

Index of New Genera and Species.

Vol. 110, Ser. B, 1940.

- Anthracobune* (?) *daviesi*, sp. n., 135.
 — *pinfoldi*, sp. n., 129.
 — (?) *wardi*, sp. n., 138.
Goniodes *agelastes*, nom. n., 36.
 — *ammoperdix*, sp. n., 93.
 — *antennatus*, sp. n., 84.
 — *biordinatus*, sp. n., 106.
 — *chrysolophi*, sp. n., 51.
 — *crossophilon*, nom. n., 58.
 — *diardi*, sp. n., 70.
 — *extraneus*, sp. n., 79.
 — *hopkinsi*, sp. n., 26.
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 — *keleri*, sp. n., 95.
 — *meinertzhageni*, sp. n., 9.
 — *minor confusio*, subsp. n., 105.
 — *oreophilus*, sp. n., 77.
 — *perlatus*, sp. n., 31.
 — *simoni*, sp. n., 44.
 — *soueft*, nom. nov., 100.
 — *tetraogallae*, sp. n., 74.
 — *tragopan*, sp. n., 13.
Kiritharia, gen. n., 141.
 — *clayi*, sp. n., 141.

V. 110 1940
Series B.]

PROCEEDINGS
 OF THE
 ZOOLOGICAL SOCIETY OF LONDON.

PAPERS.

1. Genera and Species of Mallophaga occurring on Gallinaceous Hosts.—
 Part II.* *Goniodes*. By THERESA CLAY, B.Sc., F.Z.S.

[Received January 28, 1939.]

(Text-figures 1-79.)

The continuation in this part of the paper on the genera and species occurring on gallinaceous hosts deals with the genus *Goniodes* as defined by the present author. In a subsequent paper it is hoped to deal with the genus *Goniocotes* and new genera which have been removed from *Goniodes*, together with a key to the genera of *Goniodinae*, and a complete host-list of Ischnoceran Mallophaga occurring on gallinaceous hosts.

Authors' Names.—In Part I. certain species of Nitzsch were wrongly attributed to the authorship of Giebel, i. e., those with descriptions published by Giebel, but taken directly from the Nitzsch manuscript. Thus the following species should stand under the authorship of Nitzsch:—

Gallipeurus heterographus (Nitzsch), 1866.*G. heterogrammicus* (Nitzsch), 1866.*G. cinereus* (Nitzsch), 1866.*Oxylipeurus mesopelios* (Nitzsch), 1866.*Lagopæcus cæmenticius* (Nitzsch), 1874. (Reference in Part I., p. 192, incorrect. Read 1874, p. 154.)

Types.—Lectotypes have been designated for all species of Piaget, and for those of Denny in the cases where this had not already been done. Neotypes have been designated for certain species where the types are known to be lost, and where material from the type-host has been available.

Type-hosts.—The present name of the type-host (according to 'Check-list of Birds of the World,' Peters, 1934) has been given under each species followed by the host name as given in the original publication where this is different.

Piaget and Denny Collections.—Lists of the species contained in these collections have been published by Thompson (1937 (1), p. 74, and 1938, p. 493), but as the names have been taken from the labels without any reference to the actual identity of the specimens on the slides these lists are in many cases misleading. As a result of this it has been considered advisable to list the specimens and hosts contained in these collections under their correct species,

* Part I. appeared in *Proc. Zool. Soc. Lond.* 1938, ser. B, 108, pp. 109-204.

although in many cases these specimens are obvious stragglers or on wrongly labelled slides, and as regards to the host records should be ignored.

Abdominal Segments.—Throughout the paper the segments have been numbered from their actual positions, although it is probable that the apparent first segment is formed by the fusion of the true first and second, and that the apparent second to ninth segments in the male are actually the third to tenth. In the female it is probable that the apparent eighth segment is formed by the fusion of two segments, i. e., IX and X.

Chaetotaxy.—The abdominal chaetotaxy has been given for all species. Although the addition or loss of two or three hairs in a group of hairs is not of specific importance, the presence or absence of certain hairs is in many cases a diagnostic character. Examples of the diagnostic arrangement of the hairs are:—the presence or absence of the first pair of sternal and pleural hairs; the increase of the central sternal or tergal hairs from 2 to 8 or more; the presence or absence of the lateral post-spiracular tergal hair on the abdomen; and the presence or absence of the meso- and metasternal hairs on the thorax. Two pairs of fine hairs, arising from pits in the integument, one pair on the ventro-lateral margins of the pterothorax, the other on the lateral margins of segment VII, occur in every species, and have, therefore, not been mentioned under the specific descriptions.

Abbreviations.—The following abbreviations have been employed:—

C.I. Head index (breadth : length, taken from centre of clypeal margin to centre of occipital margin).

T. Tergite. S. Sternite. P. Pleurite.

Those figures marked T. have been drawn by Mr. Terzi; those marked P. by Mr. R. S. Pitcher.

As in the previous paper, the majority of specimens on which the paper is based are in the collection of Colonel R. Meinertzhagen. The author is also indebted to the Trustees of the British Museum (Natural History) for permission to publish certain figures drawn by Mr. Terzi; to the Zoological Society of London for material; to Mr. G. H. E. Hopkins for material and much valuable advice, and to Dr. S. Kéler for information concerning the Nitzsch and Giebel types in the Halle collection.

ISCHNOCERA Kellogg.

PHILOPTERIDÆ Burmeister.

GONIODES Nitzsch, 1818.

Goniodes Nitzsch, 1818, p. 293. Genotype by subsequent designation (Johnston and Harrison, 1911, p. 326): *Goniodes pavonis* (Linné).

Gonocephalus Nitzsch, 1861 (1), p. 306. Genotype: *Goniodes chelicornis* Denny *nec* Children (see Kéler, 1938, p. 310).

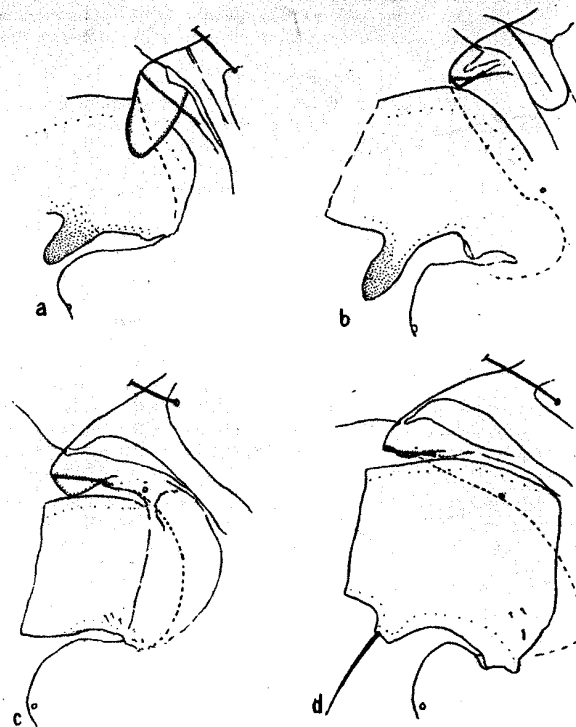
Description of Genus.—Head circumfasciate; clypeal margin flattened or broadly rounded, with clypeal angles prominent; clypeal band without sclerotic spine-like process arising from inner margin each side (compare *Physconelloides*). Trabeculae undeveloped, and represented by membranous lobes (see Kéler, 1938, p. 310); clavi* present, and may be either membranous or sclerotic in character (text-figs. 1 & 2). Temple angle with latero-ventral process bearing hair or spine in at least one sex, and usually both (compare *Goniocotes*);

* Name suggested for German "Zapfen" used by Kéler.

occipital margin drawn out posteriorly each side to form occipital angle bearing small hair or spine. Antennae may or may not be sexually dimorphic, but segments IV-V never modified or greatly reduced in the male (compare *Coloceras*).

Pterothorax present without lateral indication of meso-metathoracic junction

Text-figure 1.



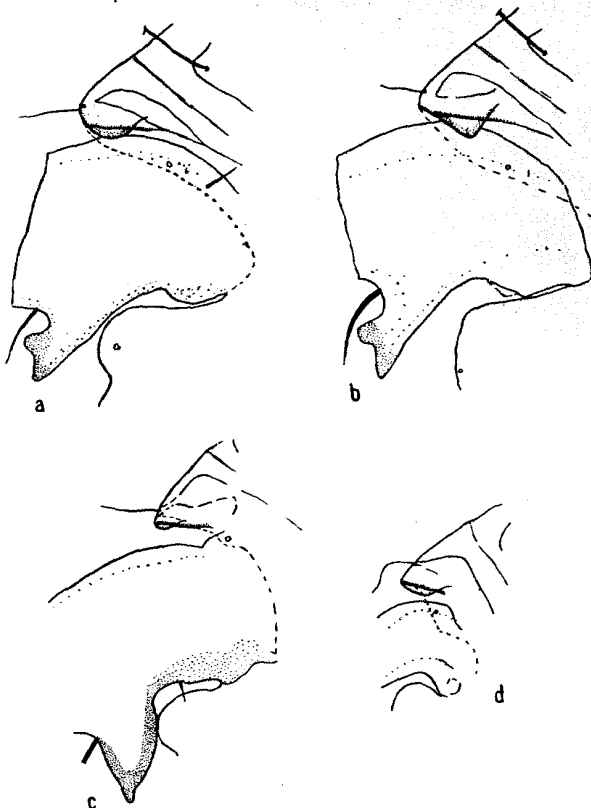
Clavi of *Goniodes* spp.: (a) *G. pavonis*; (b) *G. meinertzhageni*; (c) *G. simoni*; (d) *G. intermedius*.

and always bearing a fine ventro-lateral hair arising from a pit in the integument. Hairs either absent or present on both meso- and metasternum, never present on mesosternum alone.

Abdomen with segment I large, and with free lateral margin (compare Heptapsogastridæ, *Austrogoniodes*, *Lagopæcus*, and *Syrhaptæcus*); tergal plates I-VII widely separated, and sternal thickening in the form of lateral, never central, plates. Pleurites broad, with complicated re-entrant heads.

Segment VII with fine lateral hair arising from pit in integument. Male abdomen with nine segments, of which segment VIII (=IX) is greatly reduced, and appears as a lateral rudiment each side; genital opening dorsal, and bearing hairs on the anterior and posterior margins. Female abdomen with apparently

Text-figure 2.



Clavi of *Goniodes* spp.: (a) *G. diardi*; (b) *G. cervinicornis*;
(c) *G. crossoptilon*; (d) *G. longus*.

eight segments (8th=IX and X); tergal plate VIII continuous across the segment; vulva either terminal or at the level of segment VII, and varies in form, but never bears 1-2 sclerotic spines at the lateral corners (compare *Colocea* as).

Goniodes, as defined above, contains a large number of species of diverse form, which fall into a number of more or less well-defined groups. These, however, cannot be considered to be of generic value, as there occur species which are intermediate between the groups, and connect up the whole range of species, with one or two exceptions, into a definable genus. The generic separation of these groups would merely obscure the natural relationships of the species, and would in no way clarify the classification.

The discussion of the relationships of the groups and the characters which might be considered of generic value are given under each species group.

SPECIES GROUP A.

1. Large species (males, 3.60-3.80 mm.; females, 3.80-4.70 mm.).
2. Temples similar in the two sexes, and not greatly expanded.
3. Clavi thickened in both sexes, and prolonged posteriorly in male and postero-laterally in female.
4. Antennae sexually dimorphic. In the male first segment enlarged and bearing thickened process; third with distal post-axial angle prolonged as narrow elongated process. In the females first segment longer than second, but shorter than the combined lengths of segments II-IV* (segment I, 186-122 mm.; segments II-IV, 334-388 mm.).
5. Meso- and metasternal hairs present.
6. Pleurites broad, due to a thickened area between the marginal band of the pleurite and the spiracle being present.
7. Female with bifid structure associated with internal genital organs apparent in abdomen.
8. Vulva at the level of segment VII with hairs concentrated at lateral corners; no spinous process present on the genital region.
9. Anterior margin of male genital opening somewhat prolonged posteriorly and bilobed.

Species group A contains a single species with certain distinctive characters. However, that its affinities lie with group B is shown by the characters of *meinertzhageni*, a species somewhat intermediate between the two groups.

GONIODES PAVONIS (Linné), 1758. (Text-figs. 1 a, 3, 4 a, 5, & 9 a.)

Pediculus pavonis Linné, 1758, p. 613. Host: *Pavo cristatus* Linné.

Nirmus tetragonocephalus Olfers, 1816, p. 90. Host: *Pavo cristatus*.

Goniodes falcicornis Nitzsch, 1818, p. 293. Host: *Pavo cristatus*.

This is a distinct species not closely related to any other, although its affinities lie with the three following species. It is distinguished by the large, thickened overhanging clavi and terminal segments of the abdomen in both sexes, and by the male genitalia. The female resembles somewhat that of *meinertzhageni*, from which it is distinguished by the shape of the head, the blunted, not pointed clavi, and the form of the terminal segments of the abdomen.

Male.—Head and thorax as shown in text-fig. 3, and characterized by the elongated thickened clavi and greatly thickened process on the first antennal segment. Ventral chaetotaxy of head and thorax as in female.

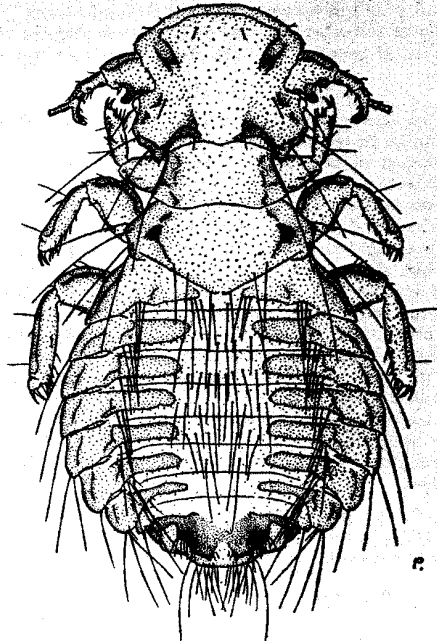
Abdomen as shown in figure with ventral chaetotaxy of segments I-VII as in female; segment IX with 14-18 long, stout, elongated marginal and submarginal hairs each side, and 6-8 shorter and finer marginal hairs.

* Compare Kéler, 1937 (1), p. 131.

Genitalia as shown in text-fig. 4 a, and characterized by the large, flattened, leaf-like paramera.

Female.—Ventral view as shown in text-fig. 5 a, with dorsal chestotaxy of segments I-VII as in male. Dorsal chestotaxy of terminal segments as shown in

Text-figure 3.

*Goniodes pavonis*, ♂.

text-fig. 5 b. Lying in the abdomen, and apparently associated with the internal genital organs, is a sclerotic structure which is not apparent elsewhere among the *Goniodes*, except in *meinertzhageni*, *spiniicornis*, and *tragopan* (text-fig. 9 a).

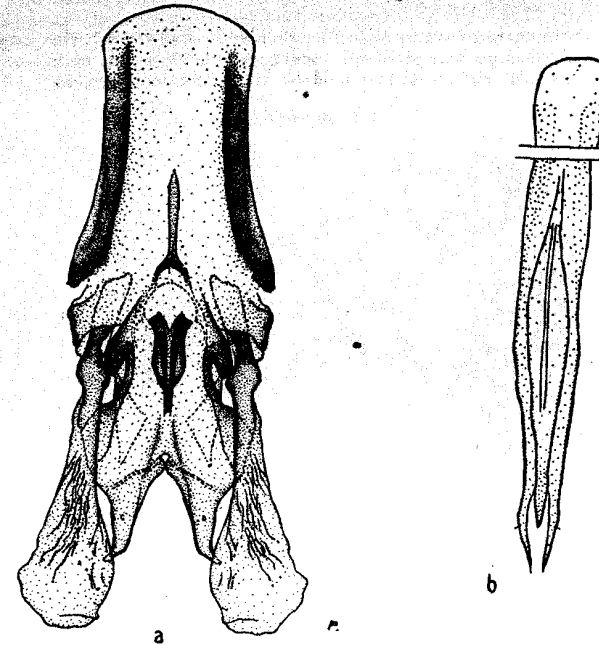
Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.86-0.96	1.09-1.13	0.96-1.13	1.32-1.56
Prothorax....	0.40-0.43	0.78-0.83	0.40-0.45	0.80-0.96
Pterothorax..	0.50-0.55	1.14-1.21	0.55-0.72	1.23-1.40
Abdomen....	0.85-1.09	1.94-2.08	2.28-2.78	2.12-2.80
Total.....	3.65-3.75	.....	3.89-4.69	.....
C.L.....	1.26-1.27		1.37-1.38	

Specimens examined.—18 males, 22 females, from skins, and captive and wild specimens of *Pavo cristatus* Linné from India; 1 male, 1 female, from *Pavo muticus* Linné from S. Annam.

Types Collection.—British Museum, 5 males, 5 females, from *Pavo cristatus*

Text-figure 4.

♂ genitalia: (a) *Goniodes pavonis*; (b) *G. meinertzhageni*.

Linné, and 3 males, 2 females from *Pavo nigripennis* (= *Pavo cristatus*). Leiden Museum, 2 males and 2 females, from *Pavo cristatus*.

Neotype.—Male in the Meinertzhagen collection, slide no. 8175, from captive specimen of *Pavo cristatus* from India.

Neoparatypes.—22 males, 27 females, from the same host.

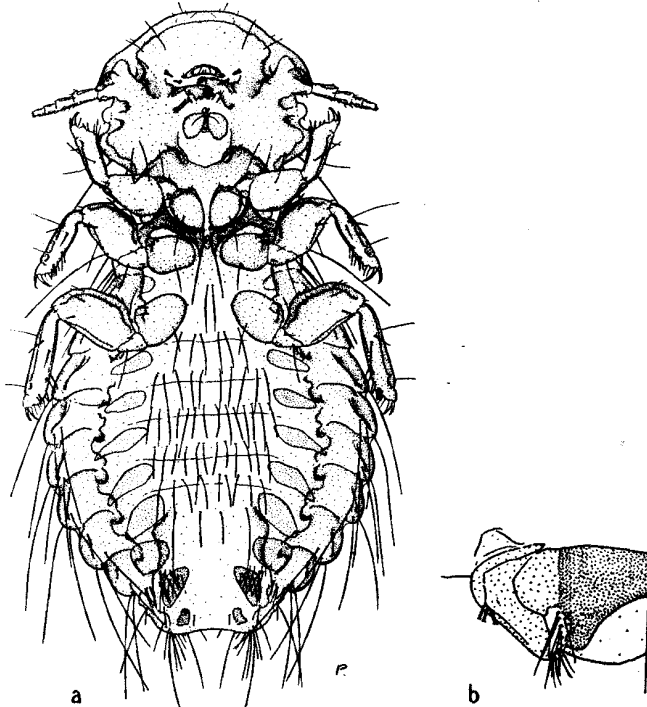
SPECIES GROUP B.

1. Large species (males, 3.48-5.22 mm.; females, 3.66-5.65 mm.).
2. Temples either similar in the two sexes and not expanded, or with the temples of the female greatly expanded.
3. Clavi thickened in both sexes; scarcely developed in the male (text-fig. 1 b); produced postero-laterally in the female.
4. Antennae as in group A.

5. Thoracic sternal hairs as in A.
6. Pleurites either as in A (*meinertzhageni*), or without inner thickened area.
7. Bifid structure present in female abdomen.
8. Vulva nearly terminal, with hairs along posterior margin, and not concentrated laterally. No spinous process on genital region.
9. Genital opening either similar to A (*meinertzhageni*), or with margin not prolonged posteriorly.

Species with metanotum in male (female also in *spinicornis*) with irregular lateral or posterior process each side, which approximates to, or in some individuals fuses with, the tergal plates of the first abdominal segment.

Text-figure 5.



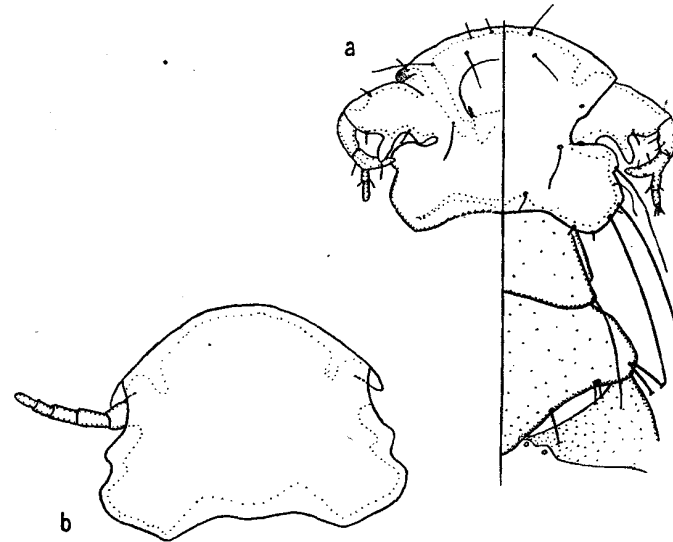
Goniodes pavonis: (a) ♀; (b) terminal segments of ♀ abdomen, dorsal.

A distinctive group of species, but approaches C in the characters of female *spinicornis*, and both groups I and J, through the common characters of the males of *crossoptilon* (olim *major* Piaget) and *cervicornis*, with those of male *spinicornis* (text-figs. 1 & 2).

GONIODES MEINERTZHAGENI, sp. n. (Text-figs. 1b, 4b, 6, 7, & 9b.)

This species is somewhat intermediate between *spinicornis* and *pavonis*, the male resembling the former species, and the female in many respects resembling the latter. It is distinguished from related species in the male by the genitalia, from *megaceros* and *spinicornis* in addition by the characters of the first antennal segment, and from *pavonis* by the absence of elongated clavi. In the female it is distinguished from *spinicornis* by the slight expansion of the temples, and from this species and *pavonis* by the characters of the genital region and the number and arrangement of the sternal hairs.

Text-figure 6.



Goniodes meinertzhageni: (a) ♂ head and thorax; (b) ♀ head.

Description of Male.—Head similar to that of *spinicornis* in shape, with square temples, and small clavi scarcely projecting beyond the lateral dorsal margin of the head. Antennae with first segment greatly enlarged and bearing thickened, somewhat pear-shaped process (text-fig. 6a).

Thorax, as shown in text-fig. 6a, with process arising each side from postero-lateral margins of metanotum; this process appears to fuse with the tergal plate of the first abdominal segment each side. Mesosternum with two long and metasternum with three to four long hairs.

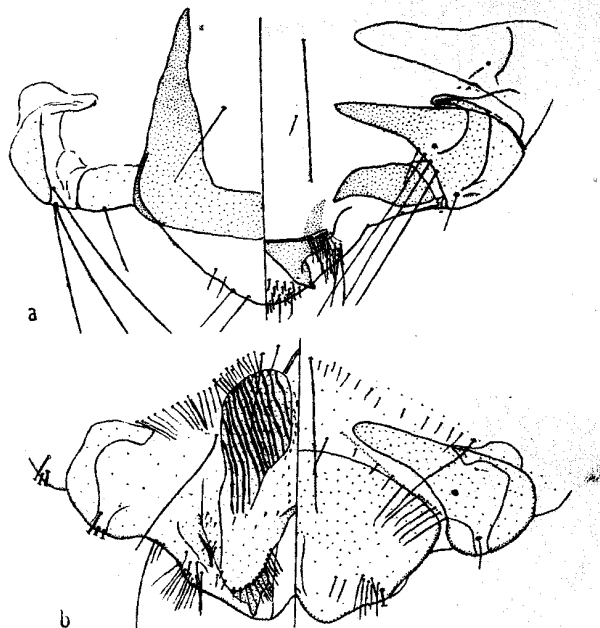
Abdomen with broad pleurites similar to those of *pavonis*, and segment IX somewhat elongated posteriorly, with rounded distal margin bearing numerous

marginal and submarginal hairs. Lip of genital opening prolonged, and somewhat thickened as large bilobed process (text-fig. 7a).

Genitalia, which are similar in certain respects to those of *spiniicornis*, differ in the form of the paramera, which are narrow, elongate, and uniformly thickened; pseudopenis shorter than paramera (text-fig. 4b).

Description of Female.—Head similar in shape to that of male, with square temples. Clavi elongated and thickened (text-fig. 6b).

Text-figure 7.



Goniodes meinertzhageni: terminal segments of (a) ♂ abdomen; (b) ♀ abdomen.

Thorax as in male, but without lateral processes from metanotum, and in the only specimen examined there are five metasternal hairs.

Abdomen, except for characters of the posterior segments, similar to that of *pavonis*. Vulva deeply bilobed, with a number of hairs on the inner and terminal margins of each lobe, and with anterior portion of genital region striated (text-fig. 7b). Thickened structure associated with genital organs present, but differing in shape from that of *spiniicornis* and *tragopan* (text-fig. 9b).

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I	3, 4, 3	4	0, 0	4	4	0, 0
II	1, 2, 1	8	1, 1	1, 2, 1	2-4, 8, 3-4	1, 1
III	1, 2, 1	10	2, 2	1, 2, 1	6-8, 10, 6-8	2, 2
IV	1, 2, 1	9-10	3, 3	1, 2, 1	6-8, 10, 6-8	2, 2
V	1, 2, 1	9-10	3, 3	1, 2, 1	58	3, 3
VI	3, 2, 3	4	3, 3	1, 2, 1	60	3, 3
VII	2-4, 2, 2-4	2	3, 3		Fig.	3, 3
VIII	Fig.	Fig.	1, 1	Fig.	Fig.	
IX	Fig.	Fig.		Fig.	Fig.	

In the male, in addition to the tergal hairs shown above, there are a number of minute spines. In the female the lateral sternal hairs of segments III-IV are considerably smaller than the central hairs, and the sternal hairs on segments V-VI vary in size and cannot be divided into the usual three groups.

Measurements.

	Male.		Female.	
	Length.	Breadth.	Length.	Breadth.
Head	0.83	1.05	0.92	1.34
Prothorax	0.37	0.81	0.35	0.82
Pterothorax	0.64	1.14	0.64	1.20
Abdomen	2.16	2.01	2.08	1.89
Total	3.78	.....	3.66	.....
C.I. ....	.....	1.26	.....	1.45

Described from 3 males, 1 female, from skins of *Pavo cristatus* Linné from Delhi.

Holotype.—Male in the Meinertzhagen collection, slide no. 4452.

Paratypes.—2 males, 1 female, from the same host.

Named after Colonel R. Meinertzhagen, whose large and unique collection has made this work possible.

GONIODES SPINICORNIS (Nitzsch), 1866 (Text-fig. 9c.)

Goniocotes spiniicornis Nitzsch, 1866 (1), p. 389. Host: *Tragopan satyra* (Linné).

Goniodes bicuspispidatus Piaget, 1880, p. 278, pl. xxiii. fig. 3. Host: *Tragopan satyra*. (Zoological Garden, Hague.)

This is a large species, distinguished by the shape of the head, characters of the clavi and antennae, and by the genitalia of the male and genital region of the female. The differential characters between this species and *tragopan*, *megaceros*, and *meinertzhageni* are given under those species.

Male *.—Head with narrow clypeal band and square temples bearing hairs and stout spines; clavi small, and scarcely projecting beyond the lateral margin of the head, and showing considerable amount of variation in the shape of the distal end. Antennae with first segment greatly enlarged and bearing elongated thickened process, third segment with distal post-axial angle produced into narrow elongate process, fourth and fifth segments comparatively small.

* Species which are to be figured by Dr. Kéler in his paper on the *Goniodes* of the Halle collection have not been figured fully here.

Thorax with lateral prothoracic margins straight, and diverging posteriorly; stout hair on postero-lateral angle, and stout dorsal spine near antero-lateral angle. Lateral pterothoracic margins short and rounded, and bearing two long hairs each side; posterior margins each with two long hairs together, a shorter hair and a long hair on each side of the centre. Posteriorly the dorsum of the pterothorax is divided into two irregular lobes which approximate, or in some cases fuse, with the tergite of the first abdominal segment each side. Mesosoma and metasternum each with two long hairs, and in some specimens there is a group of two to five hairs posterior to the metasternal hairs.

Abdomen large and somewhat elongated; segment VIII with small flattened lateral margin; segment IX large, with flattened posterior margin. Genital opening similar to that of *megaceros*, but narrower, and lies in a more anterior position. Upper lip of opening with 6-10 long hairs each side, and lower lip with 14-16 shorter hairs each side.

Genitalia with elongated basal plate, small, leaf-like, somewhat transparent paramera, and thickened pseudopenis; sac present (see Cummings, 1916, p. 288, f. 20).

Female.—Head with shape differing markedly from that of the male, and resembling *eurygaster*. Clypeal band narrow; temples widely expanded, with flattened lateral margins bearing two long hairs and a stout spine each side; occipital angle large and bearing stout spine. Clavi elongated and pointed.

Thorax as in male.

Abdomen large and more elongated than in male. Vulva with flattened posterior margin bearing a continuous line of small spine-like hairs. Thickened structure associated with genital organs present (text-fig. 9 c).

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	4-5, 4-6, 4-5	2	0, 0	4-5, 8-12, 4-5	2	0, 0
II.	2-3, 4-6, 2-3	8	1, 1	3, 10, 3	6-8	1, 1
III.	2, 4-6, 2	6-10	2, 2	1-3, 8-10, 1-3	8-10	2, 2
IV.	1, 2-4, 2	8-10	2, 2	1-2, 8-10, 1-3	8	2, 2
V.	3, 2-4, 3	6-10	3, 3	2-3, 6, 2-3	6	3, 3
VI.	3, 2-4, 3	2-4	3, 3	2-3, 2, 2-3	2	3, 3
VII.	14-20	2	3, 3	3-5, 2, 3-5	2	3, 3
VIII. ....	..	..	3, 3			
IX.						

In the male, in addition to the tergal hairs shown above, there are a number of minute hairs which may become elongated in some individuals. Segment IX has 6-8 long, stout, sternal hairs each side. In the female the posterior margin of tergite VIII has 2 long and 4-6 short hairs each side.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.84-1.00	1.09-1.17	1.00-1.09	1.78-1.88
Prothorax.	0.46-0.62	0.85-0.92	0.48-0.53	0.95-0.98
Pterothorax.	0.70-0.79	1.21-1.31	0.78-0.84	1.30-1.43
Abdomen.	1.72-2.09	1.69-2.05	2.65-2.90	2.12-2.29
Total.	3.48-3.94		4.62-4.76	
C.I.	1.17-1.29		1.65-1.78	

Specimens examined.—10 males, 9 females, from skins and captive specimens of *Tragopan satyra* (Linné) from Sikkim; 2 males, 1 female, from these specimens compared with type of *spinicornis* by Dr. Kéler; 6 males, 8 females, from skins and captive specimens of *T. b. blythii* (Jerdon) from Assam; 12 males, 6 females, from skins and captive specimens of *T. t. temminckii* (J. E. Gray) from Assam and Szechwan; 3 males, from skin of *T. caboti* (Gould) from S. China.

Piaget Collection.—British Museum, 6 males, 6 females, 2 imm., from *Tragopan satyra*; 5 males, 5 females, 2 imm., from *Tragopan temminckii*; 1 male, 2 females, from *T. caboti*. Leiden Museum, 1 male, 1 female (labelled *G. bipunctatus*), from *Tragopan satyrus*.

Lectotype of *bicuspidatus* designated by present author:—Male in the Piaget collection, slide no. 10, from *T. satyra*.

Paratypes.—5 males, 6 females, in the Piaget collection from the same host.

GONIODES TRAGOPAN, sp. n. (Text-figs. 9 d & 11 c.)

This species, which is extremely close to *spinicornis*, is distinguished in the male by the somewhat greater width of the temples; and by the genitalia, which are larger and in which the paramera are more elongate in shape and uniformly thickened (text-fig. 11 c). The characters of the first antennal segment of the male appear to be diagnostic in that the lateral thickened margin distal to the process is raised to a greater extent than in *spinicornis*, although there appears to be considerable variation in this character throughout the latter species. In the female there tend to be fewer hairs on the posterior margin of the valve, and the thickened structure associated with the genital organs, as mentioned under *spinicornis*, is in this species thickened to a greater extent, and is flattened anteriorly (text-fig. 9 d). In all other characters examined this species is apparently identical with *spinicornis*.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.91-0.93	1.26	1.06	1.88
Prothorax.	0.54	0.94	0.46	0.98
Pterothorax.	0.85	1.39	0.86	1.48
Abdomen.	2.31	2.42	2.90	2.46
Total.	4.20		4.85	
C.I.	1.35-1.38		1.77	

Described from 2 males, 6 females, from skins of *Tragopan melanocephalus* (J. E. Gray) from Kashmir.

Holotype.—Male in the Meinertzhagen collection, slide no. 3762.

Paratypes.—1 male, 6 females, from the same host.

GONIODES MEGACEROS Kellogg & Paine, 1914. (Text-figs. 8 a & 11 a.)

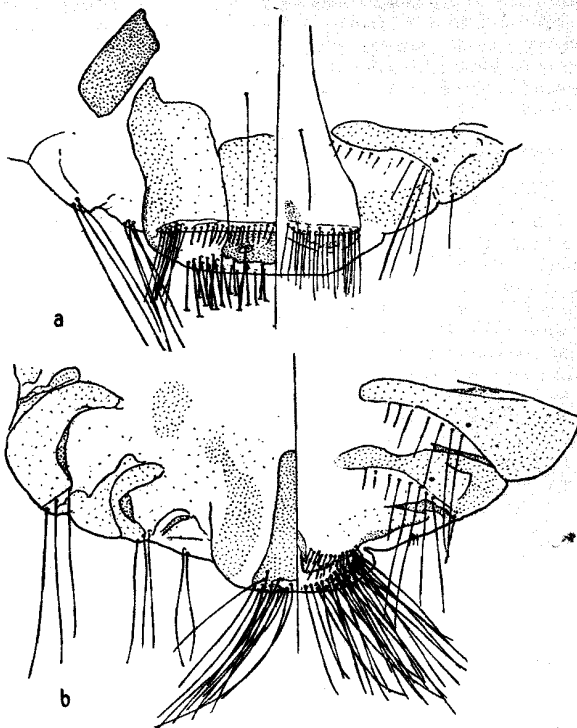
Goniodes megaceros Kellogg & Paine, 1914, p. 227, pl. xv. fig. 8. Host: *Lophophorus impeyanus* (Latham) (Zoological Gardens, Calcutta).

This species is distinguished in the males from *spinicornis* by the characters of the genitalia and antennae, and from *meinertzhagensi* by the shape of the head and genitalia. The females of this species are probably unknown (see discussion below).

Male.—Head as described and figured by Kellogg and Paine with characters of clypeal angle and clavi as in *spiniicornis*, the latter being more rounded distally.

Pterothorax with an irregular process arising laterally each side from the posterior margin of the dorsum, which lies approximate to the tergal plate of the first abdominal segment. Small rounded meso- and metasternal plates

Text-figure 8.

Terminal segments of ♂ abdomen of (a) *Goniodes megaceros*; (b) *G. eurygaster*.

present, each bearing two long hairs (one specimen with three on the meso-sternal plate).

Abdomen with dorsal view as shown in Kellogg and Paine, except for the posterior segments, which are apparently somewhat distorted in the figure. Genital opening dorsal, but practically terminal (text-fig. 8a).

Genitalia large, with distal end of paramera thickened, and drawn out into a point laterally (text-fig. 11a).

Abdominal Chastetery.

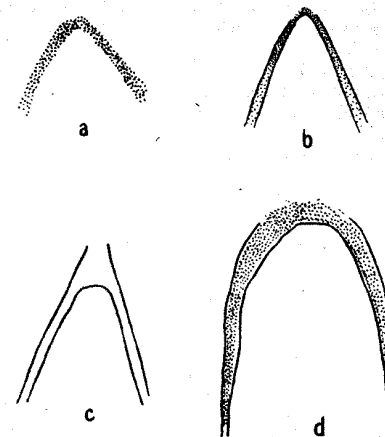
	Male.		
	T.	S.	P.
I.	2-3, 12, 2-3	7	0, 0
II.	2-3, 9, 2-3	23	1, 1
III.	2-3, 9, 2-3	18	2, 2
IV.	2, 8, 2	18	2, 2
V.	2, 7-8, 2	11-13	3, 3
VI.	3-4, 2, 3-4	2	3, 3
VII.	4, 2, 4	10	3, 3
VIII.	Fig.	Fig.	Fig.
IX.	Fig.	Fig.	Fig.

The three groups of tergal hairs are joined up by a number of extremely small hairs:—22-30 each side in segments I-IV; 13-18 each side in segments V-VI; and 7 each side in segment VII.

Measurements as given by Kellogg and Paine with C.I. as taken from the text:—1.19 (presumably with length of head taken from anterior margin to posterior level of occipital angles). C.I. with length of head taken from anterior margin to centre of mid-occipital margin:—1.40.

Female.—Five females were collected from the same host as two males of *megaceros*, and apparently do not differ from the females collected with the males of *eurygaster*. There is, however, a certain amount of variation in the

Text-figure 9.

Bifid structure of ♀ genital organs: (a) *Goniodes pavonis*; (b) *G. meinertzhageni*; (c) *G. spiniicornis*; (d) *G. tragopan*.

shape and size of the clavi among the 32 females examined. Unfortunately, all the specimens from *Lophophorus impeyanus* examined were taken under conditions in which the total population was not necessarily collected, so that the evidence of the distribution of the males of the two species with the females is of little use. There are two possibilities therefore, either the females of

megaceros have not yet been found, or the females of the two species are so close that without accurate collecting in the field and evidence as to which males the females belong, it is impossible to say whether the differences are individual variations or specific.

Measurements.

	Male.	
	Length. mm.	Breadth. mm.
Head	1.20	1.68
Prothorax	0.60	1.21
Pterothorax	1.13	1.82
Abdomen	2.89	2.76
Total	5.22	
C.I.		1.40

Specimens examined.—2 males, from skins of *Lophophorus impejanus* (Latham) from Sikkim. 2 males from skin of *Lophophorus sclateri* Jerdon from Yunnan differ from *megaceros* in the shape of the distal end of the paramera, but in other respects appear conspecific.

SPECIES GROUP C.

1. Size as in group B.
 2. Temples similar in the two sexes, but widely expanded.
 3. Clavi similar in the two sexes, and not greatly developed nor thickened.
 4. Antennæ sexually dimorphic. In the male first segment without process; third prolonged distally as small blunt-ended process. Female antennæ as in A.
 5. Thoracic sternal hairs as in A.
 6. Pleurites without inner thickened area.
 7. Bifid structure not apparent.
 8. Vulva as in B.
 9. Male genital opening unmodified.
- Contains a single species, which, although distinctive, has its affinities with group B.

GONIODES EURYGASTER Piaget, 1885. (Text-figs. 8b, 10, 11b, & 12.)

Goniodes eurygaster Piaget, 1885, p. 53, pl. vi. fig. 1. Host: *Lophophorus impejanus* (Latham) (Zoological Gardens, Amsterdam).

This species is distinguished from other known species by the combination of its large size, lack of sexual dimorphism in the shape of the head, slight sexual dimorphism of the male antennæ, and the characters of the male genitalia. The female resembles that of *spiniornis*, from which it is distinguished by the shape of the head and characters of the genital region. The position of this species depends upon the correct elucidation of the females of *megaceros* (see discussion under that species).

Male.—Head large, with widely expanded temples; clavi small, with rounded or flattened ends; antennæ with first segment slightly enlarged, and third with distal post-axial angle prolonged into a small blunt-ended process. Piaget's figure (pl. vi. fig. 1) differs somewhat in the shape of the head from his type-specimens (text-fig. 10).

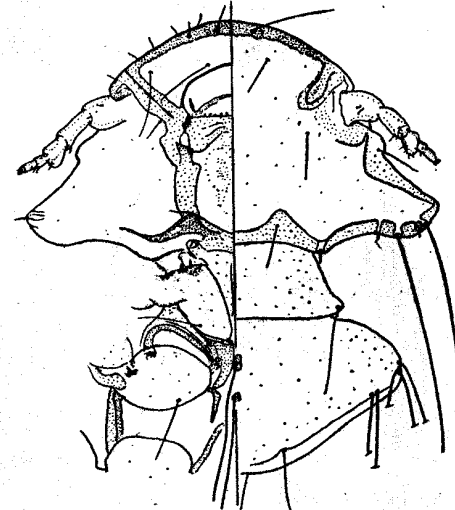
Thorax with shape as shown in text-fig. 10. Prothorax with stout elongated hair at each postero-lateral angle. Pterothorax with 2 stout elongated hairs on each lateral margin, 2 similar hairs each side on the lateral part of the

posterior margin, and a finer and shorter hair lateral to the centre of the posterior margin. Small rounded meso- and metasternal plates present, each bearing 2 stout hairs.

Abdomen with general shape as shown in Piaget's figure, with segment IX having flattened posterior margin with thickened marginal band bearing hairs (text-fig. 8b).

Genitalia simple, with narrow, pointed paramera (text-fig. 11b).

Text-figure 10.



Goniodes eurygaster: head and thorax, ♂.

Female.—Head with general shape as that of male with clavi similar, but variable in shape and size (see under *megaceros*).

Thorax as in male.

Abdomen large, with posterior margin of valve bilobed, and bearing a continuous row of small spine-like hairs (text-fig. 12).

Abdominal Chaetotaxy.

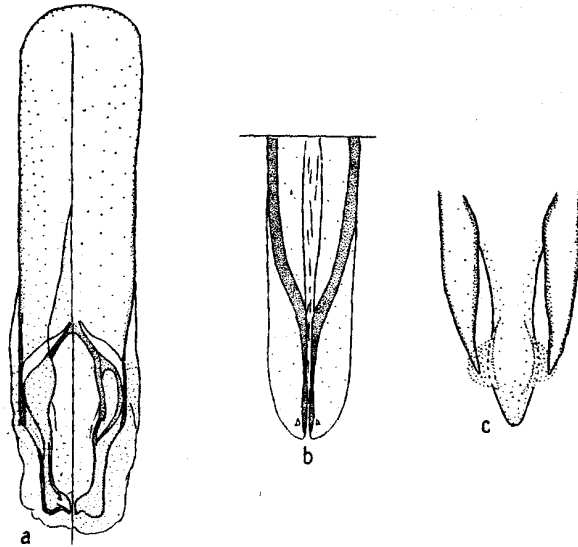
	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	40	2	0, 0	11-13	2	0, 0
II.	24	8	1, 1	1, 12-15, 1	12	1, 1
III.	20	15	2, 2	1-2, 11-14, 1-2	12	2, 2
IV.	28	11	2-3, 2-3	1-2, 11-14, 1-2	16	3-5, 3-5
V.	20	19	3-4, 3-4	2-3, 9-11, 2-3	12	3-4, 3-4
VI.	16	6	3-4, 3-4	22-26	9-10	4-5, 4-5
VII.	24	..	3, 3	Fig.	Fig.	3-4, 3-4
VIII.	Fig.	..	2, 2	Fig.	Fig.	
IX.	Fig.	Fig.				

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In the male the tergal hairs are continuous across the segments, with the outer 2-6 each side being stouter and longer; the tergal hairs are variable in number from specimen to specimen, but are as given above with + or -2-6 hairs.

Text-figure 11.

♂ genitalia: (a) *Goniodes megaceros*; (b) *G. eurygaster*; (c) *G. tragopan*.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0.95-1.02	1.79-1.92	1.04-1.15	1.86-2.16
Prothorax	0.34-0.42	0.88-0.94	0.39-0.46	0.92-1.02
Pterothorax	0.70-0.73	1.31-1.46	0.71-0.85	1.36-1.54
Abdomen	2.00-2.16	2.14-2.30	2.77-2.96	2.17-2.50
Total	3.62-4.00		4.62-4.90	
C.I.	1.85-1.88		1.73-1.92	

Specimens examined.—3 males, 5 females, in the Piaget collection from *Lophophorus impejanus* (Latham); 8 males, 21 females, from fresh specimens of *Lophophorus impejanus* from Nepal and the Zoological Gardens, London.

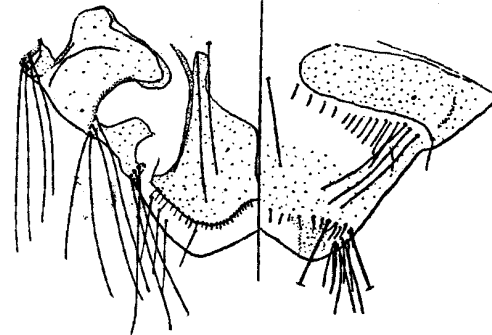
Lectotype, designated by present author.—Male in the Piaget collection, slide no. 34.

Paratypes.—2 males, 5 females, in the Piaget collection.

SPECIES GROUP D.

1. Species of medium size (males, 2.05-2.65 mm.; females, 2.50-3.05 mm.).
2. Temples as in A.
3. Clavi in the male either undeveloped or membranous; in the female membranous.
4. Antennæ exhibiting either slight or exaggerated sexual dimorphism; segment I without process. In the female segment II may be either considerably longer (*coronatus*) or approximately equal in length (*indicus*) to segment I.

Text-figure 12.

*Goniodes eurygaster*: terminal segments of ♀ abdomen.

5. Thoracic sternal hairs as in A.
 6. Pleurites as in A.
 7. Bifid structure not apparent.
 8. Vulva at level of segment VII with hairs on posterior margin, and with concentration of hairs at lateral corners.
 9. Male genital opening may or may not be somewhat modified.
- Containing two rather diverse species whose affinities are not apparent.

GONIODES CORONATUS (Giebel, 1874. (Text-fig. 13.)

Goniodes obscurus Giebel, 1866 (1), p. 389, *nom. nud.* Host: *Rollulus roulroul* (Scopoli) (*Crypturus coronatus*).

Goniocotes obscurus Giebel, 1874 (2), p. 191, *nec* Giebel, 1874, p. 188. Host as above.

Goniocotes coronatus Giebel, 1874 (2), p. 302, *nom. nov.* for *Gc. obscurus* Giebel.

Goniodes laevis Piaget, 1880, p. 673, pl. lvi. fig. 2. Host: *Rollulus roulroul* (Scopoli) (*Crytonyx coronatus*) (Sumatra and Madagascar).

Goniocotes latifasciatus Piaget, 1883, p. 157, pl. ix. fig. 4*. Host: *Cinlosoma bicolor* (in error).

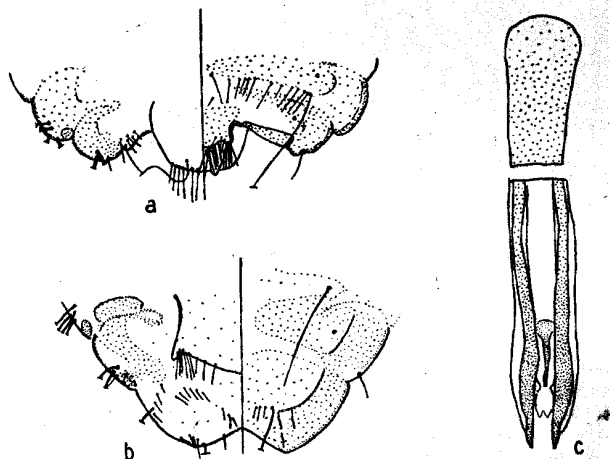
* Incorrect reference in Harrison, 1916, p. 81. Piaget described this species again as new in 1885, p. 38, pl. iv. fig. 8.

This and the following species are characterized by the lack of sexual dimorphism in the temple region of the head, the presence of meso- and metasternal hairs, form of the pleurites, terminal segment of the female abdomen, and female genital region. Characters distinguishing these two species are given under *indicus*.

Male.—Head with broad clypeal band traversed by wide canaliculi; clavi apparently undeveloped, and temples but little expanded. Antennae with first segment somewhat enlarged, second greatly elongated, and third with distal post-axial angle prolonged into blunt-ended process.

Thorax as shown in Piaget's figure (pl. lvi. f. 2) with meso- and metasternal hairs present.

Text-figure 13.



Goniodes coronatus: terminal segments of (a) ♂ abdomen; (b) ♀ abdomen; (c) ♂ genitalia.

Abdomen with shape as shown in Piaget's figure; pleurites broad; tergal plate VIII elongated laterally; segment IX small, with somewhat flattened posterior margin (text-fig. 13 a.)

Genitalia with elongated basal plate continuous with the thickened paramera; mesosome bifid (text-fig. 13 c.)

Female.—Head similar to that of male with pre-antennal region more elongated, and small membranous clavi present (see Piaget, 1885, pl. iv. f. 8). Thorax as in male.

Abdomen more elongate than in male, with shape as shown in Piaget's figure (1885). Terminal segment of distinctive form with thickened lateral plates and bilobed posterior margin. Vulva convex with spine-like hairs at the lateral corners, and a few fine marginal hairs (text-fig. 13 b.)

	Abdominal Chaetotaxy.					
	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	16-18	2	0, 0	6	2	0, 0
II.	20-24	2	3, 3	6	2	2, 2
III.	18-20	2	5, 5	1, 6-8, 1	2	4-5, 4-5
IV.	20-26	2	5-4, 5-4	1, 6, 1	2	4-5, 4-5
V.	26-28	2	5-4, 4-5	1, 2, 1	2	4-5, 4-5
VI.	26-30	2	4, 4	1, 2, 1	2	4, 4
VII.	0	2	3, 3	0	2	3, 3
VIII. ....	..	..	4, 4	..	..	..

In the male the tergal hairs are continuous across the segment, and except for 1-3 of the outer hairs are short and fine; in the female there are no lateral tergal hairs on segments I-II.

	Measurements.			
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.61-0.63	0.71-0.73	0.70-0.72	0.72-0.75
Prothorax	0.19-0.20	0.44-0.47	0.20-0.22	0.44-0.46
Pterothorax ..	0.34-0.35	0.62-0.64	0.28-0.30	0.62-0.65
Abdomen	1.07-1.15	1.06-1.08	1.45-1.49	1.05-1.08
Total.	2.08-2.18	..	2.51-2.57	..
C.I. ....	..	1.16-1.17	..	1.03-1.04

Specimens examined.—9 males, 17 females, from skins of *Rollulus roulroul* (Scopoli) from Burma and Borneo, 2 males, 2 females, from these specimens compared with type of *coronatus* by Dr. Kéler.

Piaget Collection.—2 males, 6 females, labelled *G. laevis* from *Cryptonyx coronatus* (= *Rollulus roulroul*); 2 females without host; 1 female, from *Anas arcuata* (an obvious straggler). 1 female labelled *Gc. latifasciatus* from *Cinlosoma bicolor*, a passerine bird, is conspecific with specimens from *Rollulus roulroul*, and is most probably a straggler from this host.

Lectotype of *laevis* designated by present author:—Male in the Piaget collection, slide no. 45, from the type-host.

Paratypes.—1 male, 6 females, in the Piaget collection from the same host.

Holotype of *latifasciatus*.—Female in the Piaget collection, slide no 56, as described above.

GONIODES INDICUS (Kellogg & Paine), 1914. (Text-fig. 14.)

Goniocotes indicus Kellogg & Paine, 1914, p. 218, pl. xiv. fig. 4. Host: *Arborophila r. rufogularis* (Blyth) (*Arboricola rufogularis*) (E. Himalayas).

This is a distinct species not closely resembling any other, but appears to be most nearly related to *coronatus*, from which it is distinguished by the shape of the head in both sexes; by the antennae in the male, and the genital region in the female.

Male.—Head with thick clypeal band; temples with rounded margins, and not greatly protruding. Clavi partly membranous, and not prolonged posteriorly; antennae showing slight sexual dimorphism in the larger size of first segment and the greater length of second segment. In this latter character it resembles to a certain extent *coronatus*, in which the male has the second antennal segment greatly elongated. Third antennal segment unmodified.

Thorax with shape as shown in Kellogg and Paine's figure. Meso- and metasternal hairs present.

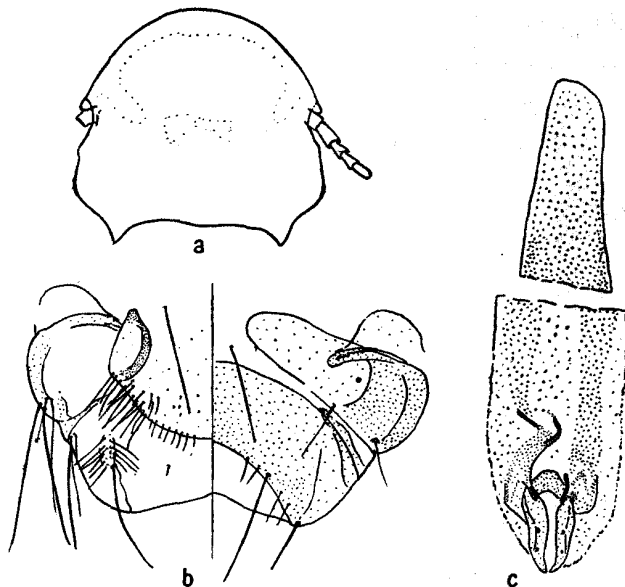
Abdomen somewhat elongated, more so than in *coronatus* with tergal chestotaxy as shown in Kellogg and Paine's figure. Upper lip of genital opening with 5-6 hairs each side, and lower lip with 7-8 each side.

Genitalia asymmetrical, with broad elongated basal plate, tapering anteriorly, paramera flattened and pointed distally (text-fig. 14c).

Female.—Head similar to that of male, but somewhat larger, and differing in the size of the antennal segments (text-fig. 14a).

Thorax as in male.

Text-figure 14.



Goniodes indicus: (a) ♀ head; (b) terminal segments ♀ abdomen; (c) ♂ genitalia.

Abdomen more elongate than in male. Terminal segment similar to that of *coronatus*, but without broad lateral band, and with continuous tergal plate. Posterior margin of vulva rounded, and except in the median portion set with small hairs, lateral corners with a concentration of somewhat larger hairs (text-fig. 14b).

Abdominal Chestotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	18-22	2	1, 1	6-8	2	1, 1
II.	18-22	2	2-3, 2-3	10	2	2-3, 2-3
III.	20-26	2	3-4, 3-4	1-2, 6-8, 1-2	2	3-4, 3-4
IV.	20-26	2	3-4, 3-4	1-2, 6, 1-2	2	3-4, 3-4
V.	18-22	2	3-4, 3-4	1-2, 4-6, 1-2	2	4, 4
VI.	4-5, 2, 4-5	2	3-4, 3-4	1-2, 4, 1-2	2	4, 4
VII.	2	2	3-4, 3-4	1, 2-4, 1	4	4, 4
VIII. ....	..	..	2-3, 2-3	Fig.	Fig.	

In the male the tergal hairs on segments I-V are continuous across the segments; in the female there are no lateral tergal hairs on segments I-II.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.72	0.81	0.75	0.88
Prothorax.	0.21	0.55	0.23	0.58
Pterothorax.	0.37	0.72	0.38	0.76
Abdomen.	1.45	1.14	1.77	1.19
Total.	2.64	.....	3.01	.....
C.I.	1.12		1.16	

Specimens examined.—1 male, 1 female, from skin of *Arborophila r. rufogularis* (Blyth) from Sikkim; 3 males, 5 females, from skins of *Arborophila rufogularis tickelli* (Hume) from Tenasserim; 4 males, 5 females, from skins of *Arborophila t. torquola* (Valenciennes) from Sikkim; 2 males, 3 females, from skin of *Arborophila t. batemani* (Ogilvie-Grant) from Burma; 1 male, from skin of *A. t. millardi* (Stuart Baker) from central Himalayas.

1 male, 1 female, from skin of *Arborophila gingica* (Gmelin), do not appear quite typical, and may prove to be a new subspecies.

SPECIES GROUP E.

1. Large species (males, 2.70 mm.; females, 3.90).
2. Temples as in A.
3. Clavi as in A, but prolonged posteriorly in both sexes.
4. Antennæ sexually dimorphic. In the male first segment without process third prolonged distally as blunt-edged process.
5. Meso- and metasternal hairs absent.
6. Pleurites as in A.
7. Bifid structure not apparent.
8. Vulva terminal with hairs on the posterior margin.
9. Male genital opening unmodified.

Contains a single species whose affinities are not apparent, but which resembles *wilsoni* in the character of the clavi, and both *wilsoni* and group G in the characters of the vulva.

Goniodes processus Kellogg & Paine, 1914. (Text-fig. 15.)

Goniodes processus Kellogg & Paine, 1914, p. 227, pl. xv. fig. 9. Host: *Arborophila r. rufogularis* (Blyth) (*Arboricola rufigularis*) (E. Himalayas).

No specimens have been examined from the type-host, *A. r. rufogularis*, but a male from *A. r. tickelli* appears to be identical with the description and figure of *G. processus*, except that segment IX of the abdomen is more elongated than shown in Kellogg and Paine's figure. However, that this varies from individual to individual is shown in the case of two males from the same host (*A. t. torquola*), in which one has the outline of segment IX as in Kellogg and Paine's figure, and one elongated as in specimen from *A. r. tickelli*. Kellogg and Paine were unable to examine the female of this species, but with the discovery of this sex the name *processus* becomes even more apt, the female being extremely distinct in the presence of finger-like processes at the temple angles formed by the prolongation of the temple margin, and in the peculiar character of the terminal segment of the abdomen, in which the lateral margin each side

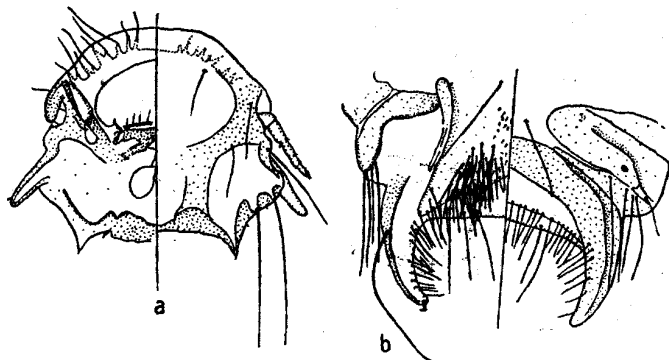
is drawn out into a finger-like process. In the male this species is unlike any other, being distinguished by the large, thickened, over-hanging clavi, shape of the head, and the characters of the abdomen and genitalia.

Male.—Head with broad clypeal band; temples not greatly rounded or expanded, and with occipital angles pointed and produced backwards to level of prothoracic hair. Clavi large and thickened, and produced posteriorly to a considerable extent; antennae with first segment enlarged, and distal post-axial angle of third segment produced as process at right angle to fourth segment.

Prothorax small, with flattened lateral margins, each bearing long hair arising from the anterior part.

Pterothorax with flattened lateral margins each bearing three long hairs.

Text-figure 15.



Goniodes processus: (a) ♀ head; (b) terminal segments ♀ abdomen.

Abdomen somewhat elongated, and narrower than is usual in this genus. Pleurites thickened and distinctive.

Genitalia with elongated basal plate and short thickened paramera; sac present.

Female.—The following description and figures are taken from specimens from *A. r. tickelli*, as no specimens from the type-host have been examined.

Head of distinctive appearance due to the great prolongation of the ventral spine-bearing process on the temples, which is present in a minute and transparent form in all *Goniodes* females. The female of *extraneus* approaches nearest to this species in the prolongation of the temple process. In the characters of the clavi, clypeal band, and occipital angles the female resembles the male (text-fig. 15 a).

Thorax as in male.

Abdomen large and somewhat elongated in shape, and distinguished from that of other *Goniodes* by the appearance of the terminal segment, which is deeply emarginate, the lateral arms being prolonged into finger-like processes. It is of interest to note that in the *Oxylipeurus (formosanus)* from *Arborophila* the terminal abdominal segment is modified in a similar manner. Genital opening nearly terminal in position, with posterior margin of vulva set with

a row of marginal hairs, and genital region with a number of stout elongated hairs each side (text-fig. 15 b).

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	16	2	0, 0	6-8	2	0, 0
II.	1, 16, 1	2	1, 1	6-8	2	1, 1
III.	3, 11-14, 3	2	3, 3	1-2, 6, 1-2	2	3-4, 3-4
IV.	3, 11-14, 3	2	3, 3	1-2, 6, 1-2	2	3-4, 3-4
V.	4, 6-8, 4	2	4, 4	2, 2, 2	2	3-4, 3-4
VI.	3, 6, 3	4	4, 4	2, 2, 2	2	3-4, 3-4
VII.	7-8, 7-8	2	4, 4	Fig.	2	3-4, 3-4
VIII. ....	.....	..	1, 1	Fig.		
IX.						

On the upper lip of the genital opening of the male there are 6-8 long hairs each side, and on the lower lip 7-8 shorter and finer hairs each side; dorsal surface of segment IX with 2-3 hairs each side; ventral surface of segment IX with 5-6 hairs each side, and 2 short and 3 long marginal hairs each side.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.84	0.95	0.94	1.40
Prothorax.	0.18	0.62	0.22	1.08
Pterothorax.	0.38	0.83	0.46	0.70
Abdomen.	1.54	1.32	2.40	1.65
Total.	2.70	.....	3.90	.....
C.I.	1-13	.....	1-48	.....

Specimens examined.—1 male, 2 females, from skins of *Arborophila rufogularis tickelli* (Hume) from Tenasserim; 1 male, 1 female, from skin of *A. rufogularis intermedia* (Blyth) from Burma; 3 males, 3 females, from skins of *Arborophila t. torquella* (Valenciennes) from Sikkim and Assam; 2 males, 1 female, from skin of *Arborophila torquella millardi* (Stuart Baker) from Central Himalayas; 2 females, from skin of *A. atrogularis* (Blyth) from Assam; 2 females, from skin of *A. gingica* (Gmelin) from S.E. China.

Specimens from skins of A. b. brunneopictus (Blyth), *A. b. henrici* (Oustalet), and *A. erythrophrys* (Sharpe) from Borneo do not appear quite typical, and may prove to be new subspecies.

SPECIES GROUP F.

1. Size as in B.
2. Temples as in A.
3. Clavi as in E.
4. Antennae sexually dimorphic. In the male first segment without process; third prolonged distally. In the female segment II tends to be longer than I.
5. Meso- and metasternal hairs absent.
6. Pleurites as in A.
7. Bifid structure absent.
8. Vulva terminal without marginal hairs.
9. Anterior margin of male genital opening thickened, and bearing numerous spine-like hairs.

Containing a single distinctive species whose affinities apparently lie with group G. It resembles this latter group in the general character of the clavi, male genital opening, female vulva, and the distinctive chaetotaxy. It differs from this group, however, in important characters such as the absence of intertergital chitin, and in the form of the sternal thickening.

Goniodes wilsoni Clay, 1938.

Goniodes wilsoni Clay, 1938, p. 5, figs. 5-9. Host: *Afropavo congensis* Chapin (E. Congo Forest).

SPECIES GROUP G.

1. Species of medium to large size (males, 2.68-4.20 mm.; females, 4.45-4.80 mm.).
2. Temples similar in the two sexes and somewhat expanded.
3. Clavi either large and greatly thickened, or small and partly membranous.
4. Antennae sexually dimorphic. In the male first segment without process; third produced distally to a greater or less extent. In the female segment II considerably longer than segment I.
5. Meso- and metasternal hairs absent.
6. Pleurites as in A.
7. Structure not apparent.
8. Vulva as in F.
9. Upper margin of male genital opening modified, and may or may not be thickened.

A distinctive and homogeneous group of species in which the males have numerous elongated marginal hairs on the temples and pterothorax, and clumps of spine-like hairs on tergites III, IV, or V; intertergital plates present between segments I-VI in the female and between segments V-VI or II-VI in the male, and with sternal thickening in the form of two irregular plates each side of the abdomen. However, the characters of *wilsoni* on one hand, and of *gigas* on the other, prevent this group being considered of generic value.

Goniodes hopkinsi, sp. n. (Text-figs. 16 & 17.)

This species resembles *wilsoni* to a certain extent in the presence of enlarged clavi: form of the male antennae; chaetotaxy of the head, thorax, and abdomen; male genitalia and certain characters of the terminal segments of the female. It is at once distinguished, however, by the shape of the head and clavi, and by the details of the genital region of the female. From *fimbriatus* it is distinguished, amongst other characters, by the shape of the clavi in both sexes and by the characters of the male antennae, and from *perlatus*, in the male by the presence of thickened clavi and absence of intertergital chitin between segments I-IV, and in the female by the shape of the clavi.

Description of Male.—Head with thickened pointed clavi elongated posteriorly; antennae with first segment not enlarged comparatively to that of female, with second segment elongated, and third with post-axial angle prolonged as a somewhat transparent process parallel to the fourth. Long marginal hairs numerous on clypeal and temple margins, and whole dorsal surface of head covered with small spine-like hairs (text-fig. 16).

Thorax with shape and chaetotaxy as shown in text-fig. 16.

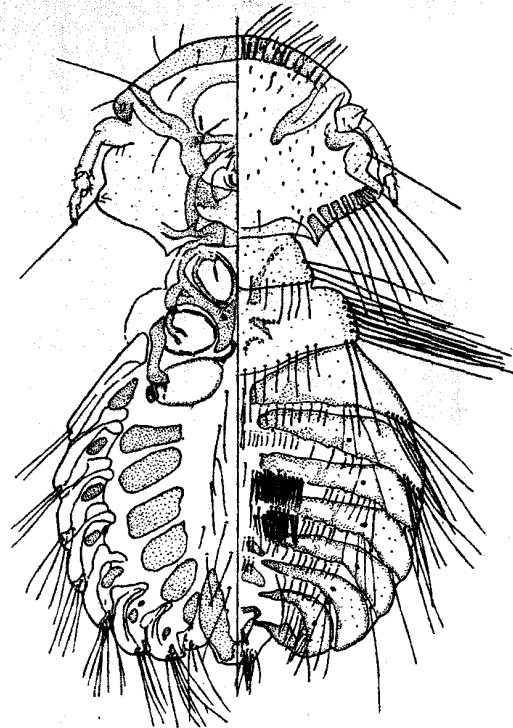
Abdomen short and rounded, with intertergital thickening only present between segments V and VI; sternal thickening in the form of two, or in some cases three, plates each side; genital opening not greatly modified or thickened

as in *fimbriatus* and *perlatus* (text-fig. 17 a); segments III and IV with a clump of stout spines at the central edge of each tergal plate (text-fig. 16).

Description of Female.—Head of the same shape as that of male, but larger, and with clavi of different shape (text-fig. 17 b), and without the numerous spine-like hairs on the dorsal surface of the post-antennal region.

Thorax with shape as in male, but with fewer dorsal ptero-thoracic hairs,

Text-figure 16.

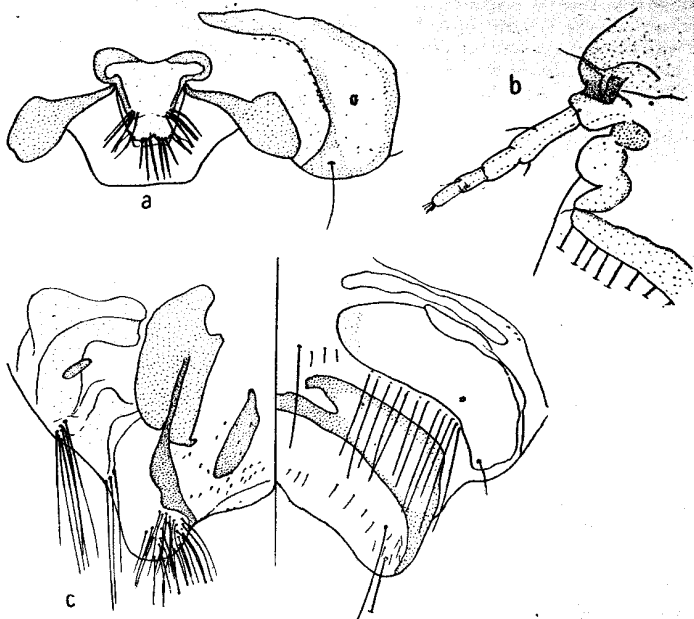


Goniodes hopkinsi, ♂.

i. e., 7-10 lateral marginal hairs each side, and 3 hairs each side of the posterior margin.

Abdomen similar to that of *fimbriatus*, with tergal and sternal plates of segments I-VI as in this latter species. On the dorsal surface chaetotaxy of segments I-VI as in *fimbriatus*, except that in segments II-III there are a greater number of median hairs each side, i. e., 6-8. Ventral and ventrolateral hairs as in *fimbriatus*. Plates and chaetotaxy of terminal segments as shown in text-fig. 17 c. Genitalia similar to those of *perlatus*.

Text-figure 17.

*Goniodes hopkinsi*: (a) ♂ genital opening; (b) ♀ head; (c) ♀ abdomen.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.89-0.94	1.23-1.34	1.07-1.14	1.49-1.58
Prothorax.....	0.24-0.28	0.69-0.73	0.32-0.35	0.80-0.84
Pterothorax.....	0.42-0.45	1.02-1.09	0.48-0.50	1.22-1.26
Abdomen.....	1.48-1.51	1.17-1.67	2.74-2.83	2.12-2.16
Total.....	2.90-3.00	.....	4.45-4.53	.....
C.I.....	1.38-1.47	.....	1.38-1.39	.....

Described from 10 males, 15 females, from *Guttera edouardi seth-smithi* Neumann from Budongo Forest, Uganda; 2 males, 5 females, from skins and fresh specimens of *G. edouardi sclateri* Reichenow from Cameroon; 2 males, 1 female, from skin of *G. edouardi pallasi* Stone from Togoland; 1 female, from skin of *G. e. edouardi* (Hartlaub) from Nyasaland; 1 male, from skin of *G. pucherani* (Hartlaub) from Tanganyika Territory.

Holotype.—Male in the British Museum, slide no. 261, presented by Mr. G. H. E. Hopkins, from *G. edouardi seth-smithi*. *Paratypes*.—9 males, 15 females, from the same host.

GONIODES NUMIDÆ Mjöberg, 1910.

Goniodes numidæ Mjöberg, 1910 (1), p. 102, figs. 60-61. Host: *Numida m. meleagris* (Linné) (Sudan).

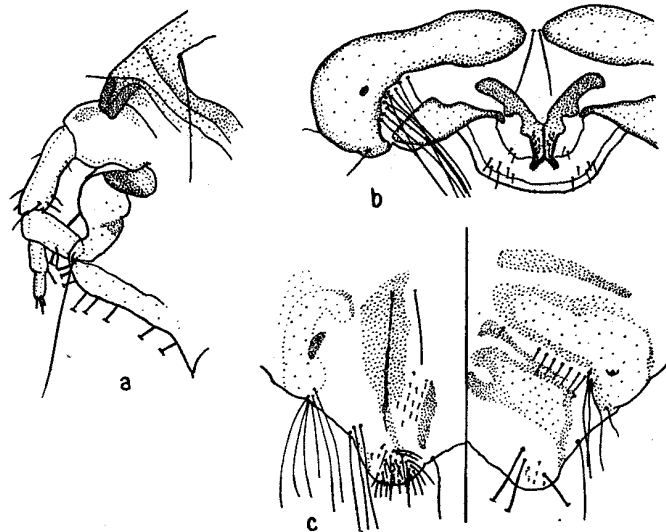
Dr. René Malaise has with great kindness searched for the type of this species in the Naturhistoriska Riksmuseum, but the only specimen labelled *numidæ* is an extremely immature example, quite useless for comparison. The measurements of the head and the description of the male antennæ of *numidæ* are apparently as those of *fimbriatus*, but in the figure and measurements of the male abdomen it differs considerably from *fimbriatus*, resembling *perlatus*. Therefore, without examination of the type material or specimens from the type-host, it is impossible to place this species, and for the present it is more satisfactory to keep *fimbriatus* and *perlatus* distinct.

GONIODES FIMBRIATUS Neumann, 1913. (Text-fig. 18.)

Goniodes fimbriatus Neumann, 1913 (2), p. 629, figs. 19-20. Host: Unknown bird from Isle of Konakry.

Neumann gave a locality, but no host, for this species; but as it is a *Numida* parasite it is probable that the host was *Numida meleagris galeata* Pallas, which

Text-figure 18.

*Goniodes fimbriatus*: (a) ♂ head; (b) ♂ genital opening; (c) ♀ abdomen.

occurs in the given locality. A male and female from this host agree with Neumann's description and figures, and have been used as the basis for the following description.

This species is distinguished from *hopkinsi* by the shape of the clavi in both sexes, and by the characters of the antennæ, genital opening, and genitalia

of the male. For characters distinguishing this species from *perlatus* see under the latter species.

Male.—Head as shown in Neumann's figure, except that in the specimens examined there are 8 hairs each side on the dorsal surface of the temple region, of which at least 5 are considerably smaller than the single hair shown in Neumann's figure; in addition to these hairs there are a number of minute hairs scattered over the dorsal surface. Ventro-lateral temple hair elongate, not spine-like. Large, blunt-ended clavi present. Antennae with first segment enlarged comparatively to that of female, second segment elongate, and distal post-axial angle of third segment prolonged at right angles to fourth segment as a large process rounded distally (text-fig. 18 a).

Thorax as shown in Neumann's figure, but in the specimens examined the posterior prothoracic margin appears somewhat more flattened and bears 3-4 hairs each side; lateral pterothoracic margin with 14-18 long hairs each side, and 9-12 dorsal hairs each side of the posterior margin. Dorsal thoracic thickening as in *hopkinsi* (text-fig. 16).

Abdomen similar to that of *perlatus*, but larger and more elongate; intertergital chitin present between segments I-VII (i. e., 6 plates); dorsal margin of genital opening prolonged into a thickened process bilobed distally (text-fig. 18 b); sternal thickening consisting of two plates each side. Chatotaxy similar to that of *perlatus*, except that there is a slight indication of a group of spines at the inner margin of the tergal plate of segment III, a definite group on segment IV (as in *perlatus*), and a scanty group on segment V.

Genitalia similar to those of *perlatus*, and consisting of an elongated basal plate terminating in simple pointed paramera of unequal length.

Female.—Head of the same shape as that of the male, with filiform antennae; similar clavi, but somewhat more elongated than in the male; clypeal band with only 2 long submarginal hairs.

Thorax as in male, but lateral pterothoracic margins bear fewer hairs, i. e., 12 on each side, and the posterior margin bears only 3 hairs each side.

Abdomen large and more elongated than in male; tergal plates widely separated medianly, with narrow strips of intertergital chitin between segments I-VIII (i. e., 7 strips); sternal plates in two pieces each side; postero-lateral corner of segment I is prolonged into thickened point (Neumann's fig. 20, labelled δ). On the dorsal surface segments I-IV have 2 lateral hairs each side, 4-5 median each side, and 2 long central hairs which are situated somewhat more anteriorly; segments V-VI have 2-3 lateral hairs, 3-5 median hairs each side, 2 of which may be shorter and finer, and 2 long central hairs. On the ventral surface segments I-VII have 2 central hairs except for segments V-VI, which have 4 central hairs. Segment I has no pleural hairs; segment II, 4-5 each side; segments III-VII have 5-8 each side. Posterior segments with plates and chatotaxy as shown in text-fig. 18 c.

Measurements.

	Male.		Female.	
	Length.	Breadth.	Length.	Breadth.
	mm.	mm.	mm.	mm.
Head (a).....	1.17	1.87	1.14	1.65
(b) *.....	1.27	..	1.25	..
Prothorax.....	0.33	0.95	0.35	0.93
Pterothorax.....	0.61	1.51	0.57	1.43
Abdomen.....	2.40	2.18	3.14	2.38
Total.....	4.20	..	4.80	..
C.I. (a).....	..	1.43	..	1.45
(b).....	..	1.32	..	1.32
C.I. Neumann's measurements: male, 1.37; female, 1.39.				

* Length to posterior level of occipital angles.

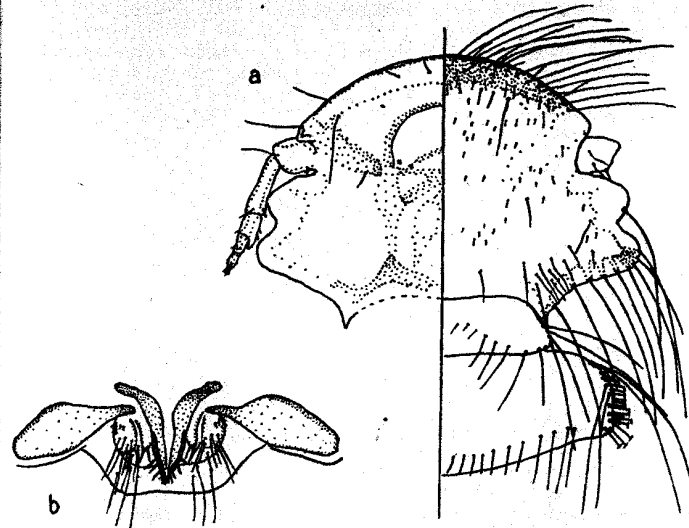
Specimens examined.—1 male, 1 female, from skin of *Numida meleagris* *valentia* Pallas from Sierra Leone; 1 male, from skin of *Numida m. calleserti* Chapin from Belgian Congo.

GONIODES PERLATUS, sp. n. (Text-figs. 19 & 20.)

This species is distinguished from *fimbriatus* in the male by the absence of enlarged thickened clavi, by the form of the third antennal segment, the shape of the abdomen, and by the characters of the genital opening. The females of this species are apparently indistinguishable from those of *fimbriatus*.

Description of Male.—Head with clypeal margin bearing a number of long hairs, and dorsal surface covered with numerous short spine-like hairs. Clavi

Text-figure 19.



Goniodes perlatus: (a) ♂ head; (b) ♂ genital opening.

small and transparent; antennae with first segment scarcely enlarged, second segment elongated, and third segment with distal post-axial angle prolonged parallel to fourth segment as a somewhat transparent process (text-fig. 19 a).

Thorax with lateral pterothoracic margin bearing numerous hairs (text-fig. 19 a).

Abdomen short and broad, and widest at the third segment, with intertergital chitin present, and double sternal plates (text-fig. 20 a). Dorsal surface of genital opening prolonged into pear-shaped process, with thickened margin bearing hairs (text-fig. 19 b).

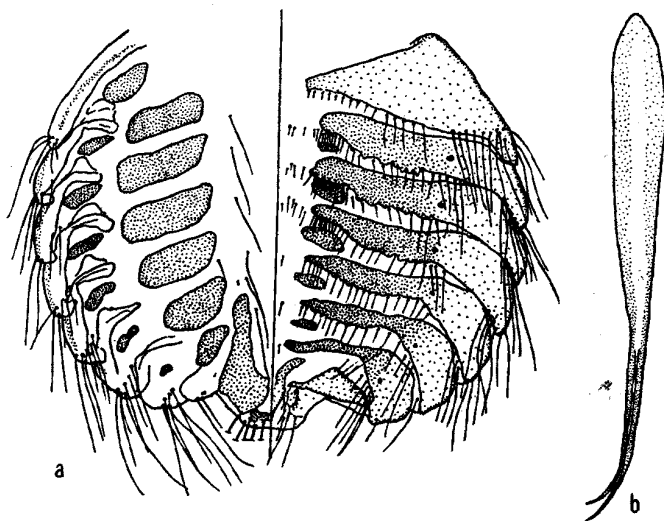
Genitalia with pointed unequal paramera continuous with the outer margins of the elongated basal plate (text-fig. 20 b).

Description of Female.—Apparently identical with that of *fimbriatus*.

	Measurements.			
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.85-0.89	1.31-1.33	1.12-1.18	1.65-1.61
Prothorax.....	0.25-0.27	0.74-0.76	0.23-0.37	0.85-0.94
Pterothorax.....	0.38-0.44	1.16-1.19	0.54-0.61	1.34-1.45
Abdomen.....	1.27-1.30	1.68-1.83	2.76-2.90	2.24-2.34
Total.....	2.68-2.76		4.50-5.70	
C.I.....	1.47-1.53		1.32-1.44	

Described from 41 males, 15 females, from *Numida meleagris major* Harlaub from Budongo, Uganda; 2 males, 1 female, from skins of *N. meleagris maxima*

Text-figure 20.



Goniodes perlatus: (a) ♂ abdomen; (b) ♂ genitalia.

Neumann from Angoland; 1 male, 1 female, from *N. m. coronata* Gurney from Transvaal; 4 males, 1 female, from skins of *N. m. mitrata* Pallas from Zambesi Valley; 1 male, from skin of *N. m. damarensis* Roberts from S.W. Africa.

Holotype.—Male in the Meinertzhagen collection, slide no. 7638, from *Numida meleagris major*, from Uganda. **Paratypes.**—40 males, 15 females, from the same host.

Amongst material examined from *Numida* there is at least one, and possibly two, further species related to *fimbriatus* and *perlatus*, but the material is inadequate for descriptions.

SPECIES GROUP H.

1. Size as in G.
2. Temples similar in the two sexes, and not greatly expanded.
3. Clavi membranaceous and similar in the two sexes.
4. Antennæ similar in the two sexes, with segment II considerably larger than segment I.
5. Thoracic sternal hairs as in G.
6. Pleurites as in A.
7. Structure not apparent.
8. Vulva as in A.
9. Male genital opening similar to *G. (hopkinsi)*.

Containing two species which, in addition to the above characters, resemble group G in the double nature of the sternal plates and the form of tergal plate VIII in the female. The strongly developed crop teeth and the coloration, two characters in which this group resemble group G, are most probably directly correlated with the habitat, and do not necessarily indicate close relationship, as these characters are also found in the *Goniocotes* and *Lipeurus* species occurring on the Numididae. These species cannot, however, be included in group G with the other *Goniodes* from the Numididae owing to the absence of the distinctive chatotaxy and intertergital chitin, and to the differences in the character of the female vulva.

GONIODES GIGAS (Taschenberg), 1879. (Text-figs. 21 & 22.)

Goniocotes hologaster Denny, 1842, pp. 56 & 153, pl. xiii. fig. 4, nec *Gc. hologaster* (Burmeister), 1838. Host: *Gallus domesticus* (British Isles).

Goniocotes gigas Taschenberg, 1879, p. 104, pl. i. fig. 10. Nom. nov. for *hologaster* Denny.

Goniocotes abdominalis Piaget, 1880, p. 238, pl. xx. fig. 9. Host: *Gallus domesticus*.

Although originally described from the domestic chicken (*Gallus domesticus*), the true host of this species is the guinea fowl (*Numida*).

This species and *agelastes* are not closely related to any other, except that in certain characters they resemble the preceding *Goniodes* species from the Numididae.

Male.—Head with thick clypeal band and temples but little expanded; antennal band terminating centrally in circular thickening. Antennæ with second segment elongated, and third simple and unmodified (text-fig. 21).

Thorax with shape and dorsal chatotaxy as in female (text-fig. 22), and without sternal plates or hairs.

Abdomen broadly rounded, with the posterior margins of the two halves of the first tergal plate fused to the anterior margins of the second; sternal plates on segments II–VI in two parts each side. Genital opening resembling that of *hopkinsi*.

Genitalia with thickened elongated basal plate and somewhat flattened paramera reaching a considerable distance below the distal termination of the mesosome (Cummings, 1916 (1), fig. 18).

Female.—Head as in male, but larger, and with antennæ comparatively shorter.

Thorax as shown in text-fig. 22.

Abdomen large; tergal plates of segments I and II not fused; tergal plate on segment VIII partially divided into two antero-posteriorly, the most posterior portions each side fusing centrally as in *fimbriatus* (text-fig. 22).

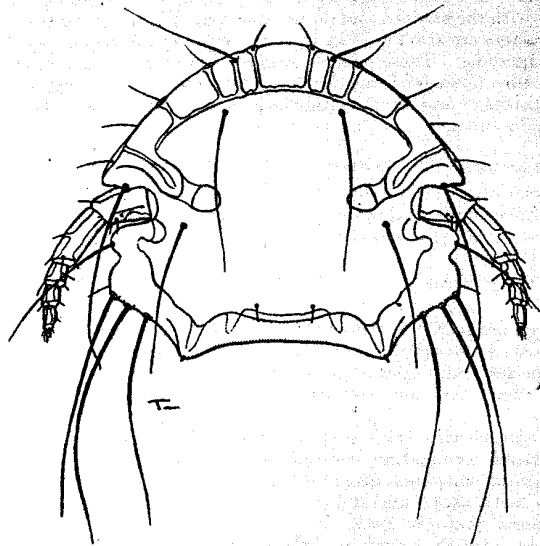
PROC. Zool. Soc. LOND., SER. B.—VOL. 110,

Abdominal Chetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	2-3, 20, 2-3	0	0, 0	Fig.	0	0, 0
II.	2-3, 18-20, 2-3	2	2, 2	"	2	2, 2
III.	2-3, 16-18, 2-3	4	4, 4	"	4-6	2-3, 2-3
IV.	2-3, 14-16, 2-3	6	4-5, 4-5	"	6	4, 4
V.	3, 8-12, 3	4-5	5, 5	"	4	5, 5
VI.	3, 4-6, 3	4	5-6, 5-6	"	2	5, 5
VII.	4, 2, 4	2	4, 4	"	2	4, 4
VIII. ....	.....	.....	3, 3	"	Fig.	Fig.
IX. ....	.....	.....	.....	"	Fig.	.....

In the male the central tergal hairs are irregular in size and position.

Text-figure 21.



Goniodes gigas, ♂ head.

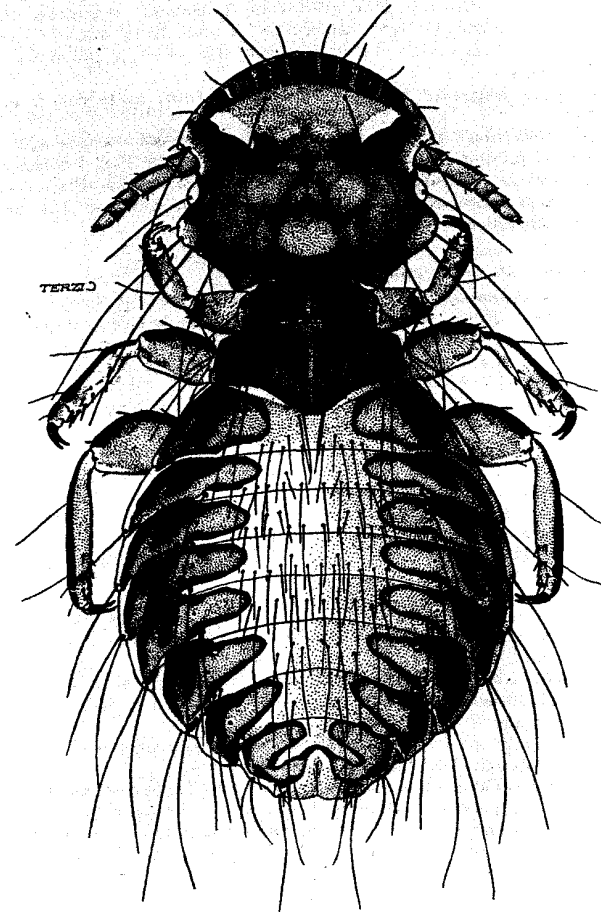
Measurements*.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	1.00-1.09	1.15-1.19	1.14-1.18	1.28-1.29
Prothorax.....	0.24	0.64	0.23	0.78
Pterothorax.....	0.49	0.95	0.55	1.12
Abdomen.....	1.74	1.92	2.40	2.11
Total.....	3.30	.....	4.20	.....
C.I.	1.09-1.15		1.09-1.12	

* Measurements made from specimens from *N. meleagris mitrata*,

Specimens examined.—1 female in the Denny collection labelled *hologaster*, from *Gallus domesticus*, British Isles; 3 males, 3 females, in the Piaget collection labelled *abdominalis*, from *Gallus domesticus*; 1 male, 5 females, from the same

Text-figure 22.



Goniodes gigas, ♀.

host from Nigeria, Uganda, and British Guiana; 1 male, 5 females, from *Numida meleagris major* Hartlaub from Uganda; 2 males, 3 females, from skins of *N. m. mitrata* Pallas; 1 male, from skin of *N. m. rickwa* Reichenow

from Tanganyika; 2 females, from skin of *N. m. coronata* Gurney from Transvaal; 1 female, from skin of *N. m. calleserti* Chapin from Belgian Congo; 1 female, from skin of *N. m. galeata* Pallas from Sierra Leone; 1 male, 1 female, from *N. m. reichenowi* Ogilvie-Grant from Kenya; 4 males, 4 females, from *Guttera edouardi sethemi* Neumann from Kenya and Uganda; 2 females, from skins of *G. e. edouardi* (Hartlaub) from Nyasaland; 4 females, from skin of *G. e. sclateri* Reichenow from Cameroons; 1 male, from skin of *G. pucherani* Hartlaub from Tanganyika; 1 male, from skin of *G. p. plumifera* (Cassin) from Cameroons.

Holotype of *hologaster* Denny.—Female in Denny collection from *Gallus domesticus*.

Piaget Collection: British Museum.—*Lectotype* of *abdominalis*: Piaget designated by present author:—Male, slide no. 1, in the Piaget collection from *Gallus domesticus*. *Paratypes*.—2 males, 3 females, in the Piaget collection from same host. Leiden Museum, 1 male, 1 female, slide no. 134, paratypes from *Gallus domesticus*.

GONIODES AGELASTES, NOM. NOV.

Goniocotes abdominalis var. *latifasciata* Piaget, 1885, p. 44, pl. v. fig. 3*, nec Piaget, 1883. Host: *Agelastes meleagrides* Bonaparte (*Agelastus meleagrides*).

The only material of *agelastes* seen is the single female on which the original description was based, and it is not possible, therefore, to decide whether it should be given specific or subspecific rank.

This species is distinguished from *gigas* by the greater thickness of the clypeal band, and by the chaetotaxy of the genital region, *agelastes* having the hairs at the lateral margins of the vulva more numerous and stouter in form, and having more numerous spines anterior to these hairs. The measurements fall within the range of those of *gigas*.

Specimen examined.—1 female, in the Piaget collection, labelled *Gc. abdominalis* var. *latifasciata*, from *Agelastes meleagrides* Bonaparte.

Holotype.—Female in Piaget collection, slide no. 55, as described above.

SPECIES GROUP I.

1. Species large to median size (males, 1.90–4.10 mm.; females, 2.40–4.48 mm.).
2. Temples exhibiting sexual dimorphism in shape, being little, or not at all, expanded in the male, and being expanded to a greater extent in the female.
3. Clavi partly membranous in both sexes, and developed to a greater or less extent (text-figs. 1a & 2c).
4. Antennæ sexually dimorphic. In the male the first segment may either have no process (*lagopi* and others), a small unthickened process (*dentatus* and *sectus*), or a large thickened process (*crossoptilini*): third segment produced distally at right angles to fourth segment. In the female segment II is either shorter or equal to segment I.
5. Meso- and metasternal hairs absent.
6. Pleurites without thickened area between marginal band of pleurite and spiracle.
7. Structure in female abdomen absent.

* Incorrect reference in Harrison, 1916, p. 81.

8. Vulva with hairs concentrated at lateral corners (exc. *mammillatus*). Spinous process present on genital region.
9. Male genital opening unmodified.

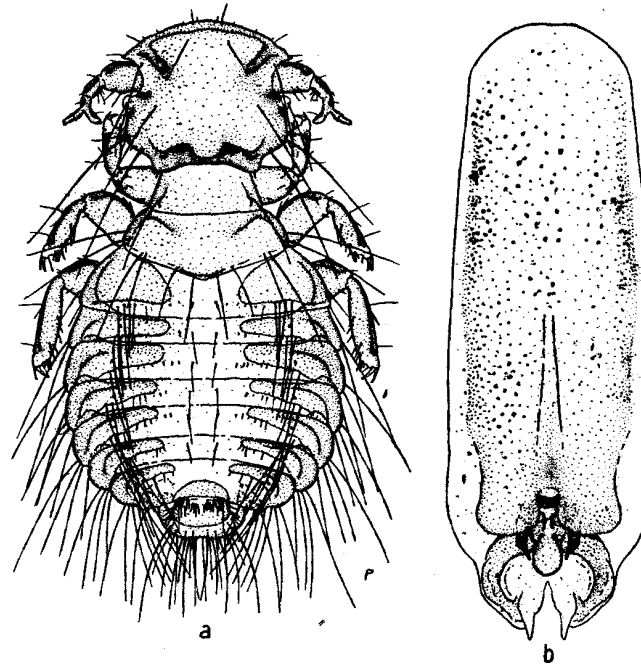
Contains a fairly homogeneous group of species, which cannot in all cases be separated from K, the two groups merging into each other. The clavi in groups I, J, and K are diverse in shape, and in I and K, and some species of J, are membranous, and apt to be distorted and indistinct in specimens treated with caustic potash.

GONIODES BITUBERCULATUS Rudow, 1869. (Text-figs. 23, 24, & 27 a.)

Goniodes chelicornis Nitzsch, 1818, p. 293, nom. nud. Host: *Tetrao u. urogallus* Linné.

Pou de Coq de Bruyère, Lyonet, 1829, p. 268, pl. iv. fig. 7.

Text-figure 23.



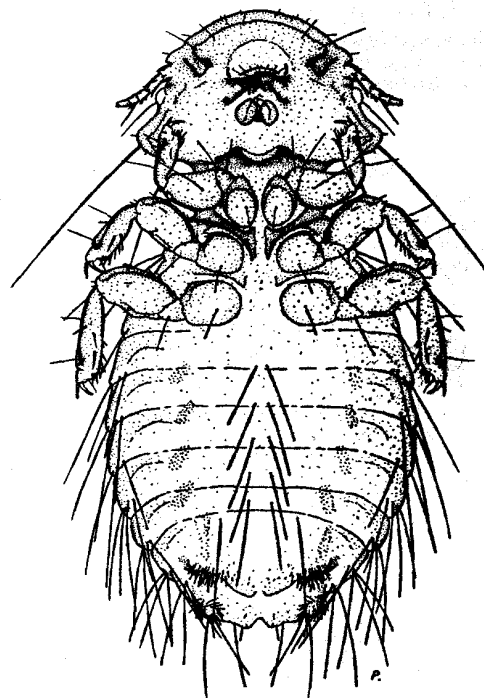
Goniodes bituberculatus: (a) ♂; (b) ♂ genitalia.

Goniodes chelicornis Denny, 1842, pp. 57 & 160, nec Children, 1836.

Goniodes bituberculatus Rudow, 1869 (2), p. 27. Host: *Tetrao urogallus* × *Lyrurus tetricus* (*Tetrao medius*).

The history of this name is somewhat unfortunate, as it was originally published by Nitzsch as a *nomen nudum*; Lyonet figured it, but gave no name; de Haan was doubtful in his application of Nitzsch's *nomen nudum* to Lyonet's figure of "Pou de coq de Bruyère," and so cannot be considered as the author; Children first applied the name *chelicornis* to the *Goniodes* occurring on *Lagopus* (= *G. lagopi*), and since he refers to a previous figure, and gives measurements and host, he must be considered as the first author of *chelicornis*. This, however,

Text-figure 24.

*Goniodes bituberculatus*, ♀.

unfortunately means sinking the name as a synonym of *lagopi*. *G. bituberculatus* Rudow is therefore the next available name for the *Goniodes* from *Tetrao urogallus* if Taschenberg's identification of the original specimen is taken. As this specimen is apparently lost, a neotype has been designated, and the type-host restricted to *Tetrao u. urogallus*.

Complete figures of the male and female of this species are given to facilitate the descriptions and comparisons of related species. As would be expected, this species is most closely related to other species from hosts belonging to the

Tetraonidae, and is distinguished in the male by the antennae, chaetotaxy of segment VI, and the genitalia. The differences in the female are given below under the related species.

Male.—Head as shown in text-fig. 23 a, with ventral chaetotaxy as in *tetraonis*. The first antennal segment is somewhat broader than in the following closely related species, and, as shown below, the ratio of the breadth of segment I to the breadth of segment IV, a fairly constant measurement, gives a useful index of the breadth of segment I.

Thorax and abdomen, as shown in figure, with the number of long abdominal dorsal hairs varying to the extent of 2-3 in different specimens.

Genitalia as shown in text-fig. 23 b.

Female.—Head as shown in text-fig. 27 a, with dorsal chaetotaxy as in male.

Thorax and abdomen as shown in text-fig. 24. The long dorsal abdominal hairs are arranged in three groups, a central, and two lateral, linked together by a varying number of minute hairs (see table).

Abdominal Chaetotaxy.

	Male.			Female.		
	T. Fig.	S.	P.	T. Fig.	S.	P.
I.	0	2-3	2-3	2-3, 6-10	2-3	2, 2
II.	2	3, 3	3, 3	2-3, 8-10	2-3	3, 3
III.	2	3, 3	3, 3	2-3, 8-10	2-3	3, 3
IV.	2-4	3, 3	3, 3	2-3, 8-10	2-3	3, 3
V.	2-4	4, 4	4, 4	3-5, 6-16	3-5	4, 4
VI.	9-14	4, 4	4, 4	2-4, 4-12	2-4	4, 4
VII.	2	4, 4	4, 4	3-5, 2-4	3-5	4, 4
VIII. ....	..	3, 3	3, 3	7-9, 7-9	..	3, 3
IX. ....	..	20-24	..	2	..	..

In both sexes there are a number of minute hairs present on most tergites, which in some specimens are elongated, thus increasing the apparent number of hairs. In the female on tergites I-VI the inner 1-3 lateral hairs each side may be shorter and finer than the remaining hairs; on tergite VIII, 2 of the hairs each side are longer and stouter than the remaining hairs.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.64-0.74	0.69-0.84	0.73-0.83	1.07-1.28
Prothorax.	0.22-0.24	0.49-0.59	0.20-0.30	0.49-0.60
Pterothorax.	0.35-0.36	0.76-0.85	0.34-0.42	0.76-0.92
Abdomen.	1.32-1.36	1.21-1.40	1.64-1.84	1.25-1.58
Total.	2.40-2.53	..	2.83-3.18	..
C.I.	1.04-1.15	..	1.44-1.54	..

Proportion of breadth of male antennal segment I to breadth of antennal segment IV.

<i>G. bituberculatus</i> .	<i>G. cupido</i>	<i>G. tetraonis</i> .	<i>G. lagopi</i> .
4.00:1-4.40:1	3.34:1-3.46:1	2.67:1-3.52:1	3.02:1-3.56:1

Specimens examined.—16 males, 26 females, from *Tetrao u. urogallus* Linné from Scotland and Europe; 4 males, 1 female, from skin of *T. urogallus aquitanicus* Ingram from the Pyrenees; 2 males, 1 female, from skin of *T. u. lugens* Lonnberg from Finland; 1 male, from skin of *T. u. kureiskensis* Buturlin

from *Yenensei*; 8 males, 2 females, from skins of *T. u. parvirostris* Bonaparte from Amurland; 1 female, from skin of *T. u. kamohaticus* Kittling from Kamchatka.

Pisagei Collection.—4 males, 3 females, 3 imm., labelled *G. chelicornis* from *Tetrao urogallus*.

Lectotype of *Chelicornis* Denny nec Children designated by present author.—Male in Denny collection from *Tetrao u. urogallus*. *Paratypes*.—2 females in Denny collection from same host.

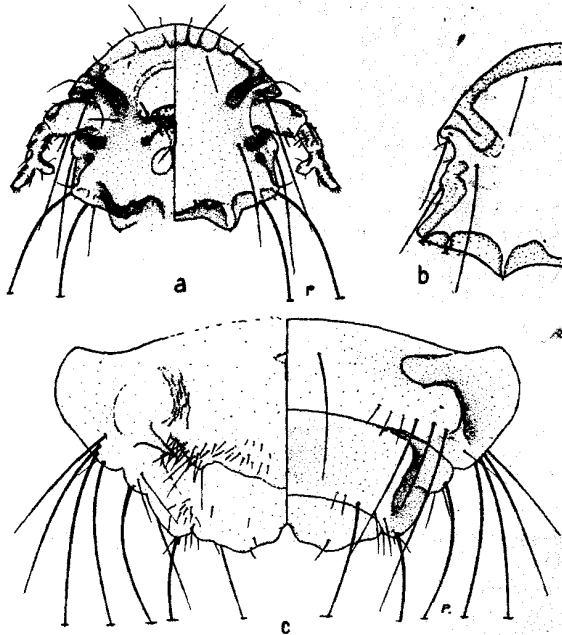
Neotype of *bituberculatus* designated by present author.—Male in the Meinertzhagen collection, slide no. 1580, from *Tetrao u. urogallus* from Estonia. *Neoparatypes*.—15 males, 26 females, from same host.

GONIODES TETRAONIS (Linné, 1761. (Text-figs. 25 & 26.)

Pediculus tetraonis Linné, 1761, no. 1961. Host: *Lyrurus t. tetriz* (Linné).

Goniodes tetraonis Denny, 1842, pp. 57 & 161 (partim), nec Linné, 1761. Host: *Lyrurus tetriz britannicus* Witherby & Lonnberg.

Text-figure 25.



Goniodes tetraonis: (a) ♂ head; (b) ♀ head; (c) ♀ abdomen.

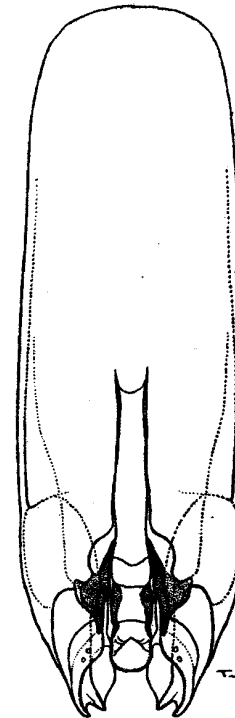
? *Goniodes homocerus* Nitzsch, 1861 (1), p. 306. Host: *Lyrurus t. tetriz*, nom. nud.

Goniodes heteroceros Nitzsch, 1874 (2), p. 195. Host: *Lyrurus t. tetriz*.

This species is distinguished from *cupido*, *centrocerci*, *simoni*, and *lagopi* in the male by the form of the genitalia, and from *bituberculatus*, in addition to the genitalia, by the shape of the head in both sexes, by the ventral chaetotaxy of segment VI in the male, and by the chaetotaxy of the genital region of the female.

Male.—The head tends to be smaller than that of *bituberculatus*, and differs

Text-figure 26.



Goniodes tetraonis, ♂ genitalia.

slightly, but distinctly, in the curvature of the anterior margin and in the shape of the temple region (text-fig. 25 a). The breadth of the first antennal segment is proportionally less than in *bituberculatus* (see under measurements of the latter species).

Thorax and abdomen with general characters as in *bituberculatus*, but all measurements tend to be less. Chaetotaxy as in *bituberculatus*, with the exception of segment VI, which has only 4-6 central hairs on the ventral surface,

and there tend to be fewer hairs on the ventral surface of segment IX, and a smaller number of hairs round the genital opening.

Genitalia as shown in text-fig. 26.

Female.—The head tends to be somewhat smaller than that of *bituberculatus*, and proportionally narrower across the temples (see C.I.).

Thorax and abdomen as in *bituberculatus*, but as in the male all measurements tend to be less. Chaetotaxy as in *bituberculatus*, but the hairs on the valve and on the ventral surface of segment VIII are fewer in number (text-fig. 25 c).

	Measurements.		Measurements.	
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.57-0.64	0.68-0.71	0.66-0.69	0.85-0.96
Prothorax.....	0.17-0.20	0.40-0.43	0.17-0.21	0.41-0.43
Pterothorax.....	0.26-0.27	0.61-1.66	0.27-0.38	0.65-1.68
Abdomen.....	1.00-1.15	1.03-1.15	1.40-1.44	1.17-1.24
Total.....	1.92-2.10	.....	2.40-2.44	.....
C.I.....	1.11-1.22	.....	1.33-1.41	.....

Specimens examined.—2 males, 3 females, from *Lyrurus t. tetricus* (Linné) from Estonia and Norway; 4 males, 8 females, from *L. tetricus britannicus* Witherby & Lonnberg from Scotland; 1 female, 1 imm., from skin of *L. tetricus viridanus* (Lorenz) from S.E. Russia; 2 males, 3 females, from skins of *Lyrurus mlotosiewiczi* (Taczanowski) from Caucasus.

Denny Collection.—Male lectotype, 7 female paratypes labelled *G. tetraonis*, from *Tetrao* sp.; 1 male, without species label, from *Phasianus colchicus*.

Piaget Collection: British Museum.—1 male, 1 female, with both *tetraonis* and *heteroceros* on label from *Tetrao scoticus* (= *Lagopus s. scoticus*). Leiden Museum, 1 male, 1 female, labelled *G. heteroceros*, from *Tetrao tetricus*.

Neotype of tetraonis.—Male in Meinertzhagen collection, slide no. 1572, from *Tetrao t. tetricus*, from Estonia.

GONIODES CENTROCEPCI Simon, 1938. (Text-figs. 27 b-d.)

Goniodes centrocepci Simon, 1938, p. 104, figs. 1-4. Host: *Centrocercus urophasianus* (Bonaparte) (Wyoming, U.S.A.).

This species resembles most closely *simoni*, from which it is distinguished in the male by the characters of the genitalia; in the female by the shape of the antennal band, by the ventral spinous process on the genital region of the abdomen, which is unusually small (only 5 females examined), and by the fewer number of hairs at the lateral margins of the vulva. In both sexes the C.I. tends to be larger, i. e., the breadth at the temples tends to be greater. *Centrocepci* is distinguished from other related species in the male by the somewhat concave lateral margins below the eye; the greater expansion of the temples and the genitalia; in the female by the shape of the antennal band, and by the position and small size of the ventral process on segment VII.

Male.—Head with characters as in *simoni*, but with antennal band somewhat narrower distally.

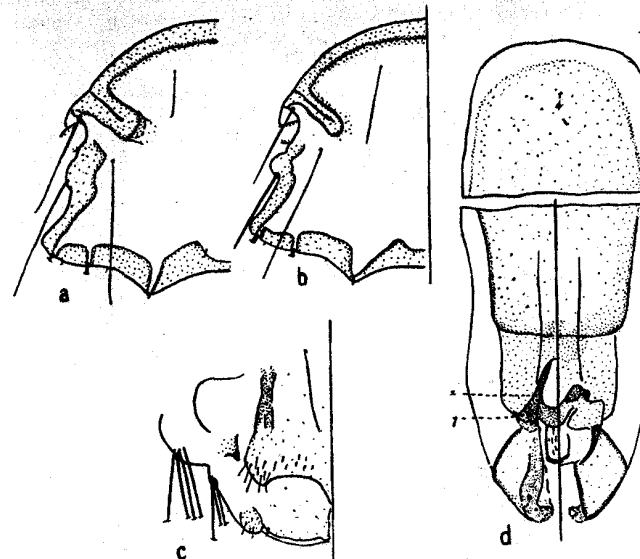
Thorax and abdomen with characters as in *tetraonis*.

Genitalia as shown in text-fig. 27 d.

Female.—Head with characters similar to the preceding species, but with antennal band narrower (text-fig. 27 b).

Thorax and abdomen as in *bituberculatus*, but with all measurements tending to be less, and with characters of genital region distinct. Ventral spinous process on genital region lying parallel to lateral margin of abdomen and

Text-figure 27.



(a) *Goniodes bituberculatus*, ♀ head. *G. centrocepci*: (b) ♀ head; (c) ♀ genital region; (d) ♂ genitalia.

extremely small (text-fig. 27 c). However, there is often a certain amount of variation in the size of this process, and it is possible if more material had been examined that individuals with larger processes might have been found.

	Measurements.		Measurements.	
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.58-0.64	0.74-0.81	0.69-0.75	0.97-1.08
Prothorax.....	0.17-0.19	0.40-0.45	0.20-0.22	0.47-0.52
Pterothorax.....	0.26-0.31	0.60-0.67	0.31-0.34	0.74-0.78
Abdomen.....	1.05-1.11	1.65-1.15	1.60-1.80	1.31-1.35
Total.....	1.95-2.16	.....	2.70-2.92	.....
C.I.....	1.22-1.26	.....	1.38-1.43	.....

Specimens examined.—4 males, 5 females, from skins and fresh specimens of *Centrocercus urophasianus* (Bonaparte) from Nebraska and Wyoming, U.S.A.

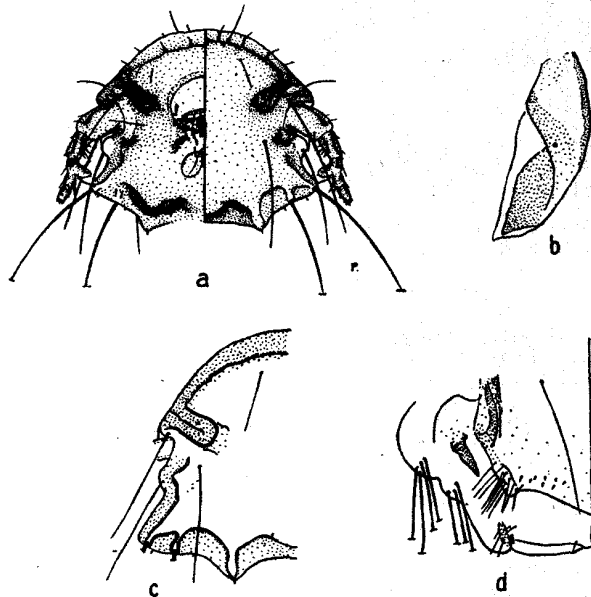
GONIODES SIMONI, sp. n. (Text-figs. 1c & 28.)

This species, which is extremely close to *centrocerci*, is separated in the male by the following characters:—

1. In the head the antennal band is somewhat broader and the C.I. tends to be smaller (text-fig. 28a).

2. In the characters of the male genitalia. Unfortunately, the material at hand was not preserved in such a way as to make an accurate examination

Text-figure 28.



Goniodes simoni: (a) ♂ head; (b) ♂ paramer; (c) ♀ head; (d) ♀ genital region.

of the genitalia possible. But it is apparent that structure *x* (text-fig. 27d) in *simoni* is smaller and does not reach to the proximal end of the semicircular indentation in the distal end of the basal plate as it does in *centrocerci*; the structure *γ* is considerably smaller, and occurs at a higher level than in *centrocerci*; the paramera appear distinct from those of *centrocerci* in shape (text-fig. 28b).

The females are distinguished by the following characters:—

1. The antennal band is considerably broader, and the C.I. tends to be less (text-fig. 28c).

2. The spinous process on the genital region which lies parallel to the lateral margin is of considerably greater size than that of *centrocerci*, and the hairs on the margin of the vulva are more numerous (text-fig. 28d).

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.60-0.64	0.71-0.77	0.68-0.72	0.88-0.97
Prothorax.....	0.15-0.18	0.38-0.41	0.17-0.19	0.41-0.45
Pterothorax.....	0.23-0.26	0.58-0.61	0.27-0.30	0.60-0.66
Abdomen.....	1.00-1.06	1.06-1.09	1.37-1.52	1.02-1.23
Total.....	1.95-2.08	.....	2.38-2.60	.....
C.I.....	1.15-1.21	.....	1.29-1.38	.....

Specimens examined.—6 males, 6 females, from skin and fresh specimens of *Dendragapus o. obscurus* (Say) from Utah and N. Colorado.

Holotype.—Male in Meinertzhagen collection, slide no. 12522, from Utah.

Paratypes.—5 males, 6 females, from the same host.

This species is named after Mr. Felix Simon, who pointed out the differences in the male genitalia between this species and *centrocerci* (1938, p. 107), and who has most kindly sent specimens.

GONIODES CUPIDO Rudow, 1870. (Text-figs. 29d & 30b.)

Goniodes cupido Giebel, 1866 (1), p. 387, *nom. nud.* Host: *Tympanuchus cupido* (*Tetrao cupido*).

Goniodes cupido Rudow, 1870, p. 482. Host: *Tympanuchus cupido* (*Tetrao cupido*).

This species is distinguished from the preceding by the narrow clypeal band and genitalia; in the former character it resembles *lagopi*. In the male it is distinguished from *lagopi* by the characters of the genitalia, and in the female by the shape of the antennal band.

Male.—Head with shape and chaetotaxy as in *lagopi*.

Thorax and abdomen with characters as in *tetraonis*.

Genitalia diagnostic (text-fig. 30b).

Female.—Head with narrow clypeal band and antennal band with shape as shown in text-fig. 29d.

Thorax and abdomen with characters as in *tetraonis*.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.61-0.63	0.69-0.71	0.69-0.72	0.91-1.00
Prothorax.....	0.18	0.43	0.20	0.47
Pterothorax.....	0.31	0.69	0.32	0.72
Abdomen.....	1.18	1.17	1.54	1.32
Total.....	2.22	.....	2.64	.....
C.I.....	1.13	.....	1.31-1.38	.....

Specimens examined.—Piguet Collection, British Museum, 2 males, 4 females, from *Tympanuchus cupido* (*Tetrao cupido*); Leiden Museum, 1 male, 2 females, from the same host. 1 male (imm.), 2 females, from skin of *Tympanuchus cupido pinnatus* (Brewster) from N.E. Texas.

Neotype.—Male in the Piguet collection, British Museum, slide no. 134.

Neoparatypes.—1 male, 4 females, in Piguet collection.

GONIODES LAGOPI (Linné), 1758. (Text-figs. 29 a-c & 30 a.)

Pediculus lagopi Linné, 1758, p. 614. Host: *Lagopus l. lagopus* (Linné).

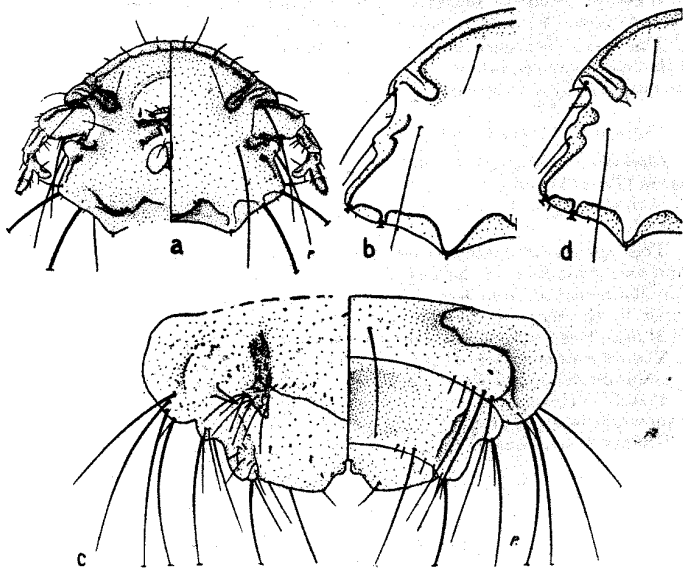
Pediculus lagopodis Gmelin, 1790, p. 349, emend. for *lagopi* L.

Goniodes chelicornis Children, 1836, p. 539. Host: *Lagopus l. lagopus* (*Tetrao saliceti*).

Goniodes tetraonis Denny, 1842, pp. 57 & 161 (partim). Host: *Lyrurus tetrax* and *Lagopus scoticus*, nec Linné, 1761.

Goniodes heteroceros Piaget, 1880, p. 251 (partim). Host: *Lyrurus tetrax* and *Lagopus scoticus* nec Nitzsch, 1874.

Text-figure 29.



Goniodes lagopi: (a) ♂ head; (b) ♀ head; (c) ♀ abdomen;
(d) *G. cupido*, ♀ head.

Waterston drew attention to the confusion which had arisen over the names used for the *Goniodes* parasitic on *Lagopus* and *Lyrurus*, and cleared up the problem in two papers published in 1922 (p. 103) and 1926 (p. 89).

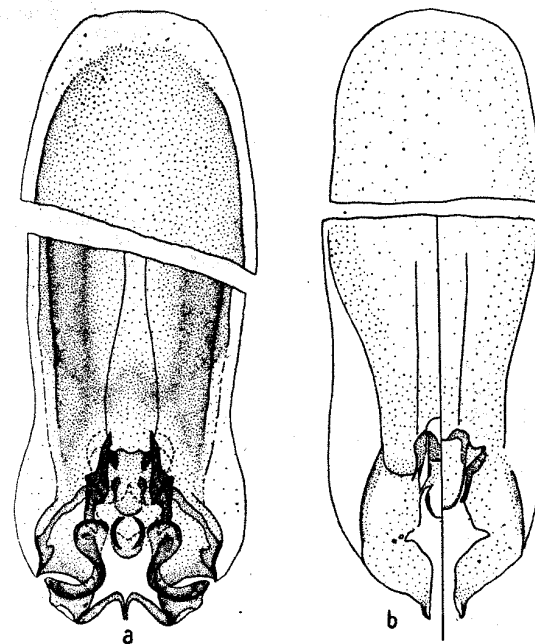
Goniodes discrepans, quoted by Kellogg and Mann (1912, p. 14), as under the authorship of Kellogg and Paine from the host, *Lagopus lagopus*, is probably a synonym of *lagopi*. However, the original description has never been traced, and it is possibly a *nomen nudum*.

The *Goniodes* from *Lagopus scoticus* described and figured by Shipley, 1909, p. 309, under the name *tetraonis* Denny, should be referred to this species.

In both sexes this species resembles *cupido* in the presence of a narrow clypeal band, but is distinguished from *cupido* and other species on the Tetraonidae by the considerable contrast between the dark inner edges and the light outer portions of the sclerotic bands of the head and pleurites. In the male the genitalia, and in the female the shape of the antennal band, together with the narrow clypeal band, are diagnostic.

Male.—Head with characters as shown in text-fig. 29 a, and differing from that of *bituberculatus*, *centrocerci*, and *simoni* by the shape of the temples, and from *tetraonis* in the curvature of the anterior margin.

Text-figure 30.



♂ genitalia: (a) *Goniodes lagopi*; (b) *G. cupido*.

Thorax and abdomen with general characters as in *bituberculatus*, but with only 4-7 sternal hairs on segment VI of the abdomen.

Genitalia distinctive in the possession of paired distal curved rods approximating centrally (text-fig. 30 a).

Female.—Head with narrow clypeal band and antennal band with shape as shown in text-fig. 29 b.

Thorax and abdomen with general characters as in *bituberculatus*, but with fewer hairs on the margin of the vulva and ventral surface of segment VIII.

than in either *bituberculatus* or *tetraonis*, and with the ventral spinous process of the genital region finer and narrower than in the two latter species (text-fig. 29 c).

	Measurements.			
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.53-0.64	0.68-0.79	0.66-0.73	0.92-1.09
Prothorax.....	0.21-0.24	0.46-0.49	0.20-0.24	0.47-0.52
Pterothorax.....	0.34-0.37	0.70-0.73	0.32-0.34	0.72-0.80
Abdomen.....	1.12-1.22	1.21-1.25	1.32-1.55	1.24-1.43
Total.....	2.17-2.23	.....	2.39-2.71	.....
C.I.....	1.12-1.27	.....	1.33-1.53	.....

Specimen examined.—1 male from *Lagopus l. lagopus* (Linne) from Estonia; 7 males, 24 females, from the same host from Churchill, Canada; 8 males, 20 females, from *Lagopus s. scoticus* (Latham) from Scotland; 3 males, 4 females, from *Lagopus mutus millaisi* Hartert from Scotland; 2 males, 2 females, from *Lagopus mutus islandorum* (Faber) from Iceland; 1 male, 7 females, from *Lagopus mutus captus* Peters from N.E. Greenland.

Denny Collection.—3 females, labelled *G. tetraonis* from ptarmigan (= *Lagopus s. scoticus*); 1 male, 2 females, labelled *G. colchici* from *Phasianus colchicus*.

Piaget Collection.—1 male, 1 female, labelled *G. ? heteroceros* var. d, *cupido* from *Tetrao tetrix*; 1 male, 1 female, labelled *tetraonis* and *heteroceros* from *Tetrao scoticus* (*Lagopus scoticus*). All these specimens should be referred to *lagopi*, and possibly 2 imm. specimens also labelled *heteroceros* from *Tetrao scoticus* (= *Lagopus scoticus*).

Holotype of *chelicornis* Children—Male in British Museum, Children's type, from *Lagopus l. lagopus* (*Tetrao saliceti*).

Neotype of *lagopi*.—Male in the Meinertzhagen collection, slide no. 1576, from *Lagopus l. lagopus* from Estonia.

GONIODES CORPULENTUS Kellogg and Mann, 1912.

Goniodes corpulentus Kellogg and Mann, 1912 (1), p. 14, figs. 1-2. Host: *Canachites canadensis*.

No material of this species examined.

GONIODES MERRIAMANUS Packard, 1873.

Goniodes merriamanus Packard, 1873, p. 731, fig. 2. Host: *Dendragapus obscurus richardsonii* (Douglas) (*Tetrao richardsoni*, Idaho, U.S.A.).

The figure shows that this species is quite distinct from that found on *Dendragapus obscurus* by Simon, 1938, p. 107, and by the present author. It appears to be nearer the *colchici* type of species, and it is possible that it was a straggler from one of the introduced pheasants, such as *Phasianus colchicus* or *Gennæus* sp.

GONIODES ITHAGINIS, sp. n. (Text-figs. 31 & 36 a.)

This species is distinguished from all related species by the presence of a dorsal central projection passing posteriorly from the sclerotic area

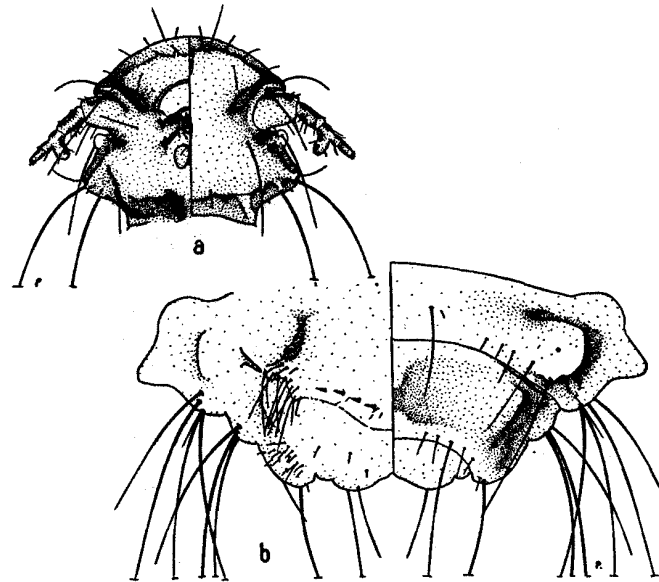
immediately internal to the clypeal band to the level of the anterior border of the oral fossa.

Description of Male.—Head as shown in text-fig. 31 a; with first antennal segment enlarged, but without lateral process.

Thorax as in *colchici*.

Abdomen normal with dorsal chaetotaxy as in *bituberculatus*. On the ventral surface segments I-VII with 2 central hairs, and in addition on segments III-V there may be 2-4 finer and shorter hairs. Pleural hairs as in *bituberculatus* except that segment I may have 3-6 hairs each side. Genital opening similar

Text-figure 31.



Goniodes ithaginis: (a) ♂ head; (b) ♀ abdomen.

to that of *dentatus*, but with fewer hairs present. Segment IX with tergal plate indented posteriorly and with fewer long ventral hairs than in *dentatus*, i. e., 6-9 in the posterior part of the segment each side.

Genitalia as shown in text-fig. 36 a.

Description of Female.—The head is proportionately wider across the temples than in *colchici*, has a narrower clypeal band, and an irregular central projection arising from the sclerotic area immediately internal to the clypeal band and passing posteriorly.

Thorax and abdomen normal with ventral chaetotaxy of segments I-VI as in the male. Dorsal chaetotaxy as in *bituberculatus* with segment V bearing 7-8 central hairs. Chaetotaxy of genital region as shown in text-fig. 31 b, with pediculate spines present.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.71-0.77	0.89-0.95	0.77-0.88	1.09-1.20
Prothorax.....	0.18-0.23	0.50-0.58	0.22-0.24	0.55-0.63
Pterothorax.....	0.31-0.37	0.75-0.84	0.33-0.38	0.79-0.91
Abdomen.....	1.12-1.25	1.22-1.38	1.62-2.02	1.46-1.79
Total.....	2.23-2.48	.....	2.84-3.24	.....
C.I.....	1.23-1.25	.....	1.36-1.42	.....

Described from 6 females; 6 females, from skins of *Ithaginis c. cruentus* (Hardwicke) from Sikkim; 2 males, 3 females, from skins of *Ithaginis cruentus clarkii* Rothschild from Yunnan; 1 female, from skin of *Ithaginis cruentus geoffroyi* Verreaux from E. Tibet.

Holotype.—Male in the Meinertzhagen collection, slide no. 3750, from *Ithaginis c. cruentus*.

Paratypes.—5 males, 6 females, from the same host.

GONIODES COLCHICI Denny, 1842. (Text-figs. 32 & 34 b.)

Goniodes colchici Denny, 1842, pp. 56 & 158, pl. xii. fig. 4. Host: *Phasianus colchicus*, Britain.

This species is distinguished from the preceding by the shape of head in both sexes, by the genitalia of the male, and by the genital region of the female.

Male.—Head and thorax as shown in text-fig. 32 a.

Abdomen normal with chatotaxy as in *bituberculatus*, but with 2-4 central hairs on the ventral surface of segment VI.

Genitalia large and of complicated structure (text-fig. 34 b).

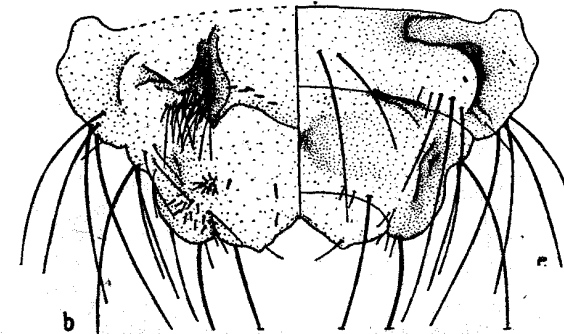
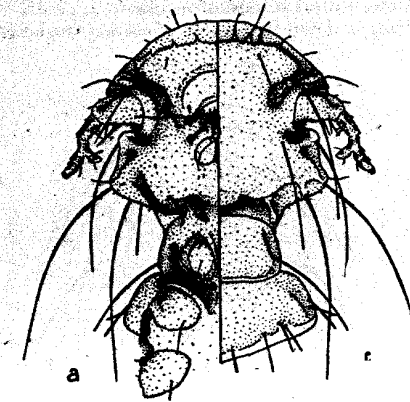
Female.—Head similar to that of male but broader across the temples.

Thorax and abdomen normal with chatotaxy as in *bituberculatus* except for the hairs on the valve and the presence of a row of characteristic pedigulate spines (text-fig. 32 b).

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.69-0.73	0.73-0.79	0.75-0.82	1.00-1.03
Prothorax.....	0.17-0.18	0.42-0.44	0.17	0.50
Pterothorax.....	0.32-0.36	0.67-0.68	0.35	0.78
Abdomen.....	1.09-1.20	1.26-1.27	1.55	1.44
Total.....	2.22-2.24	.....	2.82	.....
C.I.....	1.03-1.11	.....	1.24-1.26	.....

Specimens examined.—1 female lectotype, 1 female paratype in the Denny collection in the British Museum from *Phasianus colchicus* from Britain; 2 males, 1 female, from the same host and locality; 29 males, 47 females,

Text-figure 32.



Goniodes colchicus: (a) ♂ head; (b) ♀ abdomen.

from *Phasianus colchicus bianchii* Buturlin from Afghanistan; 2 females, from skin of *Phasianus colchicus mongolicus* Brandt.

Piaget Collection.—British Museum, 1 male, 2 females, 2 imm., from *Phasianus colchicus*. Leiden Museum, 1 female from the same host.

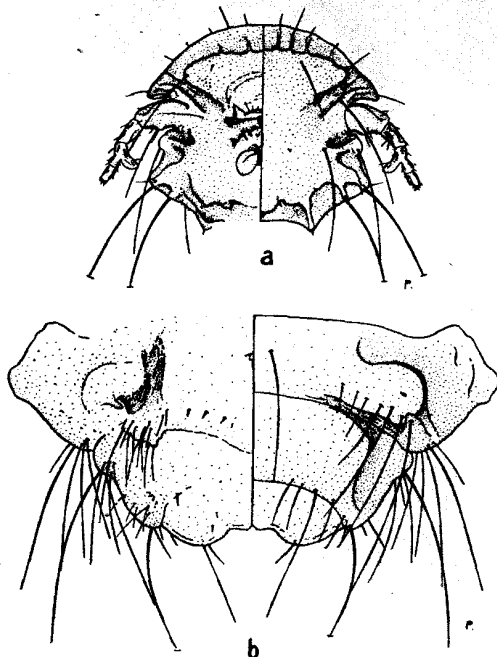
GONIODES CHRYSOLOPHI, sp. n. (Text-figs. 33 & 34 a.)

This species differs but little from *colchici* except in the size and details of the genitalia, which are quite distinct. In the male the sides of the temples tend to be somewhat more concave, and in the females the heads tend to be wider across the temples (see C.I.), and the details of the chatotaxy of the genital region are distinct.

Description of Male.—Head as shown in text-fig. 33 a.

Thorax and abdomen normal with chaetotaxy as in *bituberculatus*, but with 2 central hairs on the ventral surface of segment VI.
Genitalia differing in detail from those of *colchici* (text-fig. 34 a).

Text-figure 33.

*Goniodes chrysolophi*: (a) ♂ head; (b) ♀ abdomen.

Description of Female.—Head similar to that of *colchici*, but tends to be somewhat wider across the temples.

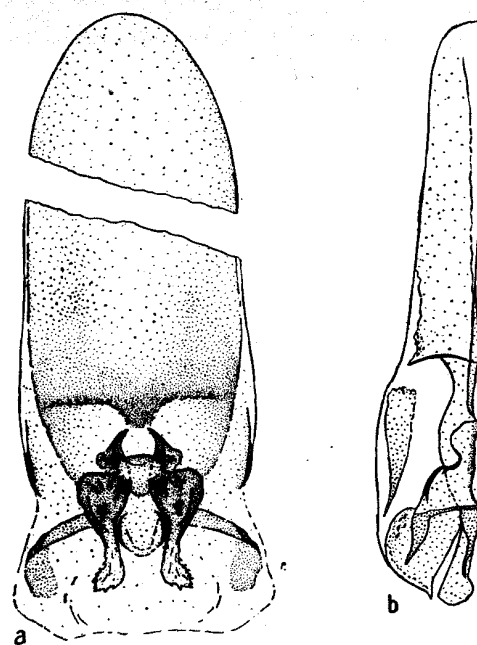
Thorax and abdomen normal with posterior ventral chaetotaxy differing from that of *colchici* in having fewer hairs and a considerably shorter spinous process on the genital region (text-fig. 33 b).

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.69-0.72	0.82-0.83	0.80-0.83	1.06-1.17
Prothorax.....	0.15	0.46	0.15	0.47
Pterothorax.....	0.31	0.69	0.34	0.74
Abdomen.....	1.09	1.18	1.54	1.42
Total.....	2.18	.....	2.72	.....
C.I.....	1.13-1.19		1.31-1.47	

Described from 2 males, 6 females, from skins of *Chrysolophus amherstiae* Leadbeater) from Tibet; 1 male, 3 females, from skins of *Chrysolophus pictus* Linné) from China.

Text-figure 34.

♂ genitalia: (a) *Goniodes chrysolophi*; (b) *G. colchici*.

Holotype.—Male in the Meinertzhagen collection, slide no. 4428, from *Chrysolophus amherstiae*.

Paratypes.—1 male, 6 females, from the same host.

GONIODES DENTATUS (Rudow), 1870. (Text-figs. 35, 36 b, & 37.)

Goniocotes dentatus Rudow, 1870, p. 476. Host: *Gennæus nyctemerus lineatus* (Vigors) (*Nyctemerus linearis*).

Although Rudow included this species under the genus *Goniocotes*, it seems more likely that he was describing a female *Goniodes*. The description is applicable to the *Goniodes* from *Gennæus nyctemerus*, and Rudow himself compares *dentatus* to *tetraonis*, which indicates that this species was a *Goniodes*.

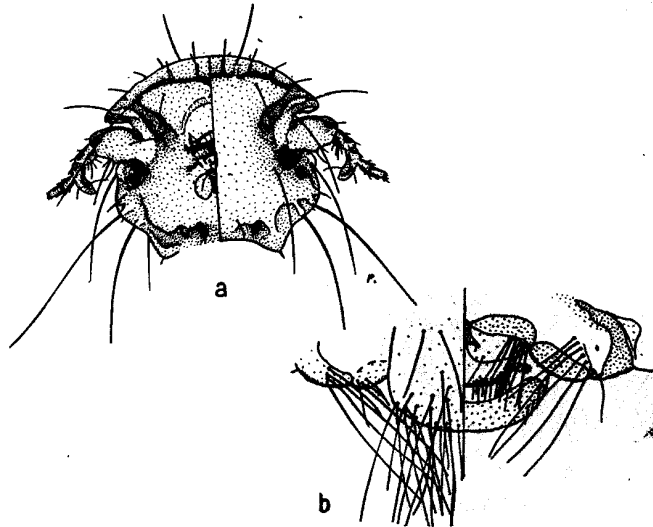
The size, 1.5 mm., given in the description is obviously not that of a *Goniodes*, but none of Rudow's measurements can be relied upon as accurate, since in the same paper (1870, pp. 480-487) the measurements of the true *Goniodes* species range from 1-1.5 mm.

This species is distinguished from the preceding species by the shape of the head, and form of the genitalia in the male and the chaetotaxy of the genital region in the female.

Male.—Head as shown in text-fig. 35a, with first antennal segment bearing a small process.

Thorax as in *colchici*.

Text-figure 35.



Goniodes dentatus: (a) ♂ head; (b) ♂ abdomen.

Abdomen normal with chaetotaxy of segments I-VII as in *ithaginis*.

Chaetotaxy of genital opening as shown in text-fig. 35b.

Genitalia as shown in text-fig. 36b.

Female.—Head as shown in text-fig. 37a, with broad clypeal band.

Thorax as in male.

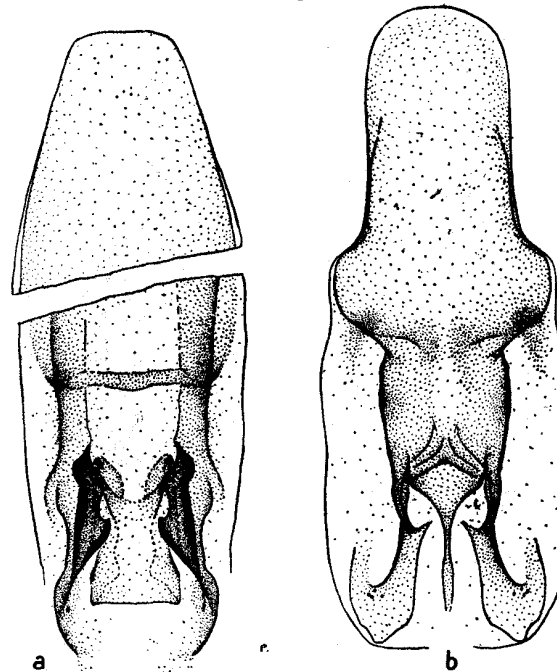
Abdomen normal with lateral tergal hairs as in *bituberculatus*, and with 6-8 central hairs on segments I-VII. Sternal chaetotaxy of segments I-VII as in male. Genital region with numerous hairs at the lateral corner of the vulva and pediculate spines present (text-fig. 37b).

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0.69-0.73	0.75-0.79	0.76-0.83	0.99-1.06
Prothorax	0.18-0.19	0.46-0.48	0.18-0.20	0.47-0.51
Pterothorax	0.29-0.32	0.71-0.76	0.31-0.34	0.67-0.78
Abdomen	1.23-0.50	1.28-1.37	1.45-1.61	1.05-1.26
Total	2.30-2.34		2.58-2.86	
C.I.	1.06-1.09		1.28-1.31	

Specimens examined.—8 males, 6 females, from *Gennæus leucomelanos hamiltonii* (J. E. Gray) from the Himalayas (died in the London Zoological Gardens); 1 female from the skin of the same host from central Himalayas;

Text-figure 36.

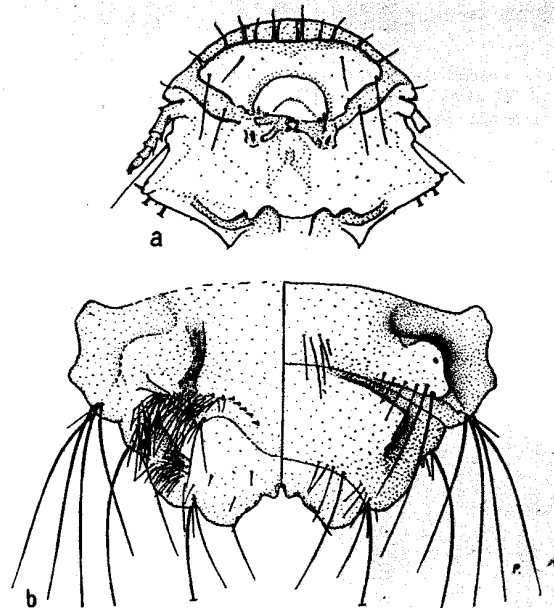


Male genitalia: (a) *Goniodes ithaginis*; (b) *G. dentatus*.

21 females, 19 males, from *Gennæus l. leucomelanos* (Latham) from Nepal; 1 male, 2 females, from skins of *G. nythemerus horefieldii* (G. R. Gray) from Assam; 1 female, from skin of *G. nythemerus oatesi* Ogilvie-Grant from Burma.

3 males, 4 females, from skins of *Pucrasia m. maculophis* (Lesson) from the Himalayas, 1 female, from the same host which died in the London Zoological Gardens and 1 male, 3 females, from skin of *P. maculophis bidulphi* Marshall from Kashmir are apparently indistinguishable from specimens from *Gennæus* spp.

Text-figure 37.

*Goniodes dentatus*: (a) ♀ head; (b) ♀ abdomen.

A neotype has not been designated for this species as no specimens have been examined from the type-host, although there is little doubt that specimens from *G. nyctemerus lineatus* would prove to be the same as those examined from the other species of *Gennæus*.

GONIODES SECTUS Kellogg & Paine, 1914. (Text-fig. 38.)

Goniodes sectus Kellogg & Paine, 1914, p. 224, figs. 1-2. Host: *Catreus wallichii* (Hardwicke) (Himalayas, India).

This species is distinguished from *dentatus* in the male by the shape of the temple region and the characters of the antennae and genitalia; in the female by the absence of a sclerotic area below the clypeal band.

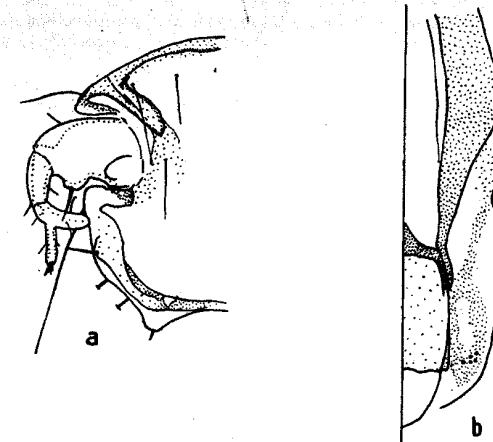
Male.—Head with flattened lateral margins below the eye and no expanded temple angle; clypeal band narrow and without sclerotic area below; first antennal segment with large blunt process bearing an elongated spine (text-fig. 38 a).

Thorax as shown in Kellogg and Paine's figure with meso- and metasternal hairs absent.

Abdomen with shape as shown in Kellogg and Paine's figure and with chstotaxy as in *dentatus*.

Genitalia of similar type to those of *dentatus* but differing in detail (text-fig. 38 b)*.

Text-figure 38.

*Goniodes sectus*: (a) ♂ head; (b) ♂ genitalia.

Female.—Head with temples not greatly expanded and without sclerotic area below clypeal band.

Thorax as in male.

Abdomen with ventral chstotaxy, including that of the genital region, as in *dentatus*. Dorsal chstotaxy as in *dentatus*, but there tend to be a greater number of elongated central hairs on segments I-IV, i. e., 12.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.84-0.85	0.89-0.96	0.90-0.96	1.25-1.31
Prothorax.....	0.31-0.32	0.61-0.68	0.24-0.32	0.61-0.66
Pterothorax.....	0.37-0.43	0.91-1.02	0.38-0.40	0.89-0.97
Abdomen.....	1.73-1.74	1.67-1.92	1.80-1.82	1.58-1.67
Total.....	3.16-3.23	.....	3.23-3.41	.....
C.L.....	0.106-1.13	.....	1.36-1.39	.....

Specimens examined.—2 males, 2 females, from skin of *Catreus wallichii* (Hardwicke) from Himalayas.

* Only one specimen of genitalia examined in poor condition, details of mesosome may not be accurate.

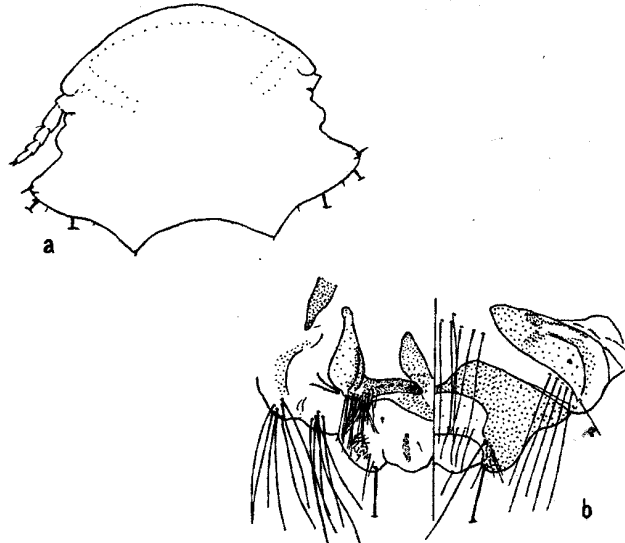
GONIODES CROSSOPTILON, nom. nov. (Text-figs. 2c & 39.)

Goniodes major Piaget, 1880, p. 274, pl. xxiv. fig. 1, nec Piaget, 1880, p. 239.
Host: *Crossoptilon auritum* (Pallas) (Zoological Gardens, Rotterdam).

This species resembles *cervinicornis* to a certain extent in the characters of the male genitalia and in the presence of a thickened process on the first antennal segment, but is at once distinguished from this species by the shape of the head, the absence of heavily thickened clavi in the male, and the characters of the genital region of the female.

Male.—Head as shown in Piaget's figure with temples not greatly expanded; first antennal segment enlarged and bearing a process, pointed and thickened distally.

Text-figure 39.



Goniodes crossoptilon: (a) ♀ head; (b) ♀ abdomen.

Thorax with shape as shown in Piaget's figure and with chaetotaxy as in *bituberculatus*.

Abdomen with shape as shown in Piaget's figure.

Genitalia large stretching from segment I to the end of the abdomen and with general characters of paramera, sac and mesosome resembling *cervinicornis*, but quite distinct (material inadequate for figure).

Female.—Piaget's figure of the head (pl. xxiv. fig. 1, a) differs somewhat in shape from his specimen in that the temples are shown less expanded (text-fig. 39a).

Thorax as in male.

Abdomen large and broadly rounded with ventral spinous process somewhat elongated and pointed (text-fig. 39b).

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	7, 2, 7	2	2, 2	3-4, 10, 3-4	2	2, 2
II.	4-5, 2, 4-5	2	3-4, 3-4	2-3, 18, 2-3	2	3, 3
III.	4-5, 4, 4-5	2	3-4, 3-4	2-3, 12, 2-3	2	3-4, 3-4
IV.	4-5, 6, 4-5	2	3-4, 3-4	2-3, 12, 2-3	2	3, 3
V.	4-5, 2, 4-5	2	2-6, 2-6	2-3, 12, 2-3	2	4, 4
VI.	4-5, 2, 4-5	6	4-6, 4-6	2-3, 12, 2-3	2	5, 5
VII.	Fig.	8	7-8, 7-8	4, 10, 4	2	7-8, 7-8
VIII.	Fig.	..	6-9, 6-9	Fig.	Fig.	6-7, 6-7
IX.	Fig.	Fig.	....		

In the male the groups of tergal hairs are linked up by a number, 2-8, of shorter finer hairs not shown in table.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	1.02	1.15	1.20	1.80
Prothorax	0.35	0.85	0.35	0.85
Pterothorax	0.50	1.27	0.54	1.27
Abdomen	2.26	2.35	2.58	2.35
Total	4.10	..	4.48	..
C.I. . . . .	..	1.12	..	1.50

Specimens examined.—1 male, 1 female, in the Piaget collection labelled *Gd. major* from *Crossoptilon auritum* (Pallas).

Lectotype designated by present author.—Male in the Piaget collection, slide no. 70.

Paratype.—Female in the same collection.

GONIODES DOLANI Eichler, 1937.

Goniodes major dolani Eichler, 1937 (4), p. 96. Host: *Crossoptilon c. crossoptilon* (Hodgson).

This subspecies has been included here temporarily as a species although the females (no males have been seen) are indistinguishable from those of *crossoptilon* (olim *major* Piaget). However, there appears to be more than one species of *Goniodes* occurring on the species of *Crossoptilon*, since a male examined from *Crossoptilon c. harmani* appears to differ from Piaget's type in the proportions of the head and the characters of the male genitalia. Until males have been examined from *Grossoptilon c. crossoptilon* it is impossible to place *dolani* correctly.

G. dolani was described from a female and separated on the measurements as compared with those given in Piaget, 1880, p. 275. Piaget's text measurements, however, are nearly always different from the measurements taken from his types when these have been treated with caustic potash and remounted in canada balsam.

	Piaget's type.	Piaget's text.	Specimen from <i>Crossoptilon c.</i> <i>crossoptilon</i> .	Eichler's text.
	mm.	mm.	mm.	mm.
Length of head (a) (to centre of posterior margin)	1.20	1.25	1.18	
Length of head (b) (to level of postero-lateral corners of head)	1.33	..	1.31	1.35
Breadth of head	1.80	1.56	1.81	1.86
C.I. (a)	1.50	1.25	1.52	
C.I. (b)	1.35	..	1.38	1.38

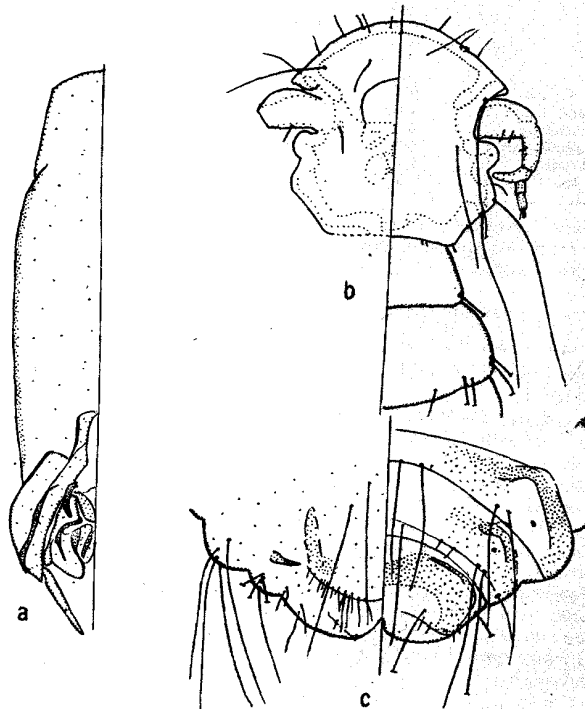
As will be seen from the above table, *G. dolani* cannot be separated from *G. crossoptilon* on the measurements of the head; the other measurements of the body as given by Eichler, 1937, p. 96, do not differ greatly from those of Pisaget's type.

Specimens examined.—1 female, Eichler's type from *Crossoptilon c. crossoptilon* (Hodgson), and 1 female from skin of the same host from Szechwan.

GONIODES MAMILLATUS Rudow, 1870. (Text-fig. 40.)

Goniodes mamillatus Rudow, 1870, p. 483. Host: *Pelecanus ruficollis* (name untraceable) in error.

Text-figure 40.



Goniodes mamillatus: (a) ♂ genitalia; (b) ♂ head and thorax; (c) ♀ abdomen.

Taschenberg, 1882, p. 25, who examined Rudow's original specimen and re-described and figured this species, considered it to be identical with specimens

from *Lophortyx californica*. This host must be therefore considered as the type-host of *mamillatus*.

G. mamillatus is not closely related to any known species, and is distinguished from others in this group by the shape of the head, characters of antennae and genitalia of the male, and by the shape of the head and characters of the genital region of the female.

Male.—Head with narrow clypeal band; temples scarcely expanded, and ventral lateral temple hair fine and spine-like; first antennal segment enlarged, and distal post-axial angle of third segment prolonged to a considerable extent at right angles to the fourth (text-fig. 40 b).

Thorax with prothoracic lateral margins flattened and diverging posteriorly; pterothorax with lateral margins rounded and diverging posteriorly.

Abdomen not greatly swollen and somewhat elongated; segment IX with straight posterior margin and with thickened submarginal band.

Genitalia with large thickened basal plate stretching from segments I-VI, and with mesosome complex in character (text-fig. 40 a).

Female.—Head with narrow clypeal band and temples not greatly expanded, but to a greater extent than those of the male.

Thorax as in male.

Abdomen somewhat elongated and with tergal plate on segment VIII continuously thickened. Chatotaxy of vulva unusual in having a row of marginal hairs and no concentration of hairs at the lateral corners; pediculate spines absent; narrow elongated spinous process present (text-fig. 40 c).

Abdominal Chatotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	2-4, 6, 2-4	2	2, 2	1-2, 4, 1-2	2	2, 2
II.	2, 4, 2	2	3, 3	1-2, 4, 1-2	2	3, 3
III.	2, 4, 2	2	3, 3	2-3, 4, 2-3	2	3, 3
IV.	2, 4, 2	2	3, 3	2, 4-5, 2	2	3, 3
V.	2, 2, 2	2	4, 4	2, 4, 2	2	4, 4
VI.	2-3, 2, 2-3	2	4, 4	2, 4, 2	2	4, 4
VII.	2, 2, 2	2	4, 4	2-4, 2, 2-4	2	4, 4
VIII.	2-3, 2-3	..	2-3, 2-3	Fig.	Fig.	Fig.
IX.						

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.52-0.64	0.48-0.49	0.58-0.63	0.68-0.71
Prothorax	0.13-0.14	0.35-0.37	0.14-0.15	0.38-0.40
Pterothorax ..	0.23-0.24	0.50-0.52	0.25-0.26	0.55-0.57
Abdomen	0.94-0.98	0.92-0.94	1.12 1.27	1.00 1.12
Total.	1.80 1.85	.....	2.10 2.20	.....
C.I.	0.89-0.93	.....	1.01-1.16	.....

Specimens examined.—4 males, 3 females, from skins of *Lophortyx c. californica* (Shaw) from California; 2 males from skin of *Lophortyx g. gambeli* Gambel from California.

GONIODES DISSIMILIS Denny, 1842. (Text-figs. 41-43.)

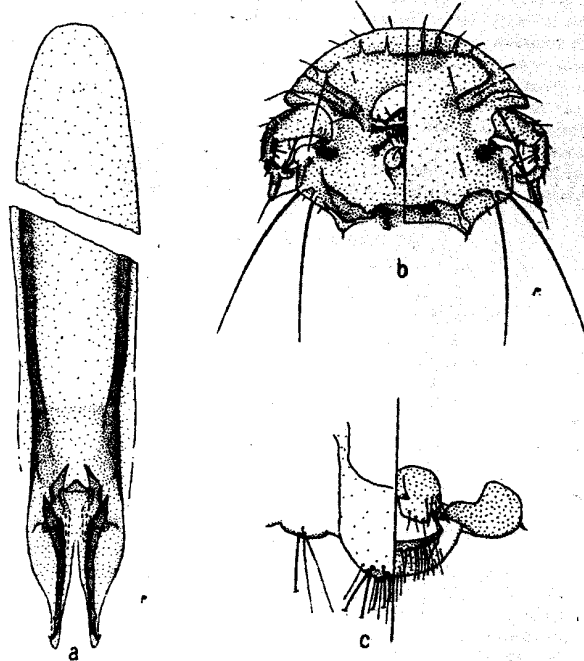
Goniodes dissimilis Nitzsch, 1818, p. 294. Host: *Gallus* sp. nom. nud.

Goniodes dissimilis Denny, 1842, pp. 57 & 162, pl. xii. fig. 6. Host: *Gallus domesticus*.

Goniodes dissimilis var. *bankiva* Piaget, 1880, p. 268, pl. xxii. fig. 3 a. Host: *Gallus g. bankiva* Temminck.

This is a distinct species, and not closely related to any other. It is distinguished by the shape of the head and thick clypeal band in both sexes, by the terminal segments and genitalia of the male, and by the chaetotaxy of the genital region of the female.

Text-figure 41.



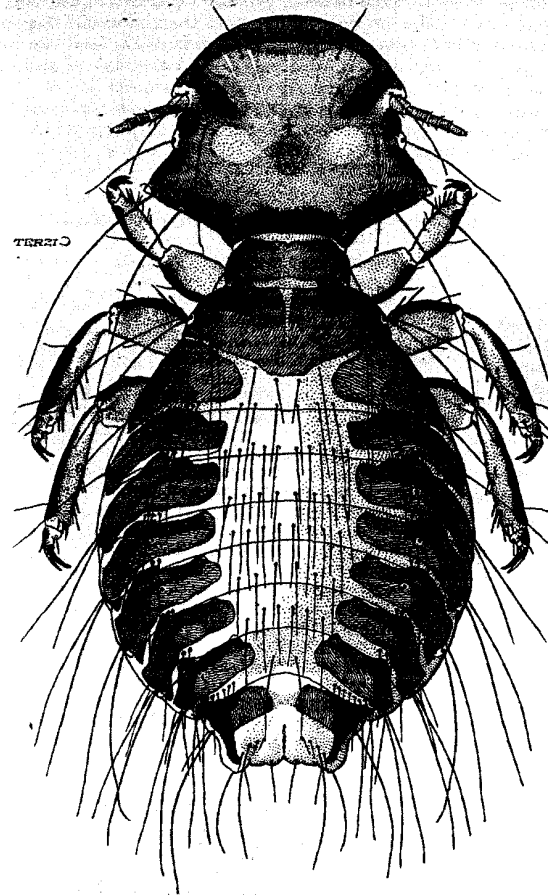
Goniodes dissimilis: (a) ♂ genitalia; (b) ♂ head; (c) ♂ abdomen.

Male.—Head as shown in text-fig. 41 b, and is proportionately broader across the pre-antennal region than the preceding species; clypeal band broad; first antennal segment without process.

Thorax with shape as in the female (text-fig. 42).

Abdomen normal except for segment VIII, which is larger than in the preceding species, and segment IX, which is narrower. Dorsal chaetotaxy as

Text-figure 42.



Goniodes dissimilis, ♀.

in *bituberculatus*, except for the hairs surrounding the genital opening. On the ventral surface segments I-VII have two central hairs with some specimens having 4 central hairs on segments IV-V. The pleural hairs are as follows:—

Segment I has no hairs, segment II has 2 each side, segments III-IV have 3, segments V-VII have 4 each side. Chaetotaxy of genital openings and posterior segments as shown in text-fig. 41 c.

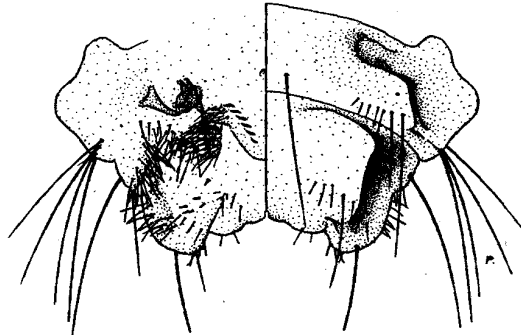
Female.—As shown in text-fig. 42, and characterized by the broad clypeal band, prominent ventral spine-bearing process on the temples, and by the chaetotaxy and form of the terminal segments of the abdomen. Segment VIII is elongated posteriorly, protruding beyond segment IX, and dorsally bears a thickened lateral plate. Pleural chaetotaxy as in the male; sternites I-VII with 2 central hairs.

Genital region with a considerably greater number of hairs and "stalks" of pediculate spines of greater length than in the majority of the preceding species (text-fig. 43).

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.72-0.74	0.80-0.84	0.81-0.85	1.06-1.12
Prothorax....	0.15	0.50	0.15	0.54
Pterothorax..	0.35	0.71	0.37	0.74
Abdomen....	1.15	1.29	1.69	1.49
Total.....	2.36	.....	2.98	.....
C.I.....	1.10-1.14		1.27-1.38	

Text-figure 43.



Goniodes dissimilis, ♀ abdomen.

In the Piaget collection there is 1 female labelled *G. dissimilis* var. *bankiva* from *Gallus bankiva*, and 1 male, 1 female, labelled *G. dissimilis* from the same host; these are all typical *dissimilis*, the differential characters as given by Piaget (p. 269) being found in specimens of *dissimilis* from the type-host.

Specimens examined.—8 males, 5 females, from *Gallus domesticus* from England; 5 males, 4 females, from skins of *Gallus g. labouillei* Delacour and Kinnear from Annam; 7 males, 12 females, from skins of *Gallus g. murghi* Robinson and Kloos from Sikkim; 2 males, 4 females, from skins of *Gallus g. gallus* (Linné) from Siam; 5 males, 4 females, from skins of *Gallus lafayetii* Lesson from Ceylon.

Piaget Collection.—British Museum, 1 female, labelled *G. dissimilis* var. *bankiva*, slide no. 101, from *Gallus g. bankiva* Temminck; 1 male, 1 female, labelled *G. dissimilis* from same host. Leiden Museum, 1 male, 1 imm. from "coq."

Holotype of *G. dissimilis* var. *bankiva*:—Male slide no. 101, as described above.

Denny's specimens of *dissimilis* is not in the British Museum collection and is almost certainly lost; a neotype has therefore been designated.

Neotype.—Female in the British Museum collection, from *Gallus domesticus* from England. *Neoparatypes*.—7 males, 5 females, from the same host.

SPECIES GROUP J.

1. Size as in I.
2. Temples as in I.
3. Clavi in male either but little developed or produced posteriorly and strongly thickened (text-figs. 1 d & 2 a & b). In female as in I.
- 4-7. As in I.
8. Vulva with numerous hairs concentrated at lateral corners. Spinous process of genital region absent.
9. Male genital opening as in I.

This is a somewhat artificial group with the species connected by the characters of the female, and by the increase in size and thickness of the male clavi through *intermedius*, *longus*, *diardi* to *cervinicornis* (text-figs. 1 & 2). The species *intermedius* and *humisæ* resemble *colchici*, *chrysolophi*, *dentatus*, and *sectus* of group I in the presence of a definite unthickened process on the first antennal segment in the male, and are only separable from this latter group by the characters of the genital region of the female. Although *cervinicornis* appears extremely distinct when considered alone, it is seen to have affinities with *crossoptilon* on one side and through *diardi* with *longus* and *intermedius* on the other.

GONIODES INTERMEDIUS Neumann, 1913. (Text-figs. 1 d, 44 b, & 45 b.)

Goniodes intermedius Neumann, 1913 (2), p. 627, figs. 15-18. Host: *Pucrasia macrolopha darwini* Swinhoe. (*Pucrasia darwini*.)

This species is distinguished by the complete absence of a temple angle, by the characters of the genitalia in the male, and by the characters and chaetotaxy of the genital region of the female. It resembles most closely *humisæ*, being distinguished from this species in the male by the characters of the genitalia, the females being apparently indistinguishable.

Male.—Little can be added to Neumann's original description and figure. The head, which is practically indistinguishable from that of *humisæ*, is characterized by the complete lack of temple angles, the post-antennal margins of the head falling away immediately behind the eyes and not flattened for a short distance as in *humisæ*. The first antennal segment bears a short protuberance carrying a spine-like hair.

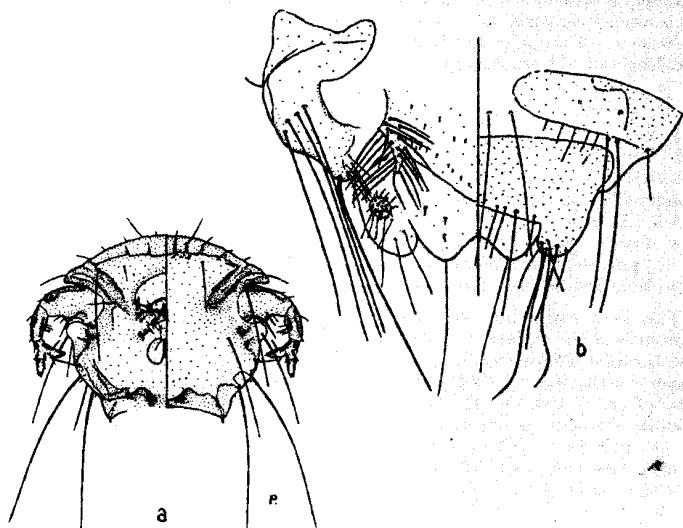
Thorax with lateral prothoracic margins flattened and diverging somewhat posteriorly; pterothorax with shape and chaetotaxy as in *colchici*. Abdomen as in Neumann's figure. Chaetotaxy as shown in table below.

Genitalia similar to that of *humilis*, but whole structure somewhat larger. (length from proximal end of mesosome to distal end of paramera = 374 mm.; breadth = 334 mm.), and with structures *x* and *y* bearing stout spines (text-fig. 45*b*).

Female.—Head as shown in Neumann's figure.

Thorax as in male.

Text-figure 44.



(a) *Goniodes humilis*, ♂ head; (b) *G. intermedius*, ♀ abdomen.

Abdomen normal with chaetotaxy as shown below. Terminal segments differing in chaetotaxy and form from those of the species considered above, in the arrangement of the hairs at the lateral corners of the valve, and in the absence of the spinous process on the genital region (text-fig. 44*b*); in these characters this species resembles *cervinicornis* and *longus*.

Measurements as given by Neumann, but since his longitudinal head measurements are apparently taken from the anterior margin to the posterior level of the occipital angles, and not to the mid-line of the occipital margin as in the measurements of the other species given in this paper, the C.I. of Neumann's specimens are given below to facilitate comparison with other species:—

C.I.: male, 1.09; female, 1.40-1.47.

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I ..	4, 2, 4	2	1-2, 1-2	1, 6, 1	2	2, 2
II ..	3, 2, 3	2	3, 3	2-3, 7-8, 2-3	2	2-4, 2-4
III ..	3, 2, 3	2	3, 3	2-3, 7-8, 2-3	2	2-4, 2-4
IV ..	3, 2, 3	2	3, 3	2-3, 7-8, 2-3	2	2-4, 2-4
V ..	3, 2, 3	2	4, 4	2-3, 7-8, 2-3	2	2-4, 2-4
VI ..	3, 2, 3	2	4, 4	2-3, 6, 2-3	2	2-4, 2-4
VII ..	4-6, 4-6	2	4, 4	6, 2, 6	2	2-4, 2-4
VIII ..	..	..	3, 3	Fig.	Fig.	Fig.
IX ..	..	..	..	..	..	..

In the male the hairs surrounding the genital opening and on the dorsal surface of segment IX are as in *dentatus*, except that those of the posterior lip of the genital opening are somewhat longer and stouter, and there are 8-9 hairs each side of segment IX; ventral hairs of segment VIII-IX as in *dentatus*.

In both sexes there are a number of minute tergal and sternal hairs varying in number in different specimens which have not been included in the above table.

Specimens examined.—1 male, 2 females, Neumann's types in the British Museum from *Pucrasia macrolopha darwini* Swinhoe; 1 male from skin of *Pucrasia macrolopha biddulphi* Marshall from Kashmir.

Lectotype.—Designated by present author:—male from Neumann's types in the British Museum. *Paratypes*.—2 females.

GONIODES HUMILIS, sp. n. (Text-figs. 44*a* & 45*a*.)

This species is only distinguishable from *intermedius* by the details of the genitalia and the shape of the temple region in the male; the females are apparently indistinguishable.

Description of Male.—Head as shown in text-fig. 44*a*, and differing from that of *intermedius* in having the post-antennal margin flattened for a short distance behind the eye and not falling away at once.

Thorax and abdomen as in *intermedius*, except that segment I tends to have a greater number of elongated lateral hairs on the dorsal surface, i. e., 6-10, and segments V-VIII have 5-6 pleural hairs.

Genitalia with whole structure comparatively smaller than that of *intermedius* (length from proximal end of mesosome to distal end of paramera = 280 mm.; breadth = 259 mm.) and differing in details (text-fig. 45*a*).

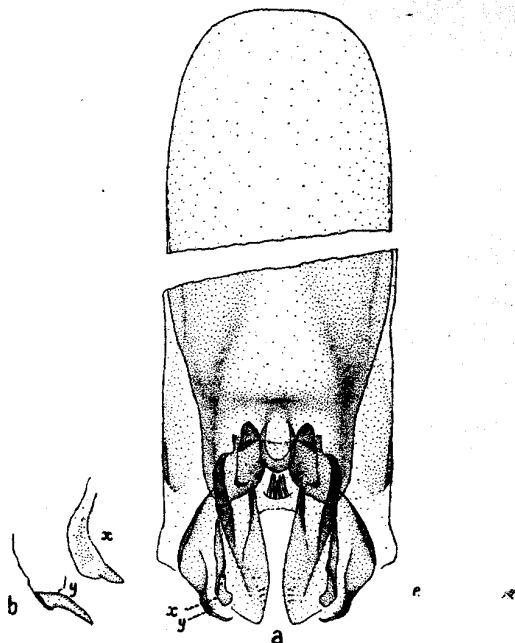
Description of Female.—The female appears identical with that of *intermedius*, except that on tergite I there are 2-4 lateral hairs each side and tergite II has a greater number of central hairs, i. e., 10-12. However, these differences in the number of hairs cannot be used as a diagnostic character in either sex, as only 2 males and 2 females of *intermedius* have been examined.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0.72-0.75	0.77-0.82	0.80-0.85	1.12-1.23
Prothorax	0.21-0.23	0.54-0.57	0.20-0.23	0.52-0.60
Pterothorax	0.39-0.41	0.81-0.88	0.37-0.40	0.80-0.88
Abdomen	1.32-1.48	1.46-1.50	1.58-1.80	1.43-1.57
Total	2.50-2.76	.....	2.84-3.18	.....
C.I.	1.06	1.11	1.37-1.47	.....

Described from 13 males, 9 females, from skins of *Syrnaticus h. humiae* (Hume) from Burma; 4 males, from skin of *S. humiae burmanicus* (Oates) from Yunnan.

Text-figure 45.

♂ genitalia: (a) *Goniodes humiae*; (b) *G. intermedius*.

Holotype.—Male in the Meinertzhagen collection, slide no. 4430 from *S. h. humiae*.

Paratypes.—12 males, 9 females, from the same host.

GONIODES LONGUS Rudow, 1869. (Text-figs. 2d, 46, & 48 a.)

Goniodes longus Rudow, 1869 (2), p. 26. Host: *Lophura ignita* (*Gallus ignitus*).

? *Goniodes pallidus* Giebel, 1877, p. 530. Host: *Houppifer e. erythrophthalmus* (Raffles) (*Euplocamus erythrophthalmus* auf Sumatra).

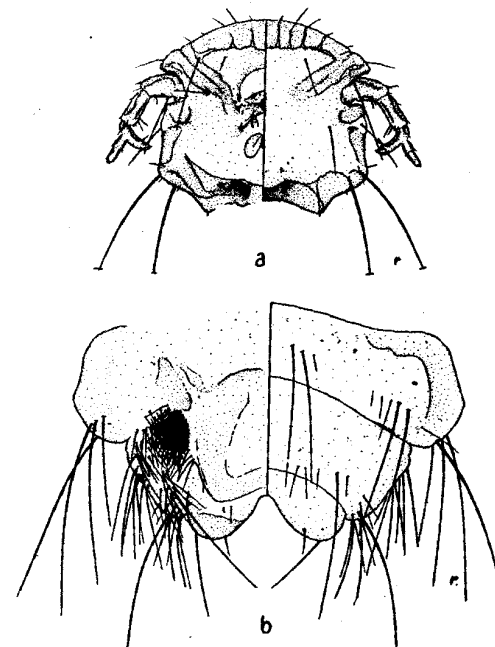
Goniodes latifasciatus Piaget, 1880, p. 269, pl. xxii. fig. 4. Host: *Lophura ignita* (*Euplocamus ignitus*. Skin).

Taschenberg (1882, p. 28), who apparently examined Rudow's specimens of *G. longus*, considers this species to be the same as Piaget's *latifasciatus*. In

the same paper Taschenberg states that the type of *G. pallidus* is an immature female; this female is no longer in the Halle collection, and so it is impossible to say exactly what *G. pallidus* represents. Comparison of specimens from the type-host of *G. pallidus* with specimens of *G. longus* shows no constant differences, and Giebel's description (1877, p. 530), with the exception of one or two of the measurements, is applicable to these specimens.

This species, which resembles *intermedius* in the shape of the male head and genital region of the female, is distinguished in the male by the vertical

Text-figure 46.

*Goniodes longus*: (a) ♂ head; (b) ♀ abdomen.

slightly concave lateral margins of the head, the first antennal segment, and by the genitalia; in the female by the details of the chaetotaxy of the genital region.

Male.—Head with broad clypeal band and temples not expanded. Clavi with posterior margins thickened and approaching the condition found in *diardi* (text-fig. 46a).

Thorax as shown in Piaget's figure (1880, pl. xxii. fig. 4) with chaetotaxy as in *bituberculatus*.

Abdomen with shape as shown in Piaget's figure and chaetotaxy as given below.

The genitalia in Piaget's specimens are somewhat distorted, and the parameres appear narrower distally than those in text-fig. 48a, which are drawn from a specimen collected from *Lophura rufa*.

Female.—Head with broad clypeal band; temples not greatly expanded and with lateral ventral temple spine borne on prominent process.

Thorax as in male.

Abdomen similar in shape to that of male, but somewhat longer; segment VIII bilobed with lobes produced posteriorly. Genital region characterized by the large number of hairs concentrated at the lateral margins of the vulva, and by the absence of the spinous process (text-fig. 46b).

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	2-3, 2, 2-3	0	0, 0	9-10	0	0, 0
II.	2-3, 2, 2-3	2	3-4, 3-4	3-5, 9-12, 3-4	2	3-4, 3-4
III.	2-3, 2, 2-3	2	4-5, 4-5	3-5, 6-8, 3-5	2	4-5, 4-5
IV.	2-3, 2, 2-3	2	4-5, 4-5	3-5, 6-8, 3-5	2	4-5, 4-5
V.	2-3, 2, 2-3	2	4-5, 4-5	3-5, 6-8, 3-5	2	4-5, 4-5
VI.	2-3, 2, 2-3	2	4-5, 4-5	3-5, 6-8, 3-5	2	4-5, 4-5
VII.	2-3, 2-3	2	5-6, 5-6	Fig.	2	5-6, 5-6
VIII.	.....	.....	2-3, 2-3	.....	.....	.....
IX.	8-10, 8-10	14-18, 14-18	.....	.....	.....	.....

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0.81-0.96	0.98-1.05	0.89-0.94	1.20-1.28
Prothorax	0.20-0.27	0.62-0.64	0.24-0.26	0.60-0.65
Pterothorax	0.44-0.49	0.97-0.99	0.46-0.49	0.88-0.96
Abdomen	1.85-1.91	1.76-1.82	2.11-2.14	1.76-1.78
Total	3.18-3.24	.....	3.43-3.59	.....
C.I.	.....	1.21-1.22	.....	1.31-1.35

Specimens examined.—1 male, 1 female, from skin of *Lophura rufa* (Raffles) from Sumatra; 5 males, 6 females, from skins of *Houppifer e. erythrophthalmus* from Sumatra.

Piaget Collection.—British Museum, 3 males, 3 females, of *G. latifasciatus* from *Lophura ignita*; 1 male, labelled *G. latifasciatus* from *Houppifer erythrophthalmus pyronotus* (G. R. Gray).

Leiden Museum, 1 male, 1 female, labelled *G. latifasciatus* from *Euplocomus ignitus* (*Lophura ignita*).

Lectotype of *latifasciatus* designated by present author. Male in Piaget collection, slide no. 51, from *Lophura ignita*. *Paratypes*.—3 males, 4 females, in the Piaget collection from the same host.

GONIODES DIARDI, sp. n. (Text-figs. 2a & 48c.)

This species is intermediate between *longus* and *cervinicornis* in respect to the form of the clavus. In *diardi* the clavi are small and thickened and produced posteriorly to a greater extent than in *longus*. It is distinguished from this latter species in the male by the shape of the head, antennae, and

genitalia, and in the female by the characters of the genital region. This species is extremely close to *cervinicornis*, from which it is distinguished by the form of the clavi, antennal appendage, and genitalia in the male. In the females these two species appear almost indistinguishable, except that the head index of *diardi* tends to be smaller.

Description of Male.—Head and thorax as in *cervinicornis*, except that the clavus is smaller and the appendage on the first antennal segment is somewhat different in shape (text-fig. 2a).

Abdomen as in *cervinicornis* with segment I tending to have more of the lateral dorsal hairs elongated, i. e., 5-8 each side; ventral chaetotaxy as in *cervinicornis*, except that segment VI tends to have fewer central hairs, i. e., 8-10.

Genitalia similar to those of *cervinicornis*, but differ in the proportions and characters of the paramera and in having the bilobed termination of the endomer plate unthickened (text-fig. 48c).

Description of Female.—Head as in *cervinicornis*, but the head-index tends to be smaller, i. e., 1.32-1.38 compared with 1.41-1.47 in *cervinicornis*.

Thorax and abdomen as in *cervinicornis*.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0.81-0.83	1.01-1.04	0.94-0.96	1.25-1.37
Prothorax	0.27-0.30	0.61-0.63	0.25-0.29	0.61-0.66
Pterothorax	0.42-0.44	0.89-0.94	0.42-0.46	0.89-1.00
Abdomen	1.42-1.64	1.62-1.65	1.76-1.97	1.60-1.71
Total	2.82-2.88	.....	3.26-3.54	.....
C.I.	.....	1.23-1.29	.....	1.32-1.38

Described from 9 males, 20 females, from *Diardigallus diardi* (Bonaparte) from the London Zoological Gardens (Siam).

Holotype.—Male in the Meinertzhagen collection, slide no. 8304. *Paratypes*.—8 males, 20 females, from the same host.

GONIODES CERVINICORNIS Giebel, 1874. (Text-figs. 2b, 47, 48b, & 49.)

Goniodes cervinicornis Giebel, 1874 (2), p. 199. Host: *Genus nychthemerus*. (*Phasianus nychthemerus*.)

This species is distinguished in the male by the thickening and enlargement of the clavi and the characters of the genitalia, and in the female by the characters of the genital region. The characters by which this species is distinguished from *diardi* are given above under that species.

Male.—Head with broad clypeal bands; thickened clavi produced medianly; first antennal segment enlarged and bearing a process thickened and forked distally (text-fig. 47a).

Thorax as shown in text-fig. 47a.

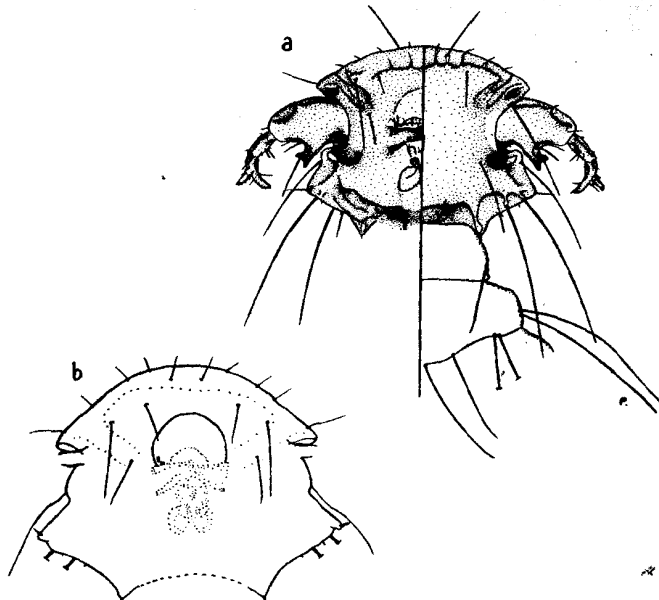
Abdomen with dorsal chaetotaxy as in *bituberculatus*, with the hairs surrounding the genital opening stouter and more elongated and somewhat more numerous. Sternites II-V with 2 central hairs; sternite VI with 8-12 central hairs; sternite VII with 2-4 hairs. Pleural hairs arranged as follows:—Segment I has 2 hairs each side; segments II-III, 5-6 hairs; segment IV, 4 hairs; segments V-VI, 6 hairs; segments VII-VIII have 4 hairs each side. All these hairs are long and stout.

Male genitalia as shown in text-fig. 48 b.

Female.—Head as shown in text-fig. 47 b. Thorax as in male.

Abdomen normal except for genital region. Dorsal chaetotaxy of segments I-VI as in male, but there tend to be fewer long lateral hairs on segment I.

Text-figure 47.



Goniodes cervinicornis: (a) ♂ head and thorax; (b) ♀ head.

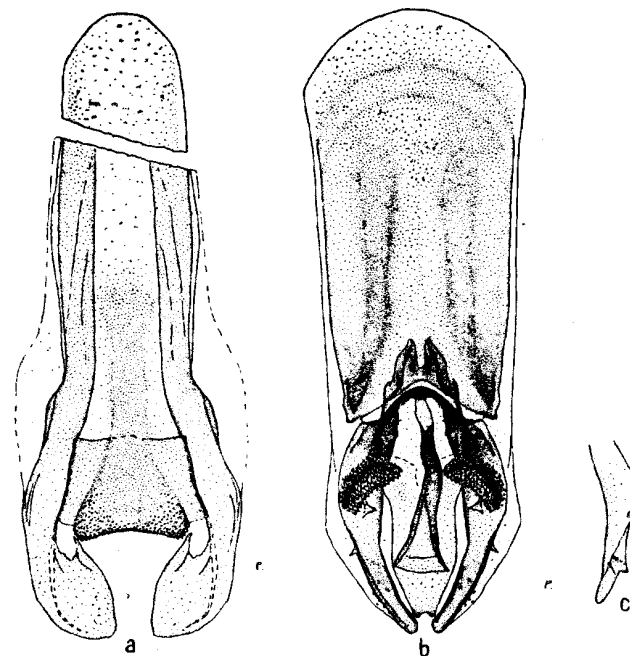
Pleural hairs as in male; sternal hairs with 2 central hairs on segments II-VII with a varying number of minute spines in each segment. Posterior segments and genital region similar to those of *longus*, but with fewer hairs at lateral margins of vulva (text-fig. 49).

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.89-0.91	1.15-1.19	1.04-1.06	1.46-1.56
Prothorax....	0.25-0.31	0.71-0.73	0.23-0.25	0.64-0.69
Pterothorax..	0.50-0.53	1.06-1.08	0.50-0.52	1.08-1.09
Abdomen.....	1.62	1.92-2.00	1.84-2.40	1.75-1.95
Total.....	3.16	.....	3.61-3.78	.....
C.I.	1.29-1.30		1.41-1.47	

Specimens examined.—2 males, 3 females, from skins of *Gennæus n. nycthemerus* (Linné) from Fokien, China; 2 females, from skin of *Gennæus nycthemerus horsfieldii* (G. R. Gray) from Assam.

Text-figure 48.



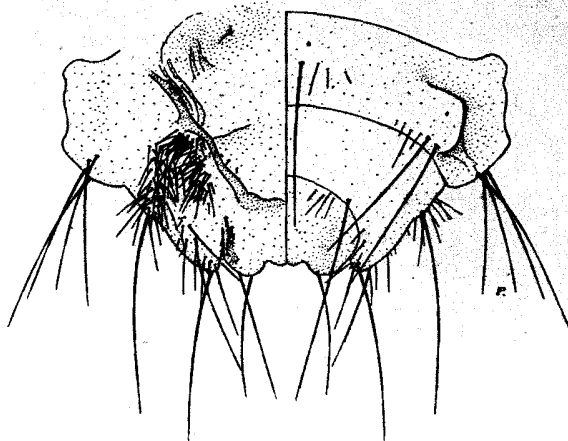
♂ genitalia: (a) *Goniodes longus*; (b) *G. cervinicornis*; (c) paramere of *G. diardi*.

Piaget Collection.—British Museum, 2 male, 2 females, 1 imm., labelled *G. cervinicornis* from *Gennæus nycthemerus*; 1 male, 3 females, labelled *G. cervinicornis* from *Tragopan satyrus*. Leiden Museum, 1 male, 1 female, from *Tragopan satyrus*.

SPECIES GROUP K.

1. Species large to small in size (males, 1.60-4.20 mm.; females, 2.05-3.90 mm.).
2. Temples expanded and similar in the two sexes.
3. Clavi as in I.
4. Antennæ sexually dimorphic. In the male first segment without thickened process; third produced distally as a minute tubercle (*securiger*) or as a process lying either parallel or at right angles to fourth segment. Female as in I.

Text-figure 49.

*Goniodes cervinicornis*, ♀ abdomen.

5. Thoracic sternal hairs as in I.
6. As in I, except for *isogenos*, in which the pleurites have the thickened area as in A.
7. Structure absent.
8. Vulva as in I with the exception of *extraneus*.
9. Male genital opening as in I.

This group contains a diverse collection of species which are, however, not conveniently separated into further groups. The females are not separable from those of I, nor can certain species in this group be separated from those of I.

GONIODES TETRAOGALLE, sp. n. (Text-figs. 50 & 51.)

This is a distinct species not closely related to any known species, and is at once recognized by the deeply-coloured sclerotic bands, by the genitalia of the male, and by the indication of occipital bands in the female.

Description of Male.—Head with temples expanded and with ventral lateral temple hair greatly elongated instead of the usual short spine (text-fig. 50 a).

Thorax as shown in text-fig. 50 a, with 3 lateral pterothoracic hairs.

Abdomen normal with tergal plate of segment VIII larger than is usual. Dorsal surface with a continuous row of hairs across each segment, due to the fact that the intervening minute hairs present in the preceding species are here elongated. Segments I–VII with 2 central sternal hairs, except in segment V, where there are 4. Pleural hairs arranged as follows:—Segment I with 1 hair each side, segment II with 2–4, segments III–IV with 4, segments V–VIII with 5–6 each side. Form and chatotaxy of posterior segments as shown in text-fig. 51 a.

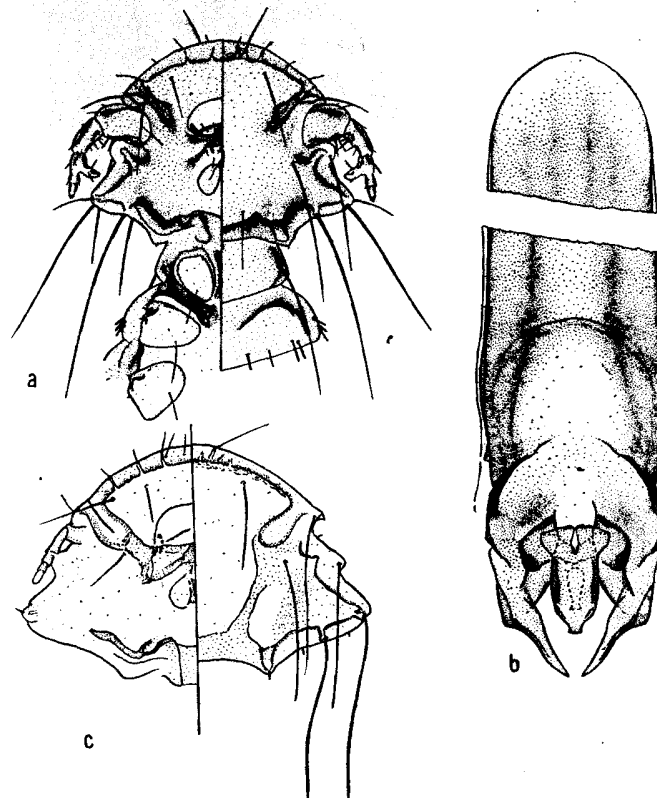
Description of Female.—Head with widely expanded temples and with a

lateral temple spine, not an elongated hair as in male. Occipital bands present (text-fig. 50 c).

Thorax as in male.

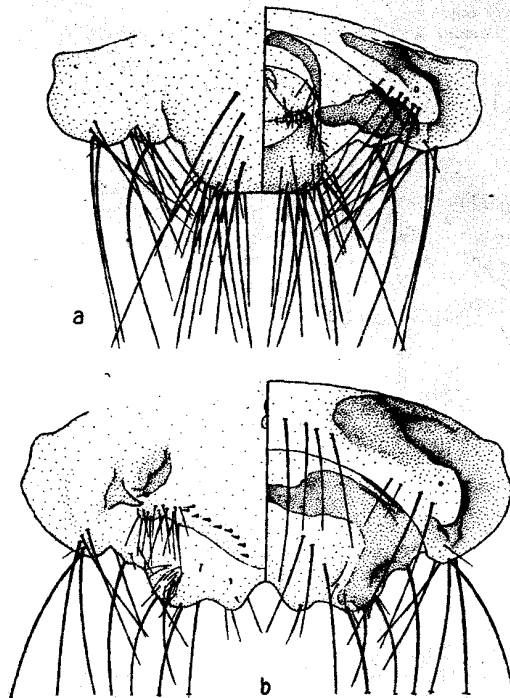
Abdomen normal with sternal and pleural chatotaxy of segments I–VI

Text-figure 50.

*Goniodes tetraogalle*: (a) ♂ head; (b) ♂ genitalia; (c) ♀ head.

as in the male. Lateral tergal hairs as in *bituberculatus* and central tergal hairs as follows:—Segments I–VI, 10–12; segment VII, 6–8. Chatotaxy and form of posterior segments as shown in text-fig. 51 b, with number of pediculate spines each side varying from 4–9 in different individuals and from side to side of the same individual.

Text-figure 51.

*Goniodes tetraogallus*: (a) ♂ abdomen; (b) ♀ abdomen.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.80-0.84	1.00-1.03	0.96	1.45
Prothorax....	0.22-0.24	0.54-0.59	0.25	0.65
Pterothorax..	0.32-0.43	0.77-0.85	0.43	0.97
Abdomen....	1.33-1.39	1.42-1.57	1.62	1.79
Total.....	2.56	2.74	3.14	
C.I.....	1.23-1.25		1.56	

Described from 7 males, 7 females, from skins of *Tetraogallus h. himalayensis* G. R. Gray from Ladak; and 3 females from fresh examples of the same host

from Afghanistan; 3 females, from skin of *Tetraogallus h. koslovi* Bianchi from Koko-nor; 1 female, from skin of *T. a. altaicus* (Gebler), bought in the London market; 8 males, 1 female, from skins of *T. t. tibetanus* Gould from Ladak and Sikkim; 1 male, 4 females, from *T. tibitanus aquilonifer* R. and A. Meinertzhagen from Sikkim.

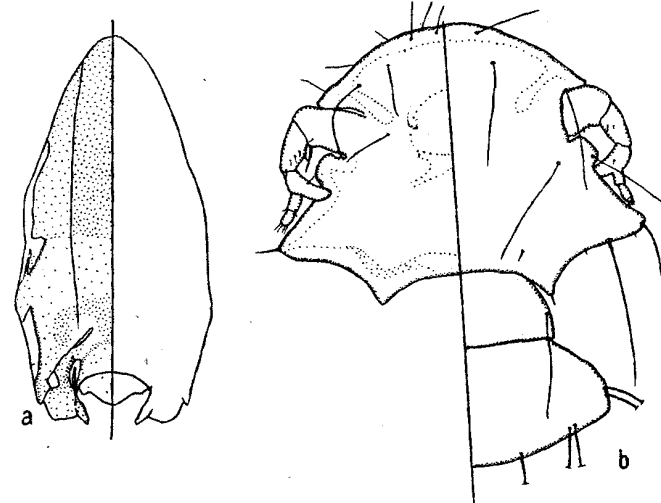
Holotype.—Male in the Meinertzhagen collection, slide no. 3259, from *T. h. himalayensis* from Ladak. *Paratypes*.—6 males, 10 females, from the same host.

GONIODES OREOPHILUS, sp. n. (Text-figs. 52 & 53.)

A large darkly-marked species distinguished by the shape of the head in both sexes, by the large flattened genitalia of the male, and by the characters of the terminal segments of the abdomen of the female.

Description of the Male.—Head and thorax as shown in text-fig. 52 b, with temples expanded widely and with the small process bearing the ventro-lateral

Text-figure 52.

*Goniodes oreophilus*: (a) ♂ genitalia; (b) ♂ head and thorax.

temple spine apparent; first antennal segment enlarged, and distal post-axial angle of third segment prolonged to a considerable extent.

Abdomen with inner margin of tergal plates straight; segment IX large, rounded, and protruding with thickened marginal band (text-fig. 53 a).

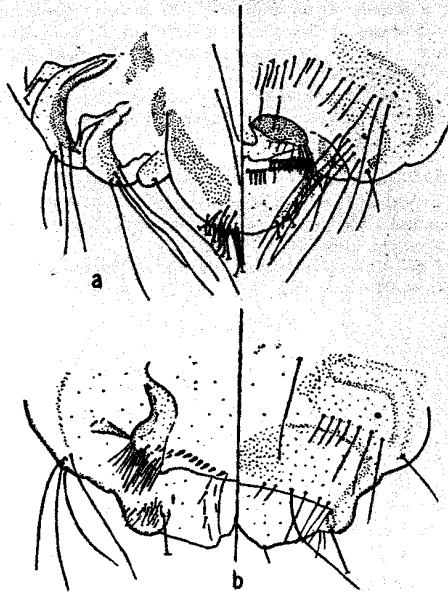
Genitalia of peculiar form and unlike any other known species (text-fig. 52 a).

Description of Female.—Head of similar shape to that of the male, but is somewhat wider across the temples.

Thorax as in male.

Abdomen large and rounded, with form and chaetotaxy of terminal segments as shown in text-fig. 53 b.

Text-figure 53.

*Goniodes oreophilus*: (a) ♂ abdomen; (b) ♀ abdomen.

Abdominal Chetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	4, 91-1, 4	0	0	3-4, 10-14, 3-4	0	0
II.	2, 16, 2	2	2, 2	3-4, 10-14, 3-4	2	2, 2
III.	4-5, 7-8, 4-5	2	3, 3	3-4, 10-14, 3-4	2	3, 3
IV.	2-5, 7-8, 4-5	2	3, 3	3-4, 10-14, 3-4	2	3, 3
V.	2, 10-12, 2	2-4	3, 3	3-4, 10-14, 3-4	2-4	4, 4
VI.	2, 10-12, 2	2	4, 4	4, 8, 4	2	4, 4
VII.	Fig.	2	4, 4	Fig.	2	Fig.
VIII.	Fig.	..	1, 1	Fig.		Fig.
IX.	Fig.					

In both sexes there are a number of minute spines on the sternites, and there may be an increase or decrease by one or two in the number of pleural hairs in different specimens.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.91-0.95	1.36-1.39	0.94-0.95	1.43-1.15
Prothorax ..	0.27-0.31	0.62-0.66	0.22	0.66
Pterothorax ..	0.45-0.49	0.98-1.03	0.46	1.02
Abdomen	1.99-2.40	1.97-2.00	2.10	1.91
Total.....	3.52-3.80	.....	3.66	.....
C.I.	1.45-1.51	.....	1.52-1.58	.....

Described from 9 males, 8 females, from *Francolinus shelleyi theresae* Meinertzhagen from Mt. Kenya, Kenya Colony; 6 males, 7 females, collected both from skins and fresh specimens of *F. j. jacksoni* Ogilvie-Grant, from Aberdare Mts., Kenya Colony; 1 male, 6 females, from *F. jacksoni pollenorum* Meinertzhagen from Mt. Kenya, Kenya Colony; 2 males, 1 female, from skins of *F. jacksoni* subsp. ? from Kenya Colony.

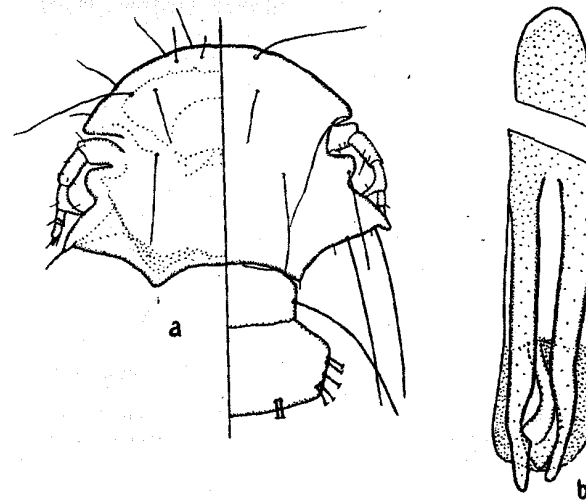
Holotype.—Male in the Meinertzhagen collection from *F. shelleyi theresae*, slide 6589, from Mt. Kenya, Kenya Colony. *Paratypes*.—8 males, 8 females, from the same host.

It is of interest to note that the two mountain inhabiting *Francolinus* species of tropical Africa have apparently identical species which are quite distinct from those found on other species of *Francolinus*.

GONIODES EXTRANEUS, sp. n. (Text-figs. 54 & 55.)

This is an extremely distinctive species unlike any found on the other species of *Francolinus*. It is distinguished by having the ventral temple spine, which is

Text-figure 54.

*Goniodes extraneus*: (a) ♂ head and thorax; (b) ♂ genitalia.

somewhat longer than usual, borne on a definite elongated process in both sexes, by the male genitalia, and by the form of the terminal segments and genital region of the female.

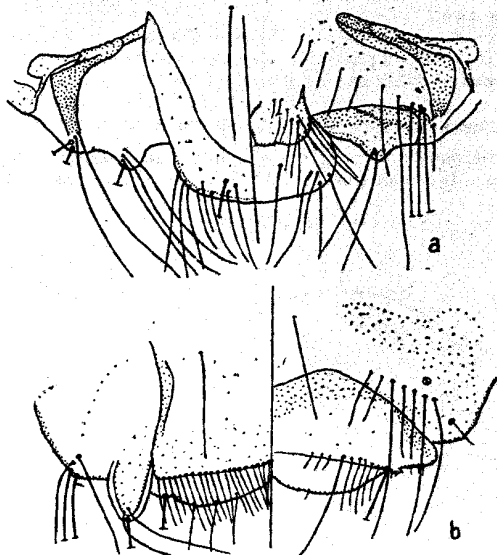
Description of Male.—Head with temples widely expanded and with lateral temple spine borne on definite blunt-ended process; first antennal segment enlarged, and distal postaxial angle of third segment produced at right angles to fourth segment as a narrow appendage thickened distally (text-fig. 54 a).

Thorax as shown in text-fig. 54 a, with lateral margin of pterothorax flattened, and bearing a greater number of hairs than in related species.

Abdomen ovoid and somewhat elongated, with the postero-lateral margin of segment VIII produced into a short blunt-ended process (text-fig. 55 a).

Genitalia with elongated thickened basal plate and paramera of unequal length (text-fig. 54 b).

Text-figure 55.

*Goniodes extraneus*: (a) ♂ abdomen; (b) ♀ abdomen.

Description of Female.—Head and thorax with shape and chaetotaxy as in male; antennae filiform.

Abdomen broad and large with segment VIII elongated somewhat posteriorly; vulva nearly terminal with long marginal hairs; spinous process of genital region absent (text-fig. 55 b).

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	22-24	2	0, 0	1, 8, 1	2	0, 0
II.	22-24	2	1, 1	2, 8, 2	2	1, 1
III.	22-24	2	4, 4	3-4, 8, 3-4	2	4, 4
IV.	22-24	2	4, 4	3-4, 8, 3-4	2	4-5, 4-5
V.	26-28	2-4	4-5, 4-5	3-4, 6, 3-4	2-4	4-5, 4-5
VI.	30-32	2	4, 4	3-4, 6, 3-4	2	4-5, 4-5
VII.	22-24	2	4, 4	Fig.	2	4, 4
VIII.	Fig.	Fig.	Fig.	Fig.	..	Fig.
IX.	Fig.	Fig.	Fig.			

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0.92-0.95	1.28-1.37	0.98-1.03	1.46-1.54
Prothorax	0.17-0.22	0.55-0.60	0.23-0.25	0.63-0.72
Pterothorax	0.31-0.39	0.77-0.92	0.40-0.42	0.98-1.02
Abdomen	1.65-1.91	1.44-1.66	2.02-2.34	1.81-2.04
Total	3.02-4.15	.....	3.70-3.90	.....
C.I.	1.40-1.44		1.45-1.49	

Described from 3 males, 8 females, from *Francolinus gularis* (Temminck) from Nepal, and 2 females from a skin of the same host from N. Bengal.

Holotype.—Male in the Meinertzhagen collection, slide no. 9116 from Nepal.

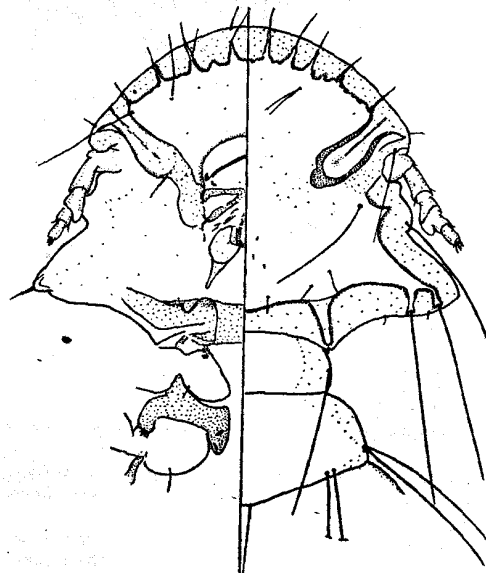
Paratypes.—2 males, 10 females.

GONIODES ASSIMILIS Piaget, 1880. (Text-figs. 56 & 57.)

Goniodes assimilis Piaget, 1880, p. 248. Host: *Francolinus capensis* (Gmelin) (Zoological Gardens, Rotterdam).

Goniodes pternistis Bedford, 1929, p. 520, fig. 21. Host: *Pternistis swainsoni* (A. Smith) (Zoological Gardens, Pretoria).

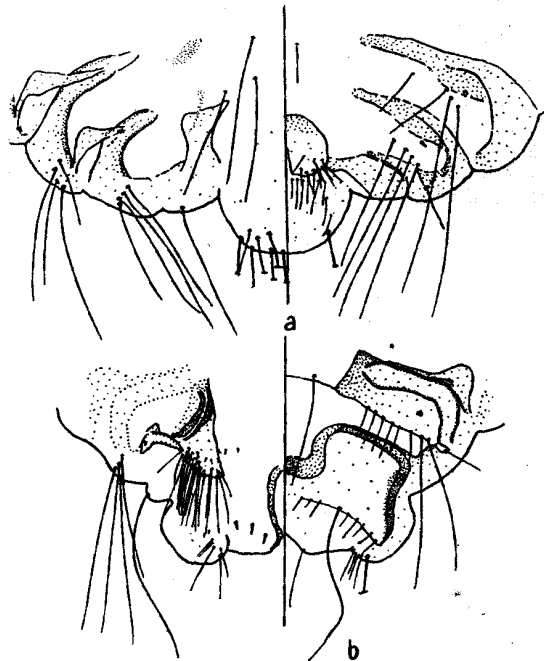
Text-figure 56.

*Goniodes assimilis*, ♂ head and thorax.

In a key to the species of *Goniodes*, Piaget (1880, p. 246) separates the species *truncatus* (= *flavipes*), *dispar*, and *assimilis* on the presence or absence of an

appendage on the lateral bands of the abdominal segments. All these species, however, possess this anterior re-entrant portion of the pleurite on segments I-VII, although in slightly immature specimens it appears to be absent. Bedford, when describing *pternistis* and *scleroptilus*, must have based his comparisons on Piaget's key, and thus separated the *Goniodes* occurring on *Pternistis* from *assimilis* Piaget by the fact that in the former "the bands on all the segments have an appendage," while in the latter "only the lateral bands

Text-figure 57.

*Goniodes assimilis*: (a) ♂ abdomen; (b) ♀ abdomen.

on the last segment have an appendage"; whereas in reality there appears to be no difference between specimens from *Pternistis swainsoni* and the types of *assimilis*.

This species, found on a large number of species of *Francolinus* and *Pternistis*, is distinguished from *dispar* by the shape of the head, the tergal plates, and the characters of the male genitalia and female genital region.

Male.—Head with expanded temples bearing the lateral spine on a small transparent process; antennæ with first segment not greatly enlarged, and

distal post-axial angle prolonged into a short rather transparent process parallel to the fourth segment (text-fig. 56).

Thorax as shown in text-fig. 56.

Abdomen with terminal segments as shown in text-fig. 57 a.

Genitalia as shown in Bedford's figure of *G. pternistis* (1929, fig. 21).

Female.—There are no females of *assimilis* in the Piaget collection, nor have any been examined from the type-host, except 2 females in the Bedford collection labelled *G. assimilis* from *Francolinus capensis*; these, however, are quite distinct from the females from the species of *Francolinus* and *Pternistis* mentioned below, and do not seem to differ in any way from a female of *scleroptilus* lent through the kindness of the late Mr. Bedford. The following description is taken from specimens from *Francolinus clappertoni gedgii*.

Head similar to that of male in shape, but somewhat larger and with filiform antennæ.

Thorax as in male.

Abdomen more elongated than in the male with tergal plates the same. There are no pediculate spines on the valve, and the spinous process on the genital region is but little thickened and easily overlooked (text-fig. 57 b).

Abdominal Chestotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	12-20	0	0	4	0	0
II.	3, 6, 3	2	2, 2	2, 8, 2	4	2, 2
III.	14-16	2	3, 3	3, 8, 3	8	3, 3
IV.	14-16	2	3, 3	4, 6, 4	7-8	3, 3
V.	14-16	6	4, 4	5-6, 4-6, 5-6	7-8	4, 4
VI.	14-16	4	4, 4	5-6, 4-6, 5-6	6-7	4, 4
VII.	4-6, 4-6	2	4, 4	Fig.	Fig.	5, 5
VIII.	Fig.	..	1, 1	Fig.	Fig.	
IX.	Fig.	Fig.	Fig.			

The tergal hairs in the male are divided roughly into three clumps, two lateral and one central, the groups being connected up by one or two hairs.

Measurements.

	Male.		Female.	
	Piaget's types of <i>assimilis</i> .		Specimens from <i>Francolinus clappertoni gedgii</i> .	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.68	0.90-0.92	0.81-0.83	1.08-1.12
Prothorax.	0.13-0.14	0.38-0.40	0.14-0.15	0.46-0.49
Pterothorax.	0.24	0.55-0.57	0.30-0.32	0.64-0.69
Abdomen.	1.02-1.06	1.06-1.14	1.46-1.60	1.29-1.38
Total.	1.97-2.04	.....	2.64-2.78	.....
C.I. ....	.....	1.33-1.36	.....	1.33-1.35

Specimens examined.—2 males, Piaget collection, from *Francolinus capensis* (Gmelin); 1 male, from skin of *Francolinus c. clappertoni* Children from E. Sudan; 4 males, 4 females, from skin of *Francolinus clappertoni gedgii* Ogilvie-Grant

from Mt. Elgon; 1 male, from skin of *F. c. heuglini* Neumann from S. Sudan; 1 male, from skin of *F. c. sharpii* Ogilvie-Grant from Sudan; 2 females, from skin of *F. b. bicaratus* (Linné) from Gold Coast; 1 male, 2 females, from skin of *F. b. ogilvie-granti* Bannerman from Cameroon; 4 males, from skin of *F. e. erkelii* (Rüppell) from Abyssinia; 2 males, from skin of *F. e. pentoni* Praed from Sudan; 1 male, 1 female, from skin of *F. sephæna zambesica* Praed from Zambesi river; 1 female, from skin of *F. sephæna rovuma* G. R. Gray from Dar-es Salaam; 1 female, from *F. squamatus maranensis* Mearns from Kenya; 1 female, from *F. icterorhynchus dybowskii* Dustalet from Uganda; 1 male, 1 female, from skin of *F. h. hildebrandti* Cabanis from Tanganyika; 10 males, 12 females, from *F. hildebrandti altumi* Fisher and Reichenow from Kenya; 1 male, 1 female (labelled *G. pternistis*), from *Pternistis swainsonii* P. Smith from the Pretoria Zoological Gardens, kindly lent by the late Mr. G. A. H. Bedford, and 1 male, 1 female, from skin of the same host from Transvaal; 1 female, from skin of *P. a. afer* (Müller) from Angola; 1 male, from skin of *P. afer nyanzæ* Conover from Uganda; 1 male, from skin of *P. afer intercedens* Reichenow from Congo; 1 male, from skin of *P. afer humboldtii* (Peters) from Nyasaland; 1 male, from skin of *P. afer harterti* Reichenow from Lake Tanganyika; 3 females, from *P. leucoscepus infuscatus* Cabanis from Kenya, and 1 male, 1 female, from skin of same host from Somaliland.

1 male, 1 female, from skin of *Ptilopachus p. petrosus* (Gmelin) from Portuguese Guinea, are apparently conspecific with *assimilis*.

Lectotype of *assimilis* designated by present author.—Male in Piaget collection, slide no. 6, from *Francolinus capensis*. *Paratype*.—Male in the Piaget collection from same host.

GONIODES ANTENNATUS, sp. n. (Text-fig. 58.)

This species resembles *assimilis* in its general characters, but is at once distinguished in the male by the prolongation of the distal post-axial angle lying at right angles to the fourth segment, and not parallel as in *assimilis* and by the genitalia.

Description of Male.—Head with broad clypeal band and temples widely expanded; first antennal segment enlarged to a greater extent than in *assimilis*, and with prolongation of third segment larger and at right angles to fourth segment (text-fig. 58a).

Thorax as in *assimilis*.

Abdomen similar to that of *assimilis* but somewhat larger, and in the specimens examined lacks the central hairs on sternites I–II.

Abdominal Chetotaxy.

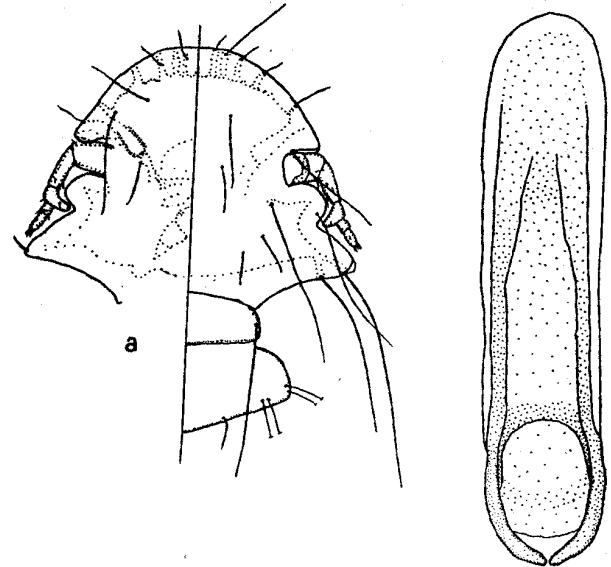
	Male.		
	T.	S.	P.
I.	22	0	0
II.	14-18	0	2, 2
III.	14-18	2	3-4, 3-4
IV.	14-19	2	3-4, 3-4
V.	14-18	2	3-4, 3-4
VI.	10	2	3-4, 3-4
VII.	4, 4	2	3-4, 3-4
VIII.	<i>assimilis</i>	..	1, 1
IX.	<i>assimilis</i>	..	..

Tergal hairs not divisible into lateral and central groups, although the outer and the central hairs are somewhat longer and stouter than the intermediate hairs.

Genitalia of unique form with broad, evenly thickened basal plate and widely curved parameres (text-fig. 58b).

Females unknown.

Text-figure 58.



Goniodes antennatus: (a) ♂ head and thorax; (b) ♂ genitalia.

Measurements.

	Male.	
	Length. mm.	Breadth. mm.
Head.	0.80-0.81	1.05-1.09
Prothorax.	0.15	0.48
Pterothorax.	0.28	0.69
Abdomen.	1.43	1.51
Total.	2.58	..
C.I. ....	..	1.31-1.34

Described from 3 males from skins of *Pternistis l. leucoscepus* (G. R. Gray) from Somaliland.

Holotype.—Male in the Meinertzhagen collection, slide no. 3643. *Paratypes*.—2 males from the same host.

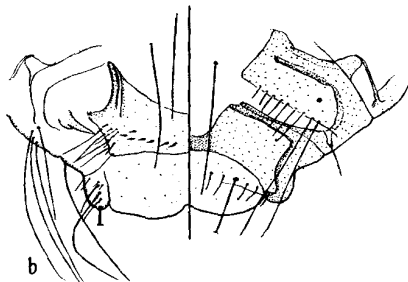
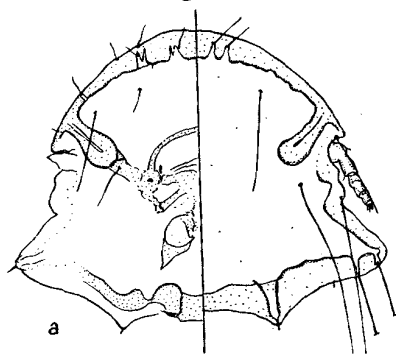
GONIODES SCLEROPTILUS Bedford, 1929. (Text-fig. 59.)

Goniodes scleroptilus Bedford, 1929, p. 520, fig. 20. Host: *Francolinus garipeensis jugularis* Büttikofer (*Scleroptila g. jugularis*) (S.W. Africa).

The host of this species was originally given as *garipeensis pallidior*, but was corrected to *garipeensis jugularis* in Bedford, 1932, p. 331.

Through the kindness of the late Mr. Bedford I have been able to examine a female of this species. It resembles the females of *assimilis*, from which it is distinguished in having the temples somewhat less expanded (text-fig. 59 a)

Text-figure 59.



Goniodes scleroptilus: (a) ♀ head; (b) ♀ abdomen.

and in the chaetotaxy of the valve and posterior segments. There are fewer hairs at the lateral margins of the valve, and a row of pediculate spines not seen in *assimilis* is present; the lateral spinous process on the genital region in this species thickened and more obvious (text-fig. 59 b).

Measurements.

	Female.	
	Length. mm.	Breadth. mm.
Head.....	0.86	1.11
Prothorax.....	0.17	0.51
Pterothorax.....	0.34	0.74
Abdomen.....	1.62	1.49
Total.....	2.88	
C.I.....		1.29

Specimen examined.—1 female, from *Francolinus garipeensis jugularis* Büttikofer from Kunene river, S.W. Africa.

GONIODES DISPAR Burmeister, 1838. (Text-fig. 60 a.)

Goniodes dispar Nitzsch, 1818, p. 294. Host: *Perdix p. perdix* (Linné) (*Perdix cinerea*), nom. nud.

Goniodes dispar Burmeister, 1838, p. 432. Host: *Perdix p. perdix* (*Perdix cinerea*.)

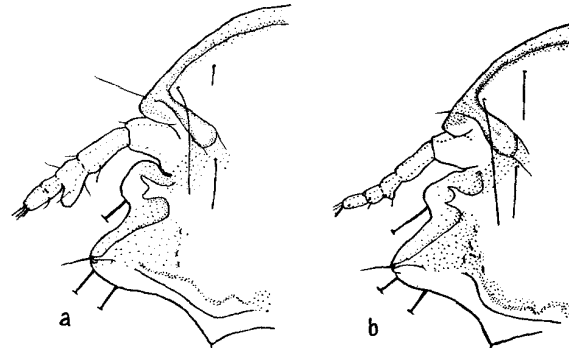
Goniodes flaviceps Rudow, 1869 (2), p. 28. Host: *Alectoris r. rufa* (Linné) (*Perdix rufa*).

Goniodes truncatus Giebel, 1874 (2), p. 194. Host: *Alectoris r. rufa* (*Perdix rubra*).

Goniodes breviantennatus Piaget, 1885, p. 50, pl. v. fig. 8. Host: *Alectoris graeca chukar* (J. E. Gray) (*Caccabis chukar*).

This species is distinguished from *assimilis* by the shape of the head and tergal plates in both sexes; by the male genitalia and by the characters of the

Text-figure 60.



♂ head: (a) *Goniodes dispar*; (b) *G. securiger*.

female genital region in which pediculate spines are present as well as a thickened ventral spinous process. From *securiger* it is distinguished in the male by the

shape of the head and clavi, the character of the third antennal segment, and the genitalia; in the female by the shape of the head and the characters of the genital region.

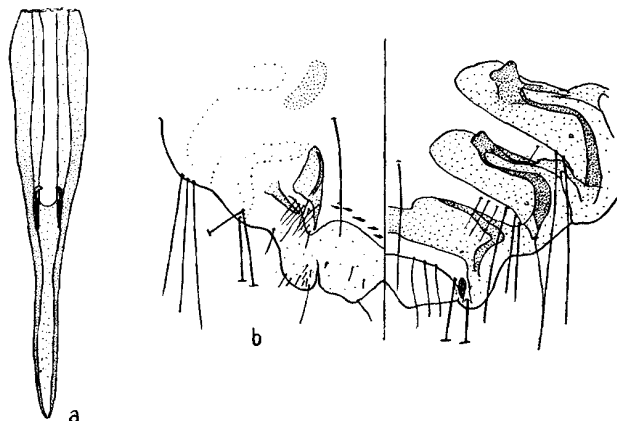
Male.—Head with expanded temples and narrow clypeal band; first antennal segment only slightly enlarged and the distal post-axial angle of third segment prolonged parallel to fourth segment and lightly thickened and rounded distally (text-fig. 60a).

Thorax as in *assimilis*.

Abdomen short and oval with inner margin of tergal plates rounded, not straight as in *assimilis*.

Genitalia with simple uncomplicated mesome and long-pointed paramera.

Text-figure 61.



Goniodes securiger: (a) ♂ genitalia; (b) ♀ abdomen.

Female.—Head with shape as that of male but somewhat larger; spine on temple angle shorter and stouter; clavi resemble those of male *securiger* in shape. The ventral process bearing the lateral temple spine does not project in either sex.

Thorax as in male.

Abdomen more elongated than in the male. There is a considerable amount of variation in the number of hairs at the corners of the posterior margin of the vulva and in the number and arrangement of the pediculate spines. These spines range in number from 3-9 each side, and may be arranged in a single row or where there are many partly in a double row. It is interesting to note that on an examination of a small number of specimens it was at first thought that there was some correlation between the number of spines and the host species; thus specimens from *Alectoris r. rufa* had 7-8 spines each side and

specimens from *Perdix perdix* rarely had more than 5, but on the examination of more material many individuals from *Alectoris rufa* were found with as few as 3 spines each side and from *Perdix perdix* with up to 7 each side.

For chaetotaxy of terminal segments see under *securiger*.

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	20-30	2	1, 1	1-2, 10-12, 1-2	2	1, 1
II.	20-30	2	3, 3	2, 8-10, 2	2	3, 3
III.	20-30	2	3, 3	2, 8-12, 2	2	3, 3
IV.	18-22	2	3, 3	2, 6-8, 2	2	3, 3
V.	18-22	2	4, 4	2, 6-8, 2	2	4, 4
VI.	24-26	2	4, 4	2, 6-8, 2	2	4, 4
VII.	5-8, 5-8	2	4, 4	2, 2-4, 2	2	4, 4
VIII. ....	.....	.....	2, 2	.....	.....	2, 2
IX. ....	.....	.....	.....	.....	.....	.....

The tergal hairs in the male are continuous across the segment, the more lateral 2-3 each side being longer and stouter than the rest. On the ventral surface in both sexes there are a number of minute spines. The tergal hairs of the female are in three groups, two lateral and a central, these groups being linked up by 1-4 smaller and finer hairs.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.58-0.63	0.77-0.86	0.72-0.81	1.00-1.12
Prothorax.	0.15	0.44	0.20	0.54
Pterothorax.	0.23	0.65	0.34	0.83
Abdomen.	1.12	1.26	2.80	1.67
Total.	2.60	.....	3.30	.....
C.I.	1.32-1.40	.....	1.37-1.45	.....

Specimens from *Perdix perdix* and the species of *Alectoris* listed below are apparently indistinguishable, although those from *Alectoris barbara* are quite distinct (see *securiger*).

Specimens examined.—15 males, 23 females, from *Perdix p. perdix* (Linné) from British Isles and Hungary, 1 male, 2 females, of which have been compared with type of *dispar* by Dr. Kéler; 2 males, 10 females, from *Perdix p. lucida* (Altum) from Estonia and Poland; 19 males, 31 females, from *Alectoris r. rufa* (Linné) from British Isles, 7 males, 3 females, which have been compared with the type of *truncatus* by Dr. Kéler; 1 male, 1 female, from skin of *Alectoris græca chukar* (J. E. Gray) from Ladak; 1 male, 2 females, from skin of *A. græca pullescens* (Hume) from Ladak; 1 male, 2 females, from skin of *A. græca philbyi* Lowe from Arabia; 48 males, 44 females, from *A. græca falki* Hartert from Afghanistan.

Piaget Collection.—British Museum, 5 males, 4 females, labelled *G. brevis-antennatus*, from *Alectoris græca chukar*; 1 male, labelled *G. dispar* from *Perdix cinerea* (= *Perdix perdix*); 4 males, 4 females, labelled *G. colchicus* from *Phasianus veneratus reevesii* [= *Syrmaticus reevesii* (J. E. Gray)]; 1 male, 1 female, labelled *G. colchicus* from *Phasianus veneratus* (= *Syrmaticus reevesii*). These specimens from *Syrmaticus reevesii* are almost certainly stragglers or on

wrongly labelled slides. Leiden Museum, 1 female, labelled *G. truncatus* from *Perdix rubra*.

Lectotype of *G. brevi antennatus* designated by present author.—Male, slide 24, Piaget collection. *Paratypes*.—4 males, 4 females, as described above.

GONIODES SECURIGER Nitzsch, 1866. (Text-figs. 60 b & 61.)

Goniodes securiger Nitzsch, 1866 (1), p. 387. Host: *Alectoris b. barbara* (Bonnaterre) (*Perdix petrosa*).

According to information received from Dr. Kéler the only specimen of *securiger* in the Halle collection is a larva, but the description and figures in Giebel, 1874 (p. 194, pl. xv. figs. 11 & 12), seem to apply to the species as described below, although in the figure of the female the temples appear too much prolonged posteriorly.

This species is distinguished from *dispar* in the male by the shape of the head, characters of the antennæ and genitalia, and by the reduction in the size of segment VIII of the abdomen; in the female by the characters of the genital region.

Male.—Head similar in shape to that of *dispar*, but with lateral margins below eye tending to be somewhat convex, not concave as in the latter species. Clavi partly membranous and differing in shape from those of *dispar*; first antennal segment slightly enlarged and distal post-axial angle produced as minute process (text-fig. 60 b).

Thorax with characters as in *dispar*.

Abdomen short and rounded with segment VIII greatly reduced in size, and segment IX small with flattened posterior margin and with thickened tergal plate indented posteriorly. Genital opening similar to that of *assimilis*, but without anterior sclerotic area and with a greater number of hairs on and round the lower lip, i. e., 20-24 each side.

Genitalia with elongated pointed paramera continuous with basal plate (text-fig. 61 a).

Female.—Head similar to that of male, but somewhat larger and proportionally broader across the temples.

Thorax with characters as in male.

Abdomen large with sclerotic areas deeply coloured; inner termination of pleural thickenings appearing anterior to margins of tergites, not parallel as in the male. Genital region similar to that of *dispar*, but there are fewer hairs at the lateral margins of the vulva, and the "stalks" of the pediculate spines are longer (text-fig. 61 b).

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	3-4, 2, 3-4	0	2, 2	1-2, 6, 1-2	0	1-2, 1-2
II.	2-3, 2, 2-3	2	3, 3	2-3, 6, 2-3	2	3-4, 3-4
III.	2-3, 2, 2-3	2	3, 3	2-3, 6, 2-3	2	3, 3
IV.	2-3, 2, 2-3	2	3, 3	2-3, 6, 2-3	2	3, 3
V.	2-3, 2, 2-3	2	4, 4	2-3, 6, 2-3	2	4, 4
VI.	2-3, 2, 2-3	2	4, 4	2-3, 4-6, 2-3	2	4, 4
VII.	3-4, 2, 3-4	2	4, 4	4, 2, 4	2	4, 4
VIII. ....	.....	..	1, 1			
IX.						

In the male the tergal hairs are linked up by a number of shorter and finer hairs not given above. Segment IX has 14-16 long sternal hairs each side of the segment.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.62-0.64	0.78-0.81	0.75-0.78	1.00-1.06
Prothorax.....	0.15-0.18	0.37-0.41	0.17-0.21	0.46-0.52
Pterothorax.....	0.25-0.26	0.59-0.63	0.27-0.31	0.71-0.75
Abdomen.....	0.92-0.95	0.97-1.02	1.42-1.54	1.28-1.38
Total.....	1.87-1.94	.....	2.58-2.74	.....
C.I.....	1.25-1.27	.....	1.32-1.37	.....

Specimens examined.—70 males, 86 females, from *Alectoris b. barbara* (Bonnaterre) from Morocco.

GONIODES ISOGENOS Nitzsch, 1866.

Goniodes isogenos Nitzsch, 1866 (1), p. 388. Host: *Francolinus africanus* (*Perdix afra*).

This species is quite distinct in the female from other *Goniodes* occurring on *Francolinus* and *Pternistis* in the form of the pleurites and genital region. As only a single female has been examined this species will not be described. Dr. Kéler, who has examined the original types, will deal with it in his paper on the *Goniodes* of the Halle collection.

Specimen examined.—1 female, from skin of *Francolinus a. africanus* Stephens from Transvaal, compared with the type-specimen by Dr. Kéler.

GONIODES ORTYGIS Denny, 1842. (Text-fig. 62.)

Goniodes ortygis Denny, 1842, pp. 56 & 158, pl. xiii. fig. 6. Host: *Colinus virginianus* (captive bird) (*Ortyx virginianus*).

Goniodes dispar var. *minor* Piaget, 1880, p. 248. Host: *Lophortyx californica* (*Perdix californica*).

There appears to be no constant difference between specimens from *Colinus virginianus* and Piaget's type of *dispar* var. *minor*, although the male of *ortygis* in the Denny collection differs from Piaget's specimen in having a narrower head (C.I. 1.07 and 1.17). However, other specimens from *Colinus v. virginianus* and *C. v. floridianus* show that Denny's male is unusual in this respect, and that *dispar* var. *minor* must be treated as a synonym of *ortygis*.

This species is distinguished by its small size, the male genitalia, and by the chaetotaxy of the genital region of the female.

Male.—Head with narrow rounded pre-antennal region and temples slightly expanded. Antennæ with first segment enlarged and with distal post-axial angle of third segment prolonged at right angles to fourth segment (text-fig. 62 b).

Thorax as shown in text-fig. 62 b.

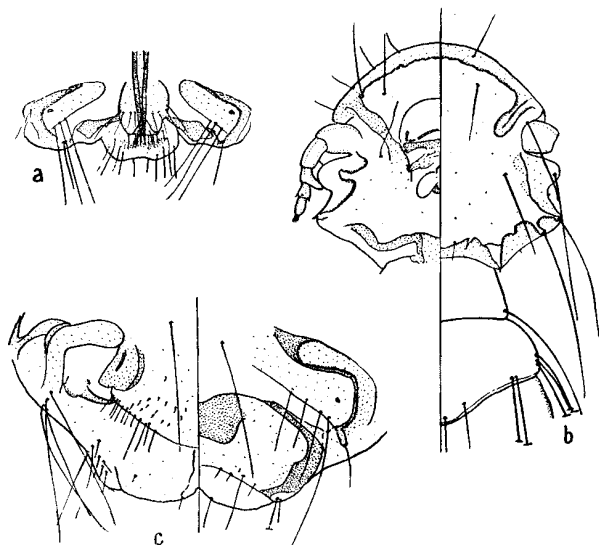
Abdomen short and rounded with segment VIII small (text-fig. 62 a).

Genitalia with elongated basal plate continuous with the pointed paramera.

Female.—Shape of the head similar to that of male but somewhat broader. Thorax as in male but broader.

Abdomen more elongated than in the male; tergal plate VIII with median butterfly-shaped thickening; spinous process present on genital region, vulva

Text-figure 62.



Goniodes ortygis: (a) ♂ abdomen; (b) ♂ head and thorax; (c) ♀ abdomen.

with posterior margin rounded and a few hairs concentrated at the lateral corners and a small number of simple spines (text-fig. 62 c).

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	28-23	2	2, 2	0, 4, 0	2	2, 2
II.	28-23	2	3, 3	2-3, 6, 2-3	2	3, 3
III.	28-23	2	3, 3	2-3, 8-10, 2-3	2	3, 3
IV.	26	2	3, 3	2, 8, 2	2	3, 3
V.	20-22	2	4, 4	3, 6, 3	2	4, 4
VI.	2-3, 2-3	2	4, 4	2-3, 4, 2-3	2	4, 4
VII.	2-3, 2-3	2	4, 4	4-5, 2, 4-5	2	4, 4
VIII. ....	.....	.....	2, 2			
IX. ....	.....	6-8, 6-8				

In the male the tergal hairs of the first five segments are not divisible into the usual three groups, but the outer 6-8 hairs each side are longer and stouter.

Measurements.

	Male.					
	Type <i>G. ortygis</i> .		Type <i>G. minor</i> .		Specimens from <i>C. v. virginianus</i> .	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0-51	0-54	0-50	0-58	0-49-0-55	0-56-0-62
Prothorax	0-15	0-34				
Pterothorax	0-25	0-51				
Abdomen	0-81	0-95				
Total	1-60					
C.I.	1-07			1-17		1-10-1-17

	Female.	
	Length. mm.	Breadth. mm.
Head	0-63-0-68	0-77-0-83
Prothorax	0-17	0-40
Pterothorax	0-26	0-60
Abdomen	1-52	1-14
Total	2-38	
C.I.		1-20-1-23

Specimens examined.—1 male lectotype, 2 female paratypes in the Denny collection from *Colinus virginianus*; 3 males, 1 female, from skin of *Colinus v. virginianus* (Linné) from Washington; 2 males, 1 female, from skin of *C. v. floridanus* (Coues) from Florida; 1 male, 1 female, from skin of *C. v. texanus* (Lawrence) from Texas.

Piaget Collection.—1 male, labelled *G. dispar* var. *minor* from *Perdix californica* (= *Lophortyx californica*).

Holotype of dispar var. *minor*.—Male in the Piaget collection, slide no. 89, as described above.

GONIODES AMMOOPERDIX, sp. n. (Text-figs. 63 & 64.)

This species does not resemble closely any other species, being distinguished by the shape of the head and narrow clypeal band in both sexes; by the genitalia of the male and the chaetotaxy of the genital region of the female.

Description of Male.—Head with narrow clypeal band and temples but little expanded laterally; first antennal segment somewhat enlarged, and distal prolongation of third segment short and at right angles to fourth segment (text-fig. 63 a).

Thorax with prothoracic lateral margin diverging and with postero-lateral angle in the form of a small protuberance. Lateral margins of pterothorax flattened and diverging posteriorly.

Abdomen elongate oval in shape; segment IX small with flattened posterior margin (text-fig. 64 a).

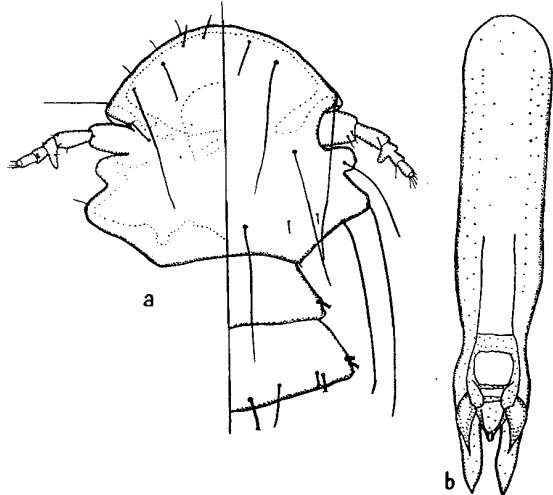
Genitalia as shown in text-fig. 63 b.

Description of Female.—Head similar to that of male in shape but tends to be broader across the temples.

Thorax as in male.

Abdomen more elongate than that of male; the spinous process on the genital region is long and pointed; pediculate spines are absent, and there is a continuous row of marginal hairs on the vulva (text-fig. 64 b).

Text-figure 63.

*Goniodes ammoperdix*: (a) ♂ head and thorax; (b) ♂ genitalia.

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	1, 4, 1	2	0, 0	4	2	0, 0
II.	2-3, 4-6, 2-3	2	2, 2	1-2, 6, 1-2	2	2, 2
III.	2-3, 4-6, 2-3	2	3, 3	1-2, 6, 1-2	2	3, 3
IV.	2-3, 4-6, 2-3	2	3, 3	1-2, 6, 1 2	2	3, 3
V.	2-3, 4-6, 2-3	2	4, 4	1 2, 6, 1 2	2	4, 4
VI.	2-3, 2, 2-3	2	4, 4	3-4, 4, 3-4	2	4, 4
VII.	Fig.	2	3, 3	3, 2, 3	..	3, 3
VIII.	Fig.	..	1, 1	Fig.	..	1, 1
IX.	Fig.	..	..	..	..	..

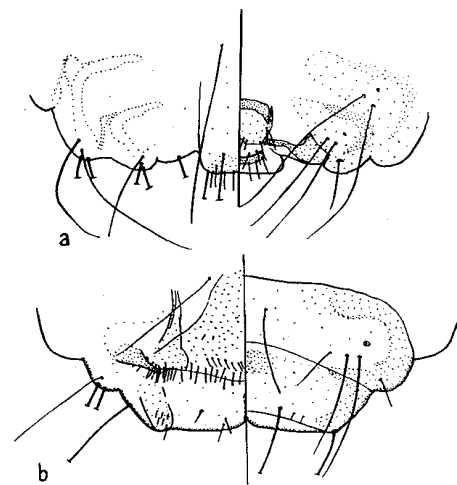
In the male two of the central tergal hairs on each segment are longer and stouter than the remainder.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.55-0.59	0.66-0.70	0.61-0.65	0.78-0.85
Prothorax	0.17-0.19	0.42-0.48	0.17-0.20	0.47-0.54
Pterothorax	0.22-0.25	0.51-0.60	0.23-0.25	0.61-0.76
Abdomen	0.98-1.05	0.95-1.06	1.37-1.48	1.09-1.20
Total.....	1.85-1.97	..	2.31-2.48	..
C.I.	1.13-1.25	..	1.27-1.32	..

Described from 19 males, 20 females, from *Ammoperdix griseogularis* (J. F. Brandt) from India and Afghanistan; 2 males, 3 females, from skins of the same host from Iraq; 4 males, 4 females, from skins of *Ammoperdix heyi*

Text-figure 64.

*Goniodes ammoperdix*: (a) ♂ abdomen; (b) ♀ abdomen.

cholmleyi (Ogilvie-Grant) from Upper Egypt; 1 female, from *Ammoperdix heyi nicolli* (Hartert) from Lower Egypt.

Holotype.—Male in the Meinertzhagen collection, slide no 9475, from *Ammoperdix griseogularis* from Peshawur. *Paratypes*.—18 males, 20 females, from the same host from India and Afghanistan.

GONIODES KELERI, sp. n. (Text-figs. 65 & 66 a.)

This species is distinguished from *ammoperdix* by the shape of the head and broader clypeal band in both sexes, and by the chaetotaxy of the genital region of the female. The genitalia of the male are of the same general type as those of the *ammoperdix* but differ in detail.

Male.—Head and thorax as shown in text-fig. 65 a, and characterized by the short blunt-ended prolongation of the distal post-axial angle of the third antennal segment, which lies at right angles to segment IV, and by the temple angles not being greatly expanded.

Abdomen short, but not greatly rounded (text-fig. 65 a).

Genitalia as shown in text-fig. 65 b.

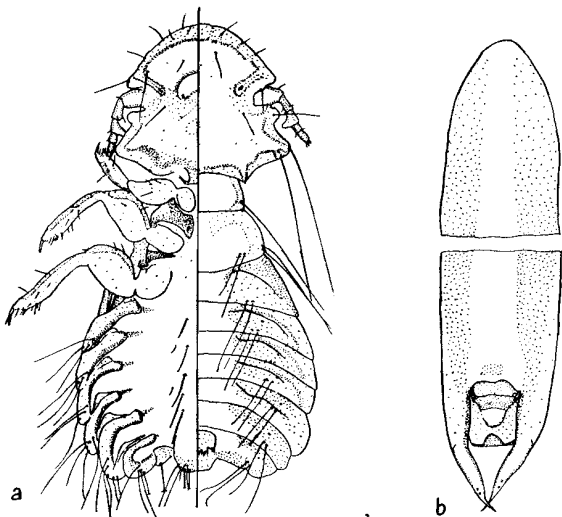
Female.—Head of similar shape to that of the male, but is somewhat broader.

Thorax as in male.

Abdomen with pleurites as in the male. On the dorsal surface segment I has no lateral hairs and 4-5 central hairs; segment II, 1 lateral hair each side

and 6 central; segments III-VI, 2-3 lateral hairs each side and 6 central hairs; segment VII, 4 central hairs. On the ventral surface segments I-VII have 2

Text-figure 65.

*Goniodes keleri*: (a) ♂; (b) ♂ genitalia.

central hairs with 2 finer hairs in addition on segments III-VI. Segment I has no pleural hairs; segments II-III, 3 hairs each side; segments IV-VII, 3-4 hairs each side. Terminal segments as shown in text-fig. 66 a.

Measurements.

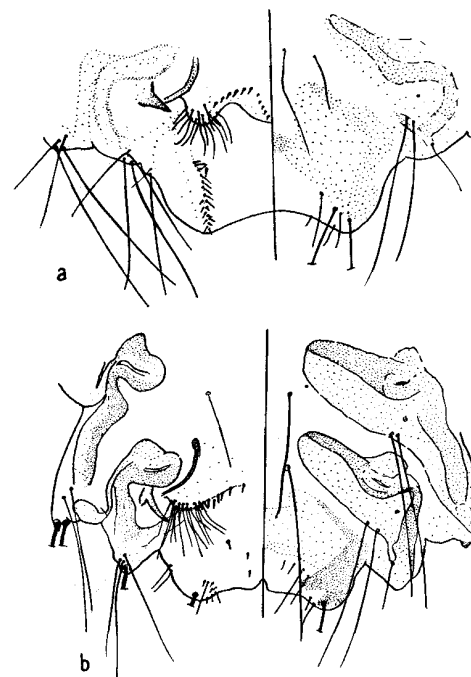
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.69	0.67	0.60-0.63	0.70-0.75
Prothorax.....	0.13	0.34	0.14-0.16	0.32-0.35
Pterothorax.....	0.27	0.51	0.25-0.26	0.52-0.64
Abdomen.....	0.86	0.92	1.17-1.19	0.97-1.05
Total.....	1.72	.....	2.08-2.14	.....
C.I.....	1.13	.....	1.16-1.20	.....

Described from 11 males, 9 females, from skins of *Margaroperdix madagarensis* (Scopoli) from Madagascar.

Holotype.—Male in the Meimertzhagen collection, slide no. 3593. *Paratypes*.—10 males, 9 females, from the same host.

Named after Dr. Kéler, who has given so much assistance in the comparing of specimens with the types in the Halle collection.

Text-figure 66.

♀ abdomen; (a) *Goniodes keleri*; (b) *G. souëfi*.

SPECIES GROUP L.

1. Small species (males, 1.80-2.60 mm.; females, 2.40-2.85 mm.).

2-3. As in K.

4. Antennæ may or may not exhibit sexual dimorphism. In the male when sexual dimorphism is present there is no process on the first segment and the third is prolonged distally at right angles to fourth. Female as in K.

5. Thoracic sternal hairs as in K.

6. Pleurites similar to those in group K, but elongated antero-posteriorly and thickened to a greater extent.

7-9. As in K.

The elongation of the abdomen and the correlated elongation and thickening of the pleurites give the species of this group an extremely distinctive facies. However, the characters of the male genitalia and the female genital region, together with the general characters of the head, thorax, and abdomen are those

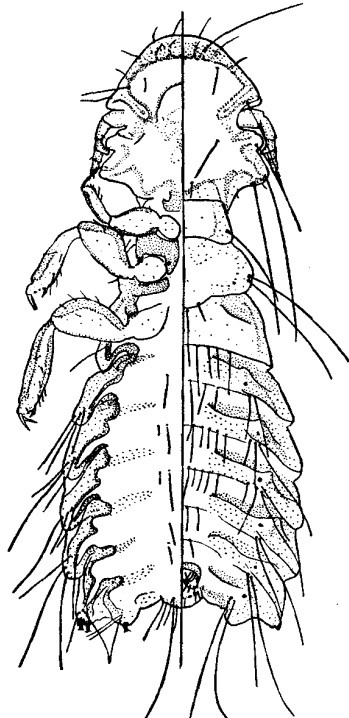
found in *keleri* of group K, thus making a generic separation unsatisfactory, as it merely obscures this relationship and does not simplify the general classification.

GONIODES RETRACTUS Le Souéf, 1902. (Text-fig. 67.)

Goniodes retractus Le Souéf, 1902 (4), p. 90. Host: *Synoicus ypsilophorus australis* (Latham) (*Synæcus australis*).

This species is distinguished from *souëfi* by the size of the third antennal segment and the occipital angles of the head, and from *astrocephalus* by having the distal post-axial angle of the third antennal segment prolonged at right

Text-figure 67.



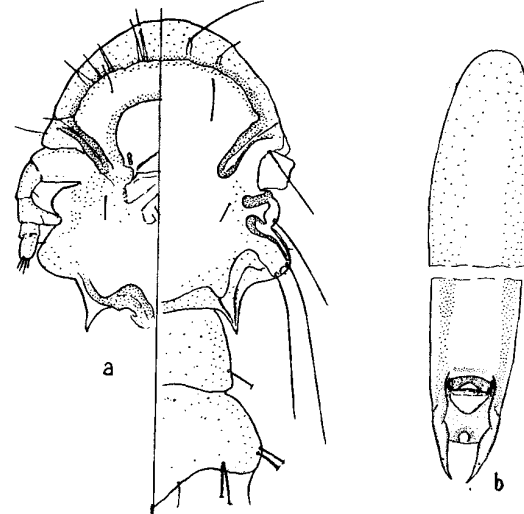
Goniodes retractus, ♂.

angles to the fourth segment. The following description and figures have been made from a single male from *Synoicus ysilophorus raaltenii*, no specimens from the type-host having been seen.

Male.—Head and thorax as shown in text-fig. 67 and characterized by the elongated head, slightly expanded temples and form of the antennæ.

Abdomen as shown in text-fig. 67 and distinguished from preceding species by its elongated form, thickened and enlarged pleurites, and by segments VI and VII bearing stout elongated pleural hairs, the margin of the segment being

Text-figure 68.



(a) *Goniodes souëfi*, ♂ head and thorax; (b) *G. astrocephalus*, ♂ genitalia.

thickened round their points of origin and, in the case of the outer hair on segment VI, the thickened margin is produced into a short point.

In the only specimen examined the distal portion of the genitalia is missing; the basal plate is similar to that found in *keleri*.

Female not examined.

Measurements.

	Male.	
	Length. mm.	Breadth. mm.
Head.....	0.60	0.60
Prothorax.....	0.15	0.34
Pterothorax.....	0.23	0.49
Abdomen.....	1.22	0.88
Total.....	2.16	
C.I.....	....	1.00

Specimens examined.—1 male, from skin of *Synoicus ypsilophorus raaltenii* (S. Müller) from Timor.

GONIOIDES SOUËFI, nom. nov. (Text-figs. 66 b & 68 a.)

Goniodes elongatus Piaget (partim) 1885, p. 52, pl. v. fig. 10, nec Piaget, 1880. Host: *Excalfactoria chinensis australis* Gould. (*Excalfactoria australis*, Museum skin.)

Goniodes longus Le Souëf, 1902 (4), p. 90, nec Rudow, 1869. Host: *Excalfactoria chinensis lineatula* Rensch.

The synonymy of the species is discussed below under *astrocephalus*.

This species is distinguished from *retractus* by the greater length of the prolongation of the distal post-axial angle of the third antennal segment of the male and by the longer and more pointed occipital angles.

Male.—Head and thorax as shown in text-fig. 68 a and characterized by the form of the third antennal segment and occipital angles.

Abdomen with general characters as in *retractus* but somewhat narrower. The only specimen examined, Piaget's male, is in extremely poor condition, but, as far as can be made out, the pleurites, chaetotaxy (except that there appear to be fewer dorsal hairs), and characters of the posterior segments of the abdomen are as in *retractus*. The genitalia appear to be of the same general type as those of *keleri* and *astrocephalus*.

Female.—No females have been examined from the type-host, i. e., *Excalfactoria chinensis australis*, the following description and figures being made from a single female from *E. c. chinensis*.

Head with shape as in male, but somewhat larger and antennae filiform.

Thorax as in male but broader.

Abdomen with general characters as in the male, but is somewhat broader and more elongated. Chaetotaxy of segments I-VI as shown for the male of *retractus*, except that segments I-III have fewer dorsal hairs. Form and chaetotaxy of posterior segments as shown in text-fig. 66 b.

	Measurements.			
	Male.		Female.	
	Piaget's type.		From <i>E. c. chinensis</i> .	
	Length.	Breadth.	Length.	Breadth.
	mm.	mm.	mm.	mm.
Head.....	0.51	0.46	0.60	0.54
Prothorax.....	0.14	0.27	0.17	0.32
Pterothorax.....	0.18	0.36	0.23	0.53
Abdomen.....	1.02	0.47	1.50	0.73
Total.....	1.81	.....	2.46	.....
C.I.....	.....	0.90	.....	0.91

Specimens examined.—1 male, labelled *Gd. elongatus*, from *Excalfactoria chinensis australis* Gould, in the Piaget collection; 1 female, from skin of *Excalfactoria c. chinensis* (Linné) from Bengal.

The 2 females from *Francolinus capensis* mentioned by Piaget (1885, p. 53) are not in the Piaget collection of the British Museum.

GONIOIDES ASTROCEPHALUS (Burmeister), 1838. (Text-fig. 68 b.)

Goniodes paradoxus Nitzsch, 1818, p. 294, nom. nud. Host: *Coturnix c. coturnix* (Linné) (*Perdix coturnix*).

Goniodes paradoxus Stephens, 1829, p. 333. Host: as above.

Goniocotes astrocephalus Burmeister, 1838, p. 431. Host: as above.

Goniodes paradoxus Burmeister, 1838, p. 432, nec Stephens, 1829.

Goniocotes astrocephalus Nitzsch, 1874 (2), p. 182, pl. xiii. figs. 3 & 4. Host: as above.

Goniodes elongatus Piaget, 1880, p. 281, pl. xxii. fig. 5 (partim). Host: as above.

Goniocotes gracilis Taschenberg, 1882, p. 71. Nom. nov. for *Goniocotes astrocephalus* Piaget nec Burmeister, 1838.

It is evident from Piaget's description and figures of *Goniocotes astrocephalus* (1880, p. 226, pl. xix. fig. 1) that he had before him immature examples, and this is further verified by the existence of two extremely immature individuals of *astrocephalus* in the Piaget collection labelled *Gc. astrocephalus* N. As a result of this Piaget described mature specimens from *Coturnix coturnix* as a new species, i. e., *elongatus*. Taschenberg, 1882, p. 71, rightly considered Piaget's *elongatus* to be a synonym of *astrocephalus* Burmeister, but presumed that Piaget's *astrocephalus* must be a different species, and therefore renamed it *gracilis*. Piaget then obtained a male *Goniodes* from *Excalfactoria chinensis australis*, which he considered to be conspecific with the females of *elongatus* from *Coturnix coturnix*, and as this male showed the sexual dimorphism of the antennae, Piaget (1885, p. 52) held to his contention that *elongatus* was distinct from *astrocephalus*. However, in *elongatus* Piaget had two species, one represented by the male, which is conspecific with *souëfi* (see above), and the other represented by the female, which is conspecific with *astrocephalus*.

Stephens (1829, p. 333) lists *G. paradoxus* without a description, but places Shaw's *Pediculus* of the Quail (1806, pl. 121, left-hand fig.) as a synonym. As this figure, however, represents unmistakably one of the Menoponidae, it seems more satisfactory to discard the name *paradoxus* altogether.

This species has been included in *Goniocotes* by previous authors owing to the absence of sexual dimorphism of the antennae, a character, however, which rarely, if at all, is of generic importance. This is well illustrated by the species *retractus*, *souëfi*, and *astrocephalus*, which are obviously closely related, but which show both the presence and absence of this sexual dimorphism.

This species, which resembles in general appearance *retractus* and *souëfi*, is distinguished in the male by the absence of sexual dimorphism of the antennae and in the female by the less pointed and shorter occipital angles.

Male.—Head narrow with elongated pre-antennal region and temples but little expanded. Antennae simple and unmodified.

Thorax as in *retractus*.

Abdomen similar to that of *retractus*, but somewhat narrower and more elongate. Chaetotaxy as in *retractus*, but there tend to be somewhat fewer dorsal hairs.

Genitalia similar to those of *keleri*, but differing in detail (text-fig. 68 b).

Female.—Head similar in shape to that of male but larger.

Thorax as in male.

Abdomen with general shape similar to that of male and with ventral chaetotaxy as in male. On the dorsal surface segment I has no lateral and 4 central hairs; segment II has 1 lateral and 4 central hairs; segments III-VII have 2 lateral and 4 central hairs. The chaetotaxy of the posterior segments and genital region as in *souëfi*, but there tend to be fewer hairs at the lateral corners of the vulva.

	Measurements.			
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.61	0.58	0.67	0.66
Prothorax.....	0.14	0.31	0.17	0.35
Pterothorax.....	0.23	0.47	0.26	0.62
Abdomen.....	1.31	0.71	1.78	0.86
Total.....	2.60	.....	2.82	.....
C.I.....	0.95		0.97	

Specimens examined.—11 males, 11 females, from *Coturnix c. coturnix* (Linné) from Marocco and Afghanistan; 2 females, from *C. c. africana* Temminck and Schlegel from Kenya; 5 males, 1 female, from *C. coromandelica* (Gmelin) from Deccan India; 1 female, from *C. d. delogorguei* Delegorgue from Kenya.

Piaget Collection.—British Museum, 1 female, labelled *G. elongatus* from *Coturnix coturnix*; 2 females, labelled *G. elongatus* from *Picus major* (a woodpecker); 2 males, labelled *G. ortygis* from *Ortyx virginianus*. Leiden Museum, 1 female, from *Coturnix coturnix*.

Lectotype of *elongatus* designated by present author.—Female in the Piaget collection, slide no. 158, from *Coturnix coturnix*.

SPECIES GROUP M.

1. Species small to medium in size (males, 1.10–2.84 mm.; females, 2.05–2.85 mm.).
2. Temples widely expanded and similar in the two sexes.
3. Clavi of diverse shape, size, and thickness.
4. Antennæ may or may not exhibit sexual dimorphism.
5. Meso- and metasternal hairs absent.
6. Pleurites may or may not have inner thickened area.
7. Structure not apparent in abdomen.
8. Vulva with lateral concentration of hairs at corners and with or without marginal hairs. Spinous process of genital region absent.
9. Male genital opening unmodified.

This group contains a number of rather diverse species, all of which are found on the Megapodiidæ, and which have no special distinctive characters except for the widely expanded temples in both sexes and the absence of the spinous process on the genital region of the female. It is probable that new species will be found on the Megapodiidæ, which will necessitate the further division of the group.

GONIODES MINOR MINOR (Piaget), 1880. (Text-figs. 69 & 70 a.)

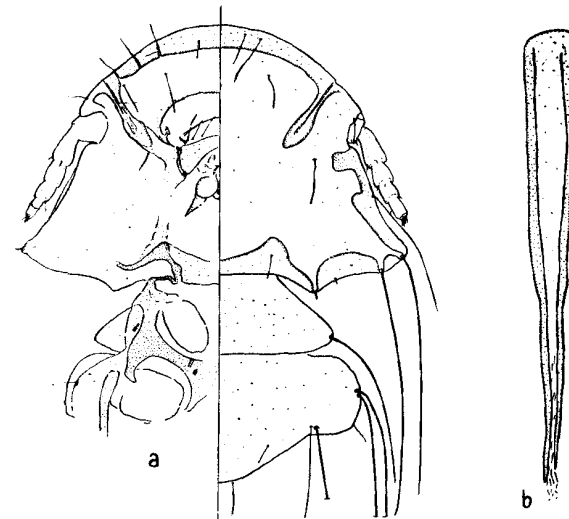
Gonicotes minor Piaget, 1880, p. 241, pl. xxi. fig. 2 (partim). Host: *Megapodius r. reinwardt* Dumont (*M. duperreyi*. Museum skin).

The Piaget collection contains a number of slides labelled *Gc. minor* from different species of *Megapodius* with specimens of at least three closely related species. As Piaget presumably considered these three species to be one, there is no indication in the original description of *minor* as to which the name should apply, the differences only being apparent in the male genitalia and chaetotaxy,

which are neither described nor figured. It has been difficult to designate the lectotype and type-host of *minor*, as it seems probable that at least one of Piaget's slides is labelled with the wrong host, and there is insufficient evidence from other material to settle the host distribution of these species finally. However, *minor* as described below, and the type-host as designated, appear to be the most compatible with the evidence from material outside the Piaget collection.

This species is distinguished from *confusio* in the males by the somewhat broader head, the longer and broader basal plate, and the greater breadth of the parameres. The females are apparently indistinguishable except that those

Text-figure 69.



Goniodes m. minor: (a) ♂ head and thorax; (b) ♂ genitalia.

of *minor* tend to be larger. From *biordinatus* the males are distinguished by the absence of a continuous row of hairs on segment IV of the abdomen and the females by the chaetotaxy of the genital region.

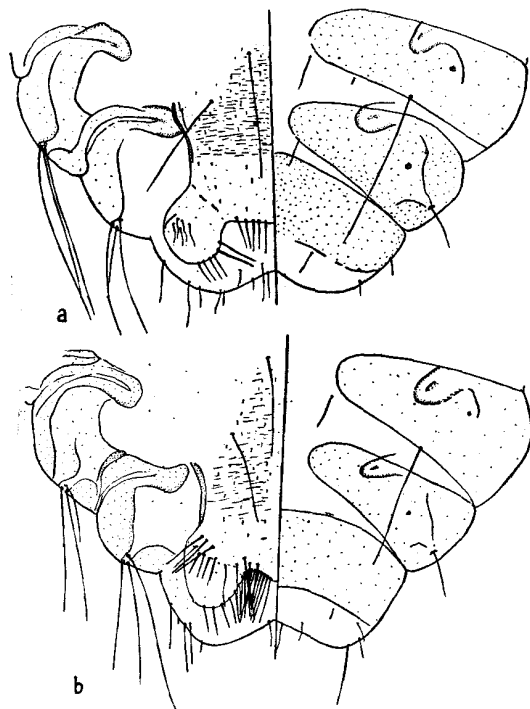
Male.—Head with broad clypeal band and expanded temples, the lateral margins below the eye being somewhat concave; ventral lateral temple spine borne on small process. Clavi small and not produced posteriorly to any great extent; antennæ filiform and unmodified (text-fig. 69 a)

Thorax with breadth of prothorax similar to that of pterothorax, the former bearing an elongate hair at each postero-lateral point. Pterothorax with short flattened lateral margins, bearing 2 long dorsal hairs each side; postero-lateral

margins sloping inwards towards short posterior margin, the former bearing 2 elongate lateral hairs each side, the latter one fine hair at each lateral corner. Dorsal surface of pterothorax with fine hair each side.

Abdomen somewhat elongated with broad pleurites (as shown for *biordinatus*); lateral margins of segment VIII extremely small and segment IX with rounded posterior margin.

Text-figure 70.

♀ abdomen: (a) *Goniodes m. minor*; (b) *G. biordinatus*.

Genitalia simple with elongated pointed paramere continuous with outer margin of basal plate, and with left paramere shorter than right; sac present and armed with minute teeth (text-fig. 69b).

Female.—Head and thorax as in male, the latter not exhibiting the sexual dimorphism as shown in Piaget's figure.

Abdomen similar to that of male but somewhat larger. Posterior margin of valve flattened and bearing hairs with a lateral lobe each side; whole genital region covered with minute spines and with faint striations (text-fig. 70a).

Abdominal Chetotaxy.

	Male					
	T.	S.	P.	T.	S.	P.
I.	1, 2, 1	2	0, 0	2	2	0, 0
II.	1, 2, 1	2	1, 1	2	2	1, 1
III.	1, 2, 1	2	2, 2	1, 2, 1	2	2, 2
IV.	1, 2-4, 1	2	2, 2	1, 2, 1	2	2, 2
V.	1-2, 12-17, 12-17, 1-2	4-6	3, 3	1, 2, 1	4	3, 3
VI.	2, 0, 2	2	3, 3	1, 2, 1	2	3, 3
VII.	2, 0, 2	2	3, 3	2	2	3, 3
VIII.	Fig.	..	1, 1	Figs.		
IX.	Fig.					

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.46-0.53	0.74-0.88	0.51-0.57	0.80-0.89
Prothorax	0.17-0.20	0.47-0.58	0.17-0.20	0.51-0.57
Pterothorax	0.22-0.29	0.55-0.60	0.24-0.28	0.60-0.66
Abdomen	0.97-1.20	0.94-1.08	1.26-1.38	1.05-1.10
Total.....	1.74-2.05	.....	2.10-2.30	.....
C.I.	1.59-1.68	.....	1.57-1.65	.....

Ratio of length of abdomen to length of genitalia = 1 : 0.76-0.92.

Specimens examined.—2 males, 1 female, in the Piaget collection, labelled *minor* from *M. duperreyi* (= *M. r. reinwardt*); 10 males, 5 females, from skins and fresh specimens of *Megapodius r. reinwardt* Dumont from New Guinea; 5 males, 4 females, from skins of *M. reinwardt yorki* Mathews from N. Queensland; 2 males, from *M. r. tumulus* Gould (no data); 9 males, 6 females, from skins and fresh specimens of *M. nicobariensis cumingii* Dillwyn from Labuan and S.E. Celebes; 1 male, 2 females, from skin of *M. nicobariensis pusillus* Tweeddale from Philippine islands.

Lectotype designated by present author.—Male in Piaget collection, slide no. 85, labelled *Gc. minor* from *M. r. reinwardt*. *Paratypes*.—1 male, 1 female, in the Piaget collection from the same host.

GONIODES MINOR CONFUSIO, subsp. n.

This subspecies is only distinguishable from *minor* in the males and differs in the following characters:—

1. All measurements tend to be smaller and the C.I. is less, due to the narrower expansion of the temples.

2. The genitalia are both proportionally shorter and narrower than in *minor*.

	Measurements.			
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0.46-0.48	0.71-0.74	0.49-0.52	0.75-0.83
Prothorax	0.13-0.15	0.40-0.42	0.16-0.18	0.43-0.54
Pterothorax	0.21-0.23	0.51-0.53	0.24-0.26	0.57-0.63
Abdomen	0.89-0.95	0.86-0.88	1.31-1.34	1.02-1.07
Total	1.66-1.80	1.47-1.54	2.09-2.14	1.62-1.60
C.I.	1.47-1.54		1.62-1.60	

Ratio of length of abdomen to length of genitalia 1 : 0.65-0.67.

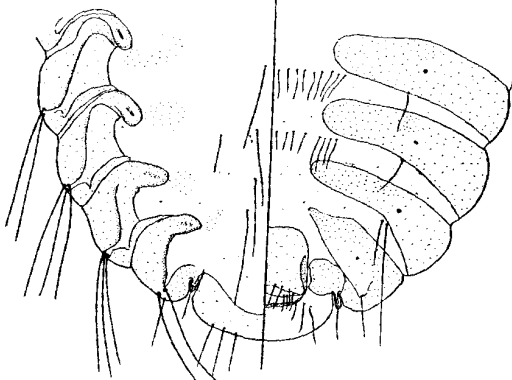
Described from 20 males, 16 females, from skins of *Megapodius n. nicobariensis* Blyth from Nicobar; 1 male, 1 female, from the same host, probably collected from a fresh bird.

Holotype.—Male in the British Museum, slide no. 3007. *Paratypes*.—20 males, 17 females, from the same host.

GONIODES BIORDINATUS, sp. n. (Text-figs. 70 b & 71.)

This species is at once distinguished from the two preceding species in the male by the dorsal chaetotaxy of segment IV, and in the female by the chaetotaxy of the genital region.

Text-figure 71.



Goniodes biordinatus, ♂ abdomen.

Description of Male.—Head similar to that of *minor*, but tends to be somewhat narrower across the temples.

Thorax as in *minor*.

Abdomen similar to that of *minor*, but with tergite of segment IV bearing 8-12 hairs each side of the mid-line instead of the usual 2 central hairs (text-fig. 71).

Genitalia with elongated basal plate continuous with the parameres, which are pointed distally, the right being slightly shorter than the left.

Description of Female.—Characters as in *minor* except for the chaetotaxy of the genital region, in which there are a greater number of hairs (text-fig. 70 b).

	Measurements.			
	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head	0.62	0.81	0.54	0.83
Prothorax	0.16	0.49	0.15	0.49
Pterothorax	0.24	0.62	0.26	0.61
Abdomen	1.08	1.00	1.28	1.00
Total	1.97	1.54	2.14	1.54
C.I.	1.54		1.54	

Ratio of length of abdomen to length of genitalia 1 : 0.86.

Described from 2 males, 3 females, in the Piaget collection labelled *Gc. minor* from *Megapodius rubripes duperreyi* (= *M. r. reinwardt* Dumont); 1 male, from *M. r. tumulus* Gould (Harrison collection, no data); 5 males, 3 females, from skins of *M. affinis decollatus* Oustalet from New Guinea.

Holotype.—Male in the Piaget Collection, slide no. 87, from *M. r. reinwardt*. *Paratypes*.—1 male, 3 females, in the Piaget collection from the same host.

In addition to the species described above there are a number of specimens from *Megapodius* sp. which are closely related but apparently not conspecific with these species. These, however, have not been described either owing to insufficient material or to doubt about the authenticity of the host. Included among these are specimens in the Piaget collection labelled *Gc. minor* as follows:—

2 males, 3 females, from *M. nicobariensis gilbertii* G. R. Gray.
1 male, from *M. reinwardt forstenii* G. R. Gray.

GONIODES MAJOR (Piaget), 1880. (Text-figs. 72 & 73.)

Goniocotes major Piaget, 1880, p. 239, pl. xxi. fig. 1. Host: *Megapodius nicobariensis gilbertii* Gray (*Megapodius rubripes* var. *gilbertii*. Museum skin).

This species is distinguished from *minor* by its much greater size, and from both *fissus* and *minor* by the shape of the head and terminal segments of male and female.

Male.—Head large with widely expanded temples and lateral temple spine borne on small process; partial indistinct bands passing anteriorly from occiput. Clavi pointed and projecting somewhat posteriorly; antennae filiform and unmodified (text-fig. 72 a).

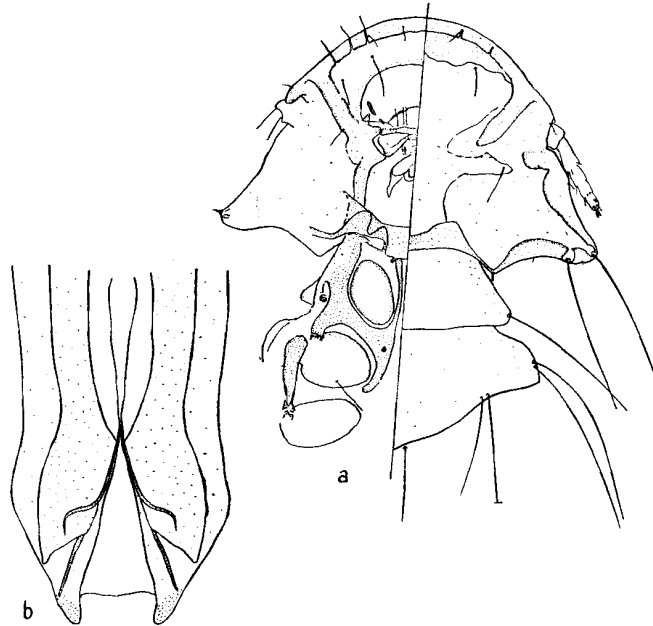
Thorax with lateral pterothoracic margins diverging posteriorly but not prolonged so far laterally as in *minor*; long hair on each postero-lateral margin. Pterothorax as shown in text-fig. 72 a, and similar to that of *minor*.

Abdomen similar to that of *minor* in the character of the pleurites and shape of segments VIII-IX, but differs considerably in size and chaetotaxy. The presence of numerous short hairs on the dorsal surface of segment IX being a distinctive character of the species (text-fig. 73 a).

Genitalia with elongated basal plate and with paramera and mesosome

but little chitinized; these latter parts become somewhat distorted in the mounting in canada balsam, so that an accurate figure from specimens treated in this manner is not possible (text-fig. 72b).

Text-figure 72.



Goniodes major : (a) ♂ head and thorax ; (b) ♂ genitalia.

Female.—Head and thorax as in male.
Abdomen similar in size and shape to that of male. Posterior margin of valve convex in outline with a sparse row of marginal hairs (text-fig. 73 b).

Abdominal Chætotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	1-2, 8, 1-2	2	0, 0	1-2, 8, 1-2	2	0, 0
II.	1-2, 8, 1-2	6-8	1, 1	1-2, 8, 1-2	8	1, 1
III.	2, 10, 2	6-8	2, 2	2, 6, 2	8	2, 2
IV.	2, 10, 2	6-8	2, 2	2, 8, 2	8	2, 2
V.	2, 10, 2	8	3, 3	2, 8, 2	10	3, 3
VI.	2, 4, 2	6	3, 3	2, 6, 2	2	3, 3
VII.	Fig.	2	3, 3	1, 2, 1	2	3, 3
VIII.	Fig.	Fig.	1, 1	Fig.	Fig.	Fig.
IX.	Fig.	Fig.				

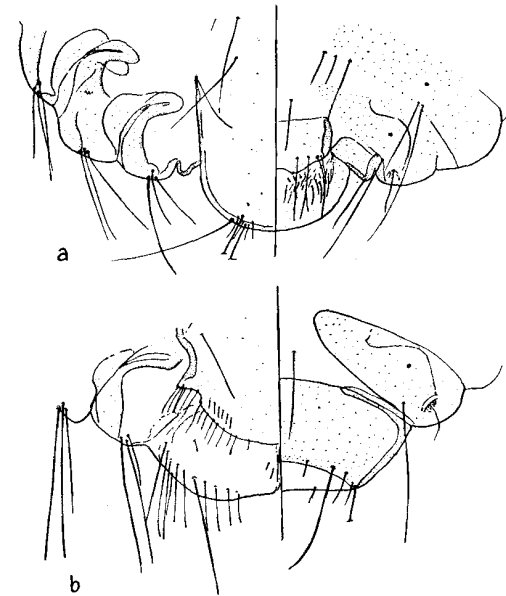
In the male the central sternal hairs are irregular in size.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.....	0.75-0.77	1.18-1.26	0.74-0.75	1.22-1.26
Prothorax	0.28	0.67	0.29	0.66
Pterothorax	0.40	0.89	0.40	0.86
Abdomen	1.57	1.50	1.60	0.86
Total.....	2.82	.....	2.84	1.46
C.I.	1.56-1.64		1.62-1.70	

Specimens examined.—3 males, 3 females, labelled *Gc. major* in the Piaget collection, British Museum, from *Megapodius nicobariensis gilbertii* Gray; 1 male, 1 female, apparently this species from the same host in Piaget's collection,

Text-figure 73.



Goniodes major : (a) ♂ abdomen ; (b) ♀ abdomen.

Leiden Museum; 7 males, 4 females, from skins of *M. nicobariensis cumingi* Dillwyn from Labuan and Luzon; 1 male, 3 females, from skin of *M. nicobariensis pusillus* Tweeddale from Philippine Island; 1 female, from skin of

M. nicobariensis tabon Hachisuka from Mindanao; 1 male, from skin of *M. nicobariensis sanghirensis* Schlegel from Talaut; 1 male, from skin of *M. freycinet geelvinkianus* A. B. Meyer from Numfor. 1 imm. (Piaget collection) from *M. freycinet* and 2 females from skin of *M. affinis decollatus* Oustalet, from N. Guinea, should probably be referred to this species.

Lectotype designated by present author.—Male in Piaget collection, slide no. 62, from *M. nicobariensis gilbertii*. *Paratypes*.—2 males, 3 females, in the Piaget collection from the same host.

Specimens from the following species of *Megapodius* do not appear quite typical of *major* :—

Megapodius tenimberensis Selater.

M. e. eremita Hartlaub.

M. r. reinwardt Dumont.

M. r. forsteni G. R. Gray.

M. r. yorki Mathews.

In the case of specimens from *M. r. reinwardt* in addition to 3 males, 4 females examined which are not typical, there are 2 males, 3 females, in the Piaget collection from the same host (*M. rubripes duperreyi*) which are apparently indistinguishable from true *major*.

GONIODES FISSUS (Rudow), 1869. (Text-figs. 74 & 75.)

Goniocotes fissus Rudow, 1869 (2), p. 23. Host: *Alectura lathamii* (*Telegallus lathamii*. Neuholland).

Rudow's description does not give much indication as to what this species might be, but Taschenberg (1880, p. 84, pl. ii. fig. 7) re-described and figured what was presumably Rudow's specimen. This species is not closely related to any other but resembles somewhat *major*, from which it is distinguished by the shape of the head, genitalia of the male, and chaetotaxy of the terminal segments of the abdomen in both sexes.

Male.—Head with broadly expanded temples and lateral ventral spine borne on small process; posterior occipital thickening dark and conspicuous without occipital bands. Antennae filiform with segments unmodified (text-fig. 74 a).

Thorax with lateral prothoracic margins diverging but slightly and bearing a hair some little way anterior to each postero-lateral angle. Pterothorax with shape and chaetotaxy as in text-fig. 74 a.

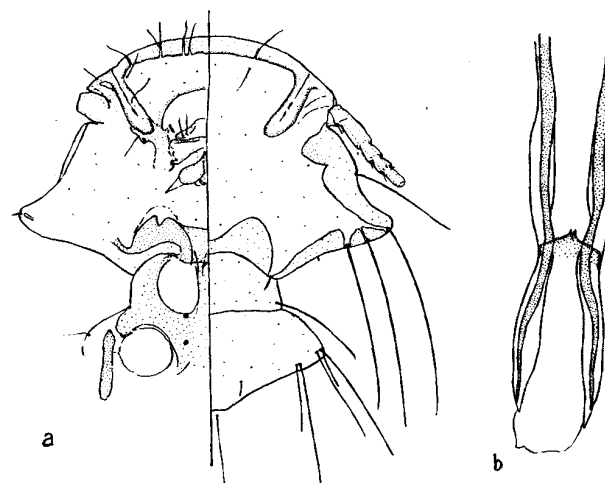
Abdomen short and broad with segment VIII small, and segment IX with rounded protruding posterior margin.

Genitalia with the rather leaf-like parameres continuous with the outer margins of the basal plate, the right being somewhat shorter than the left (text-fig. 74 b).

Female.—Head and thorax as in male.

Abdomen similar in shape to that of male, but somewhat more elongate. Posterior margin of last segment with median indentation. Valve with flattened posterior margin and a number of submarginal hairs, the majority of which are concentrated at the lateral corners (text-fig. 75).

Text-figure 74.



Goniodes fissus: (a) ♂ head and thorax; (b) ♂ genitalia.

Abdominal Chaetotaxy.

	Male.			Female.		
	T.	S.	P.	T.	S.	P.
I.	4-6, 7, 4-6	2	0, 0	2, 4-5, 2	2	0, 0
II.	2, 10-12, 2	2	1, 1	2, 6-7, 2	2	1, 1
III.	2, 8, 2	2	2, 2	2, 6-7, 2	2	2, 2
IV.	2, 2-4, 2	2	2, 2	2, 2, 2	2	2, 2
V.	2, 2	5-7	3, 3	2, 2	8	3, 3
VI.	2, 2	2	3, 3	2-3, 2-3	2	3, 3
VII. ....	...	2	3, 3	1, 1	2	3, 3
VIII.	Fig.	...	3, 3	Fig.	Fig.	...
IX.	Fig.	Fig.	...	...	...	...

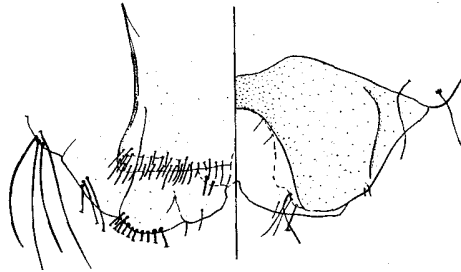
In the male the central hairs in the first tergal segment are arranged in an irregular clump.

Measurements.

	Male.		Female.	
	Length. mm.	Breadth. mm.	Length. mm.	Breadth. mm.
Head.	0.62-0.67	1.06-1.10	0.68-0.70	1.10-1.19
Prothorax.	0.16-0.18	0.43-0.44	0.18-0.20	0.45-0.47
Pterothorax.	0.29-0.33	0.68-0.73	0.30-0.31	0.68-0.74
Abdomen.	1.25-1.37	1.38-1.49	1.54-1.67	1.41-1.56
Total.	2.24-2.40	...	2.60-2.78	...
C.I.	1.63-1.70	...	1.60-1.69	...

Specimens examined.—7 males, 5 females, from skins of *Alectura l. lathamii* J. E. Gray from N.S. Wales; 4 males, 1 female, from skins and fresh specimens of *Alectura l. purpureicollis* (Le Souëf) from N. Queensland; 4 males, 1 female,

Text-figure 75.

*Goniodes fissus*, ♀ abdomen.

from skin of *Alectura lathamii* subsp. ? from Queensland; 6 males, 7 females, from skins of *Æpypodius arfakianus* (Salvadori) from Kaiser Wilhelm Island; 12 males, 13 females, from skins of *Æpypodius bruignii* (Oustalet) from Waigou.

GONIODES OCREA Piaget, 1880. (Text-figs. 76 & 77.)

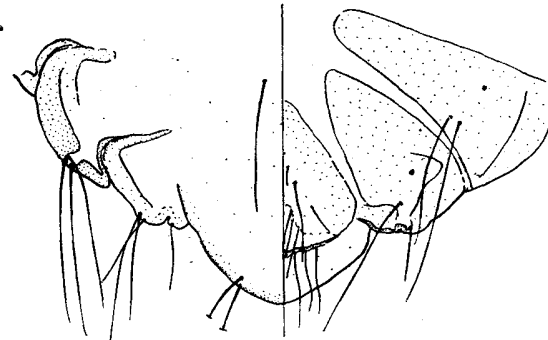
Goniodes ochrea Piaget, 1880, p. 252, pl. xx. fig. 6. Host: ? *Eulipoa wallacei* (G. R. Gray) (*Megapodium rubripes wallacei*). Museum skin).

There is no slide labelled *G. ochrea*, nor any with the host label *Megapodium rubripes wallacei* in the Piaget collection either in the British Museum or the Rijksmuseum van Natuurlijke Historie, Leiden; the information concerning the latter was kindly supplied by Dr. Blöte. However, a male labelled *minor* from *M. rubripes* var. *duperreyii* (= *M. r. reinwardti*) in the Piaget collection agrees with the original figure and description of *ochrea*, and is most probably the specimen from which the male was described, the slide being wrongly labelled, as is so often the case in the Piaget collection. The description of the female was presumably based on the two female specimens on the same slide as the male *ochrea*; these, however, appear conspecific with *biordinatus*. The host name as given by Piaget is not traceable to any known bird, but it is suggested that *Eulipoa wallacei* is meant, especially as a somewhat immature male from this host in the British Museum collection appears conspecific with *ochrea*.

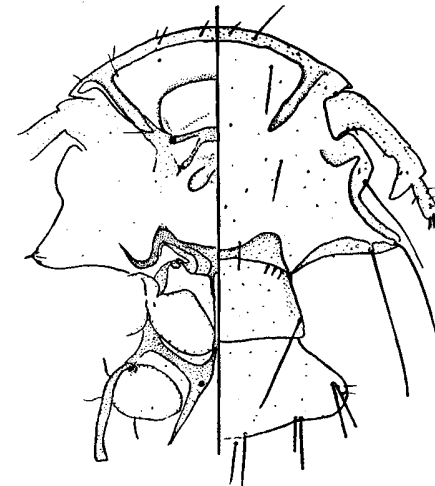
G. ochrea is distinguished in the male from the previously mentioned species occurring on the Megapodiidæ by the prolongation of the distal post-axial angle of the third antennal segment.

Male.—Head with temples expanded and somewhat pointed laterally; lateral temple margins concave; lateral temple spine borne on small protuberance. Clavi small and pointed. Antennæ with first segment not greatly enlarged and distal postaxial angle prolonged into short process lying at right angles to fourth segment (text-fig. 77).

Text-figure 76.

*Goniodes ochrea*, ♂ abdomen.

Text-figure 77.

*Goniodes ochrea*, ♂ head and thorax.

Thorax with lateral prothoracic margins flattened and but little divergent posteriorly; long postero-lateral hair present. Pterothorax with shape and chaetotaxy as shown in text-fig. 77. Abdomen with shape as shown in Piaget's

figure, and characterized by the reduction of segment VIII and the elongated somewhat pointed appearance of segment IX (text-fig. 76).

Genitalia in the only male examined have the distal parts missing. Basal plate with two strongly thickened lateral rods probably continuous with the paramera. Sac with prominent chitinized teeth present.

Female unknown (for discussion of Piaget's description of female see above).

Abdominal Chatotaxy.

	T.	S.	P.
I.	1, 2, 1	2	0, 0
II.	1, 2, 1	2	1, 1
III.	1, 8, 1	2	2, 2
IV.	1, 12, 1	2	2, 2
V.	1, 14, 1	2	3, 3
VI.	2, 2	2	3, 3
VII.	1, 1	2	3, 3
VIII.	Fig.	..	1, 1
IX.	Fig.	..	1, 1

Measurements.

	Male.	
	Length. mm.	Breadth. mm.
Head	0.45	0.72
Prothorax	0.19	0.33
Pterothorax	0.20	0.49
Abdomen	1.13	0.93
Total	1.90	
C.I.		1.60

Specimens examined.—1 male on slide labelled *Gc. minor* from *Megapodius rubripes* var. *duperreyii* (= *M. r. reinwardt*) in the Piaget collection; 1 male (immature), from *Eulipoa wallacei* (G. R. Gray), no data.

Holotype.—Male in the Piaget collection, slide no. 88, as described above. Probable type-host: *Eulipoa wallacei*.

GONIODES DISCOGASTER (Taschenberg), 1882. (Text-fig. 78.)

Goniocotes discogaster Taschenberg, 1882, p. 86, pl. ii. fig. 12. Host: *Megapodius freycinet* (Museum skin).

This is a distinctive species recognized in the male by its small size, expanded temples with the ventro-lateral spine borne on small protuberance, and by the large truncated clavi. No females have been seen, but Taschenberg's figure of the female indicates that there is little doubt as to the identity of the males described below.

Male.—Head with widely expanded temples with definite ventral protuberance bearing the temple spine; clavi large, thickened, and prolonged posteriorly as a truncate process (text-fig. 78); antennæ filiform.

Prothorax widely expanded with lateral margins drawn out into point each side and bearing elongate hair. Pterothorax somewhat wider than prothorax with flattened posterior margin. Apodemes of thorax large and greatly thickened.

Abdomen short and rounded with segment VIII greatly reduced and segment IX comparatively large with rounded posterior margin.

Genitalia with elongated basal plate having a thickened marginal band, each side continuous with parameres, which are pointed distally and not greatly thickened. The whole structure except for the size is similar to that of *fissus*.

Abdominal Chatotaxy.

	Male.		
	T.	S.	P.
I.	2-3, 5, 5, 2-3	2	0, 0
II.	2-3, 4, 4, 2-3	2	1, 1
III.	2, 4, 4, 2	2	2, 2
IV.	3, 2-3, 2-3, 3	2	2, 2
V.	2-3, 2, 2, 2-3	2	3, 3
VI.	3, 1, 1, 3	2	3, 3
VII.	3, 0, 3	2	3, 3
VIII. ....	.....	..	1, 1
IX. ....	.....	..	1, 1

The central tergal hairs are short and almost spine-like in appearance forming a diagnostic character of the species.

Measurements.

	Male.	
	Length. mm.	Breadth. mm.
Head	0.49-0.50	0.87-0.93
Prothorax	0.15	0.61
Pterothorax	0.26	0.71
Abdomen	0.96	1.13
Total	1.75	
C.I.		1.70-1.87

Specimens examined.—2 males, from skin of *Megapodius f. freycinet* Gaimard from Malacca.

GONIODES CRASSIPES (Piaget), 1888. (Text-fig. 79.)

Goniocotes crassipes Piaget, 1888, p. 154, pl. iii. fig. 7. Host: *Tallegalla cuvieri* Lesson.

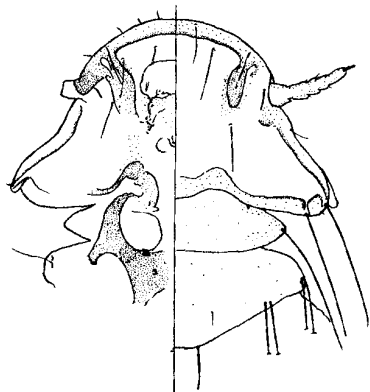
This species is distinguished by its small size, shape of head, and male genitalia.

Male.—Head with somewhat flattened anterior margin; temples expanded and with ventro-lateral temple spine borne on small thickened process. Clavi thickened and produced posteriorly as small pointed lobes. Antennæ unmodified. Inner parts of clypeal, antennal, and occipital thickening deeply coloured.

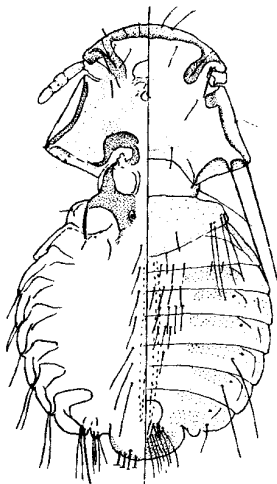
Thorax with lateral prothoracic margins short and rounded. Pterothorax with rounded, diverging, lateral margins and somewhat pointed posteriorly. Pro- and mesothoracic apodemes deeply coloured.

Abdomen short and rounded with segment VIII prolonged somewhat posteriorly, and segment IX large with rounded posterior margin. Chatotaxy as shown in text-fig. 79, and peculiar in having no lateral post-spiracular tergal hairs on segments II-IV.

Text-figure 78.

*Goniodes discogaster*, ♂ head and thorax.

Text-figure 79.

*Goniodes crassipes*, ♂.

Measurements.

	Male.	
	Length. mm.	Breadth. mm.
Head	0.34	0.53
Prothorax	0.10	0.27
Pterothorax	0.16	0.41
Abdomen	0.58	0.65
Total	1.12	
C.I.		1.55

Specimens examined.—1 male in the Piaget collection labelled *Gc. crassipes* from *Tallegalla cuvieri* Lesson.

Holotype.—Male, slide no. 31, as described above.

5 males, from skins of *Tallegalla cuvieri* from Dutch New Guinea, and 3 males, from skin of *T. fuscirostris* Salvadori differ from Piaget's type in the curvature of the anterior margin of the head, in the shape and thickening of the clavi, and in the chaetotaxy of the abdomen. However, these specimens have not been described as new, as it was thought to be more satisfactory to wait until further evidence had been collected as to the correct host distribution of these forms, and as to whether Piaget's type is merely an abnormal individual.

GONIODES MACROCEPHALUS (Taschenberg), 1882.

Goniocotes macrocephalus Taschenberg, 1882, p. 87, pl. ii. fig. 11. Host: *Alectura lathamii* (*Tallegallus lathamii*).

No specimens of this species have been examined, but it is probable from the original description and figure that *macrocephalus* is related to *crassipes*.

REFERENCES.

- Dr. Kéler's extensive bibliography of the literature on Mallophaga (1938, p. 487) makes a full list of references unnecessary. In the present paper the references are given under the author and date, and where there is more than one paper of that author for the date the position of the paper as listed in Kéler, 1938, is placed in brackets. Some difficulty arises over the references to Nitzsch and Giebel, as the species standing under the former author were published by Giebel, and Dr. Kéler has listed some of these papers under the name of Nitzsch and some under Giebel. Therefore, for purposes of reference, Nitzsch and Giebel have been treated as synonyms, and a species referred to Nitzsch 1866 (1), for example, is found under Giebel, 1866, and a species referred to Giebel 1874 (2) is found under Nitzsch, 1874.
- CLAY, T. (1938). New Species of Mallophaga from *Afropavo congensis* Chapin. *Amer. Mus. Novit.* no. 1008, 1-11.
- KÉLER, S. (1938). Uebersicht über die gesamte Literatur der Mallophagen. *Z. Angew. Ent.* 25, 487-524.
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- OLFERS, I. F. M. (1816). *De Vegetativis et animatis corporibus in corpore animato reperi-undis*. Paris, 90-97. (No 1815 edition can be found, cp. Kéler, p. 491.)
- SIMON, F. (1938). *Goniodes centrocerci*, a new Mallophagan from Grouse. *J. Kans. Ent. Soc.* 11, 104-8.
- THOMPSON, G. B. (1938). The Piaget Collection of Mallophaga.—Pt. III. *Ann. Mag. Nat. Hist.* ser. 11, 1, 493-6.

Species mentioned or described in the present Paper
with Type-Hosts. (Synonyms in brackets.)

- Goniodes* Nitzsch, 1818.
- agelastes*, nom. n. *Agelastes meleagrides* (p. 36).
(*latifasciatus* (Piaget), 1885 nec Piaget,
1883.) [(p. 93).]
- ammoperdix*, sp. n. *Ammoperdix griseogularis*
antennatus, sp. n. *Pternistis l. leucocephus* (p. 84).
assimilis Piaget, 1880 *Francolinus capensis* (p. 81).
(*pternistis* Bedford, 1929 *Pternistis swainsonii*)
- biordinatus*, sp. n. *Megapodius r. reinwardt* (p. 106).
bituberculatus Rudow, 1869 *Tetrao u. urogallus* (p. 37).
(*chelicornis* Denny, 1842, nec Children. *Tetrao u. urogallus.*) [(p. 42).]
- centrocerci* Simon, 1938 *Centrocercus urophasianus*
cervinicornis Giebel, 1874 *Gennæus nyctemerus* (p. 71).
chrysolophi, sp. n. *Chrysolophus amherstiae* (p. 51).
colchici Denny, 1842 *Phasianus colchicus* (p. 50).
coronatus (Giebel), 1874 *Rollulus rouloul* (p. 19).
(*obscurus* (Giebel), 1874, nec Giebel, 1874.)
- lævis* Piaget, 1880 *Rollulus rouloul.*
latifasciatus (Piaget), 1883 *Cinclosoma bicolor.*
corpulentus Kellogg & Mann, 1912 *Canachites canadensis* (p. 48).
crassipes (Piaget), 1888 *Talegalla cawveri* (p. 115).
crossoptilon, nom. n. *Crossoptilon auritum* (p. 58).
(*major* Piaget, 1880, nec Piaget, 1880.)
- cupido* Rudow, 1870 *Tympanuchus cupido* (p. 45).
dentatus (Rudow), 1870 *Gennæus nyctemerus lineatus*
(p. 53).
- diardi*, sp. n. *Diardigallus diardi* (p. 70).
discogaster (Taschenberg), 1882 *Megapodius freycinet* (p. 114).
dispar Burmeister, 1838 *Perdix p. perdix* (p. 87).
(*flaviceps* Rudow, 1869 *Alectoris r. rufa.*
truncatus Giebel, 1874 *Alectoris r. rufa.*
breviantennatus Piaget, 1885 *Alectoris græca chukar.*)
- dissimilis* Denny, 1842 *Gallus domesticus* (p. 62).
(*dissimilis* var. *bankiva* Piaget, 1880 *Gallus g. bankiva.*)
- dolani* Eichler, 1937 *Crossoptilon c. crossoptilon*
(p. 59).
eurygaster Piaget, 1885 *Lophophorus impeyanus* (p. 16).
extraneus, sp. n. *Francolinus gularis* (p. 79).
fimbriatus Neumann, 1913 ? *Numida meleagris galeata*
(p. 29).
- fissus* (Rudow), 1869 *Alectura lathamii* (p. 110).
gigas (Taschenberg), 1879 *Gallus domesticus* (p. 33).
(*hologaster* (Denny), 1842 *Gallus domesticus.*
abdominalis (Piaget), 1880 *Gallus domesticus.*) [(p. 26).]
- hopkinsi*, sp. n. *Guttera edouardi seth-smithi*
humiei, sp. n. *Syrnaticus h. humiei* (p. 67).
indicus (Kellogg & Paine), 1914 *Arborophila r. rufogularis* (p. 21).
intermedius Neumann, 1913 *Pucrasia macrolopha darwini*
(p. 65).
- isogenos* Nitzsch, 1866 *Francolinus africanus* (p. 91).

- ithaginis*, sp. n. *Ithaginis c. cruentus* (p. 48).
keleri, sp. n. *Margaroperdix madagarensis*
(p. 95).
- lagopi* (Linné), 1758 *Lagopus l. lagopus* (p. 46).
(*lagopodis* (Gmelin), 1790 *Lagopus l. lagopus.*
chelicornis Children, 1836 *Lagopus l. lagopus.*)
- longus* Rudow, 1869 *Lophura ignita* (p. 68).
(*pallidus* Giebel, 1877 *Houppifer e. erythrophthalmus.*
latifasciatus Piaget, 1880 *Lophura ignita.*)
- macrocephalus* (Taschenberg), 1882 *Alectura lathamii* (p. 117).
major (Piaget), 1880 *Megapodius nicobariensis gilbertii*
(p. 107).
- mamillatus* Rudow, 1870 *Lophortyx californica* (p. 60).
megaceros Kellogg & Paine, 1914 *Lophophorus impeyanus* (p. 13).
meinertzhageni, sp. n. *Pavo cristatus* (p. 9).
merriamanus Packard, 1873 *Dendragapus obscurus richard-*
sonii (p. 48).
- minor minor* (Piaget), 1880 *Megapodius r. reinwardt* (p. 102).
minor confusio, subsp. n. *Megapodius n. nicobariensis*
(p. 105).
- numida* Mjöberg, 1910 *Numida m. meleagris* (p. 29).
ocrea Piaget, 1880 ? *Eulipoa wallacei* (p. 112).
oreophilus, sp. n. *Francolinus shelleyi therese*
(p. 77).
- ortygis* Denny, 1842 *Colinus virginianus* (p. 91).
(*dispar* var. *minor* Piaget 1880 *Lophortyx californica.*)
- pavonis* (Linné), 1758 *Pavo cristatus* (p. 5).
(*tetragonocephalus* (Olfers), 1816 *Pavo cristatus.*
falcicornis Nitzsch, 1818 *Pavo cristatus.*)
- perlatus*, sp. n. *Numida meleagris major* (p. 31).
processus Kellogg & Paine, 1914 *Arborophila r. rufogularis* (p. 23).
retractus Le Souëf, 1902 *Synoicus ypsilophorus australis*
(p. 98).
- scleroptilus* Bedford, 1929 *Francolinus gariepensis juglaris*
(p. 86).
- sectus* Kellogg & Paine, 1914 *Catreus wallichii* (p. 56).
securiger Nitzsch, 1866 *Alectoris b. barbara* (p. 90).
simoni, sp. n. *Dendragapus o. obscurus* (p. 44).
souëfi, nom. n. *Excalfactoria chinensis australis*
(p. 100).
- (*elongatus* Piaget, 1885, nec Piaget,
1880 *Excalfactoria chinensis australis.*
longus Le Souëf, 1902, nec Rudow,
1869 *Excalfactoria chinensis lineatula.*
- spincornis* Nitzsch, 1866 *Tragopan satyra* (p. 11).
(*bicuspidatus* Piaget, 1880 *Tragopan satyra.*) [(p. 74).]
- tetraogalla*, sp. n. *Tetraogallus h. himalayensis*
tetraonis (Linné), 1761 *Lyrurus t. tetrrix* (p. 40).
(*tetraonis* Denny, 1842 *Lyrurus t. britannicus.*
? *homoceros* Nitzsch, 1861, nom. nud.
heteroceros Nitzsch, 1874 *Lyrurus t. tetrrix*
trigopan, sp. n. *Lyrurus t. tetrrix.*)
- wilsoni* Clay, 1938 *Tragopan melanocephalus* (p. 13).
Afropavo congensis (p. 26).

Note.—Last summer (1939) Dr. Kéler had a paper in the press describing and figuring the *Goniodes* species in the Halle Collection and also erecting several new genera. In the present paper, therefore, in order to avoid duplication, some of these species have not been fully figured (e. g., *spinicornis*, *gigas*, *isogenos*, etc.). Dr. Kéler's paper has never been published, and no news has been received from Dr. Kéler since the German invasion of Poland, but it is sincerely hoped that Dr. Kéler may be able to continue his work and that his paper on the Halle Collection may be published. Information has been received that the valuable Nitzsch and Giebel collections were returned to Halle just before the outbreak of war.