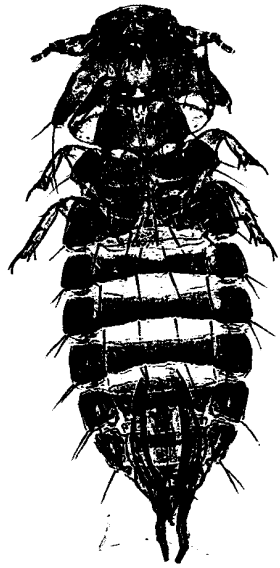


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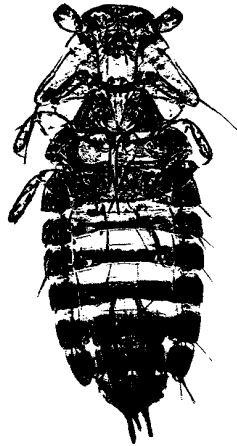
John R. Rees & Company, 1937, 200-201

MALLOPHAGA FROM THE TINAMIDAE.

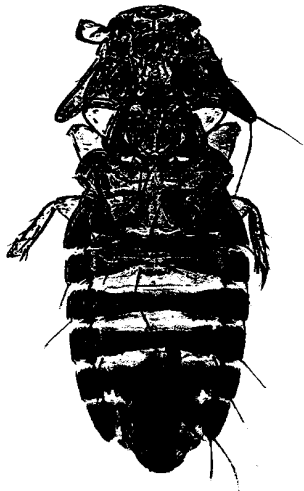




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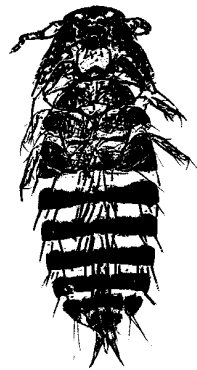
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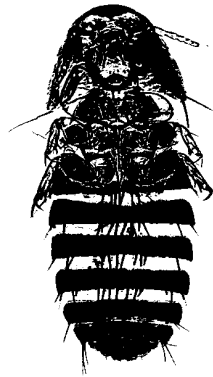
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John Bale Soma & Currow 115, London.

MALLOPHAGA FROM THE TINAMIDAE.



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Ant. Eng. Soc. 4, Darwin 1915, revised

MALLOPHAGA FROM THE TINAMIDAE.

7. The Structure and Post-Embryonic Development of *Vanessa urticæ* (Lepidoptera)—II. The Larval Malpighian Tubules. By H. HENSON, B.Sc., Ph.D., Dept. of Zoology, University of Leeds\*.

[Received October 26, 1936: Read March 16, 1937.]

(Text-figures 1-10.)

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I. INTRODUCTION.

A complete understanding of the many problems associated with insect metamorphosis is dependent upon a detailed knowledge of the growth processes of larval forms. Fundamental principles relating to the growth, differentiation, inter-relationships, and functioning of cells and tissues are involved. In fact, no detail of the process of growth, whether concerned with morphology or physiology, can be ignored in any study of metamorphosis.

In this paper the development of the Malpighian tubules in the larva of *Vanessa urticæ* (*Aglais urticæ*), the Small Tortoiseshell Butterfly, has been described. It forms part of a series in which the structure and post-embryonic development are described in detail. The pupal and imaginal tubules will be dealt with later.

The observations were made chiefly upon living material bred in the laboratory. For microscopical examination specimens were fixed in Carnoy's fluid, and sections cut at  $8\mu$  after double embedding in celloidin and wax. Iron hæmatoxylin or Delafield's hæmatoxylin proved to be the most suitable stains.

My best thanks are due to Professor E. A. Spaul for much kindly encouragement and criticism.

2. THE MORPHOLOGY OF THE LARVAL TUBULES.

The Malpighian tubules of the larva are delicate strands ramifying throughout the posterior half of the body cavity. There are three tubules on each side (text-fig. 1), which unite into a common duct opening into the anterior end of the colon. Their position in relation to the gut can best be appreciated by following them forwards from their attachments. The common duct

\* Communicated by Prof. E. A. SPAUL, D.Sc., F.Z.S.