XI. MALLOPHAGA FROM BIRDS (MOSTLY CORVIDAE AND PHASIANIDAE) OF INDIA AND NEIGHBOURING COUNTRIES.

By W. L. Kellogg and J. H. Paine, Stanford University, California.

(Plates xiv, xv.)

At the suggestion of Mr. C. W. Beebe, Curator of Birds in the New York Zoological Park, who visited the Indian Museum of Calcutta in 1910, Superintendent N. Annandale of this Museum sent to us a collection of Mallophaga taken from bird skins of the Museum. These Mallophaga were taken from the skins of crows, jays and pheasants, most of which had been collected in India.

Some, however, had come from China, Persia, Tibet, the Malay Peninsula and elsewhere. The specific determinations of the birds may of course be accepted without question, and the localities are given for most of the specimens with admirable definiteness. The determinations of the Mallophagan parasites, together with descriptions of the new species found among them, are presented in this paper.

The collecting of bird parasites from dry bird skins in museums would at first sight seem to be a proceeding attended with a dangerous lack of certainty concerning the relation of parasite and host. A good deal of straggling might be expected. As a matter of fact, this danger is not a serious one. The comparison of host records based on collections made from dried skins with records based on collections from freshly obtained hosts in the field, show that on the whole the records from the dried skins are not misleading. Indeed a great majority of the records in Piaget's "Les Pedioculides," which is the monumental basis for all of our knowledge of the Mallophaga and their host relations, were made on a basis of the examination of skins in European museums. The lack of danger from straggling comes about from the sedentary habits of the parasites themselves and their early death after the host's death.

The collection of Mallophaga described in this paper is of particular interest because it offers a rather intensive study of the parasites of the Indian Corvidae and Phasianidae. The collection of Indian birds in these two families is particularly large in the Indian Museum, and parasites have therefore been taken from many species in the two families and from many individual speci-
men of the host species. It is on the basis of collecting
them that anything like an inclusive knowledge of the re-
lationship of the Mallophaga to any given host must be based.
The types of the new species described in this paper are in
the Indian Museum, Calcutta.
The writer wishes to express their recognition of the courtesy
of Superintendant Anandel in permitting them to examine so
interesting a Mallophagan collection.

I. MALLOPHAGA FROM PHASIANIDAE.

Nirasus nigrogearatus, Piaget.
One female from Gallus domesticus (no history, India).

Goniocetes indicus, n. sp.

(Plate xiv, fig. 4.)

One male specimen from Arboctes melitellus (Porrocke, East
Himalayas). A bright-coloured, prettily patterned new form with
rounded lateral margins and conspicuous, straight, backward-pro-
jecting posterior angles on the head. The figure represents the
insect as somewhat too full, the abdomen especially appearing
considerably brighter in the specimen. This is a large species for
Goniocetes.

Description of male: Head rounded, inflated, with broadly
rounded front whose sides are somewhat flattened. General colour
a rather bright yellow with reddish brown mandibles and mark-
ings. Antennal bands pale, continuous around the front, where
they are widest, and turning in, as usual, before the antennae,
though not much darkened at this point. Five fine hairs on each
side of the front, the forward two being submarginal. There is a
clearly defined, dome-shaped, semi-transparent space in front of
the mandibles. Antennae well developed with second segment,
third and last segments about equal, basal second in length and
thickened; colour a little paler than head. Triangular projecting area directly before antennae with
surface appearing as though finely pitted. Eye large, but slightly
protruding with a fairly long hair and large, granular fleck, occu-
lar blotch quite dark with distinct margins. Temple convex in
front, concave behind, with posterior angles acute and projecting
straight backward nearly half the length of the prothorax and
bearing a minute spine. Two long, postulated hairs on the lateral
margins of the temple behind the widest part and a short spine
nearer the eye. Marginal bands little coloured, except close to
the eye, and completely interrupted for the reception of the
marginal hairs. Occipital sinus, with marginal band, darker at
each side, where it forms the ocular blotches. Occipital bands and
signature lacking.

Thorax shorter than head and narrower, also slightly darker in
general tone with rather broad marginal bands. Prothorax with

anterional angles rounded, sides diverging and slightly concave with
posterior angles protruding somewhat and bearing a postulated
hair. Posterior margin but slightly concave, base. Metathorax
posterior margin obtusely angled on the abdomen. Two long
postulate situated midway on the lateral margin; two other shorter
ones on each side near the posterior margin, arising from a sub-
marginal postulate at a point about three-fifths the distance from
the meson to the side. Legs pale with a number of heavy
spines.

Abdomen broadly elliptical, somewhat flattened toward the
front and widest at the third segment. First segment much lon-
ger than any of those following, with straight, diverging sides,
and broad slightly coloured marginal bands. Second to seventh seg-
ments with pale marginal bands giving rise to internal append-
ages, turning inward along the anterior margins and appearing
as sharp, transverse linear lateral abdomenal blottches dark in
colour, these transverse appendages are produced forward into the
segment preceding in the form of semicircular, plate-like pro-
cesses. Segments one to seven with a transverse row of short
hairs, limited between the lateral blottches above mentioned, the
more lateral ones on segments two to six forming a group of long
hairs, varying in number from four on the second to seven on the
fourth and fifth; also the usual group of long hairs in each pos-
terior lateral angle, except the first, most of them projecting from
the ventral surface. Last segment rounded, entire, with numer-
ous dorsal and ventral hairs. Genitalia prominent, extending
nearly the length of the abdomen, with long, sharp appendages.

Measurements.

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Goniocetes nirmoides, n. sp.

(Plate xiv, figs. 5, 54, 59, 65, and 65.)

Several males and females from Leptothorax imperilous (Zo-
ological Garden, Calcutta). This well-marked form is character-
ized by the shape of the head, which is short and rounded in
front with round, not angular, temples.

Description of female: Head about as broad as long, sub-
pentagonal in shape with broadly rounded front flattened on
the sides and converging temples. Antennal bands entire, pale
and widened in front with two dorsal hairs near the meson;
also six marginal hairs on each side, the third being long. As
usual the bands turn inward before the antennae, forming a prominent, partly blackish blotch on either side. Space before the mandibles not so distinct as in many species. Antennae pale with first joint short, equal in length to the adjacent trabeocular angles; second segment longest, about as long as the two following together; third and last nearly equal and the fourth but little shorter (fig. 59). Eye prominent with a long hair. Temples with a rounded anterior angle behind the eye, then considerably flattened and converging to the rounded posterior angles, in front of which is a slight emargination giving rise to a long hair (fig. 59); on the anterior angles is a short hair and a little behind this a long one, another short one occurring midway on the flattened sides. Temples slightly darker than frontal or occipital regions of head. Occiput deeply emarginate with dark marginal band and slightly darker blunche, at either end.

Thorax much shorter than head, with dark marginal bands.

Prothorax with sides rounded and protruding, bearing a postulated hair. Metathorax but little longer than prothorax, with diverging sides and acute posterior lateral angles bearing a postulate with three long hairs; another postulate with two long hairs a short distance in from these on the slightly convex posterior margin. Metathorax similar to first segment of abdomen. Legs well developed, lighter in colour than body.

Abdomen elliptical with prominent lateral angles and dark, heavily chitinized marginal bands; darkish transverse blatches, leaving a narrow light space on the meson, this space not so apparent in some specimens, however. A series of about six hairs in the middle of each segment, limited to the central portion of the abdomen, and a long hair on the posterior margin near the side on segments three to six; the usual long hairs in lateral angles, increasing in number and length posteriorly.

Last segment truncate, entire.

Male much shorter than the female. Antennae with first joint considerably enlarged, protruding, with numerous long hairs (fig. 59).

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Goniocotes chrysocephalus, Goebl

Specimens from Arvencus argus (Perek, Federated Malay States), Lophura - dendro (no history, India), Goniocotes argentatus (no history), Goniocotes eleuthraetus (Mindanao, Suluwai, 500 ft., W. Himalayas, India), Phasianus coronatus coronatus (no history).

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**Goniocotes holocestus, Nitzsch.**

Specimens from Gallus gallus (Gaya Dist., Bihar).

**Goniocotes: rectangulatus, Nitzsch.**

One male from Pavo nigriceps (no history, India).

**Lipeorus variabilis, Nitzsch.**

Specimens from Gallus muticus (Darjiling, Bhutan, India), Gallus variabilis (no history), Arvencus argus (no history), Phasianus coronatus (India), Pavo nigriceps (no history, India); also specimens which can be assigned to variabilis, but constitute one or more varieties of the specimens from Chrysophalus guttus (China), Lophura ignita (Zoological Garden, Calcutta, India), Pavo nigriceps (Zoological Garden, Calcutta, India) and a domestic fowl (Calcutta, India).

**Lipeorus rubrofasciatus, Piaget.**

One female from Arvencus rubrofasciatus (Joropokei, 7000 ft., E. Himalayas).

**Lipeorus intermedius, Piaget.**

Male and female from Poicephalus maculophus (Near Simla, W. Himalayas, India).

**Goniodes neumanni, n. sp.**

(Plate xv. figs. 6, 6a, 7 and 7a.) Two males, eighteen females, and two young from a single specimen of Arvencus argentatus (no history) and three females from another specimen of the same host from Perek, Federated Malay States. This is a curious new form bearing rather between Lipeorus and Goniocotes, and which in some future revision of the Mallophagan genera should probably be made the type of a new genus, but which we shall for the present include in Goniodes.

The female of this species is what Tschernberg (Das Mallophagen, 1888, pp. 12-34) mistakenly describes as the female of Goniodes canicollis, Nitzsch, on the basis of a single specimen taken by Nitzsch, with a male of canicollis from Arvencus gigascopus (which is Arvencus argus), and five specimens taken by Rux, also with a male of canicollis, from a dried skin of the same host. The males of canicollis differ so much from these specimens that Tschernberg says that "males and females of canicollis differ so much from each other that one could scarcely guess their relation if one did not take them from the same host." Our males, however, do unmistakably resemble the females and are entirely different from the males of
usuances. It is simply an unusual coincidence that males of *Curcicorbus* without females of the same species, and females of another species (our new one) have been taken without the males, but the females are so heavily parasitized, *Argusias argus* already having four Mallophagan species recorded from it, that the coincidence is not at all an impossible one. Fortunately we have found several females of *G. curcicorbus*, together with males, in the present lot. They were taken from *Argusias argus* and, as described in this paper under the proper species caption, are unmistakably like the males in species characteristics.

The new species is characterized by its short straight abdomen, which instead of being elliptical or sub-spherical in the male as is usual in *Goniodes*, is parallel-sided in both sexes. The abdomen of the male is not as long as the head and thorax together. The head of the male has shallow, concave temporal margin, and the antennae are very large and bear forked processes on the first segment, and the appendages of the third segment is strongly chitinized, very long, and pointed. The last two segments appear as appendages to the third. The genitalia of the male are large, and in both specimens we have are exserted. This exsertion is probably unnatural but may, because of the small size of the abdomen and unusual size of the genitalia, be natural. The general coloration of both sexes is pale yellow, with few darker red-brown markings.

Description of male: Head sub-quadrilateral with rounded front sides not expanding, the width across the temples but little exceeding that across the base of the clypeus. Front rather prominent and evenly rounded with a light brown, marginal band, terminating in two antennal blotches, a rather long hairy and four short ones on the clypeus on each side. The antennae (pl. xx, fig. 6a) are set in rather deep emarginations; the first joint is very long, as long as all the succeeding together, and bears midway on its posterior margin a most prominent forked appendage before a stout spine between the two fords, the second segment is half as long as the first and bears a smaller appendage on its inner margin; the third segment is practically all appendage, is long, curved and claw-like and bears the last two segments of the antennae near its base, leaving the appearance of an appendage of the third; of these last two the first is very short and the last about half as long as the second, a few short hairs are present. The eye is prominent with an inconspicuous disc and a short spine. Behind the eye, the sides of the head are slightly concave and bear a short spine. The round temple is two long, stout hairs, a short spine behind them and a prickle between, and farther back on the blunt posterior angle is a stout spine. The occiput is concave and the occipital band prominent, forming two pale blotches.

The thorax is longer than the head and broader; color rather darker than head or abdomen, but with few markings. Prothorax semicircular, with rounded diverging sides and straight posterior margin; posterior lateral angles with a prominent hair. Metathorax longer than the prothorax, triangle-shaped, with broadly rounded anterior angles and convergent sides meeting in an angle on the abdomen; three prominent hairs arise on the anterior angles and a number of shorter ones along the posterior sides. Legs ordinary, pale in color with a few hairs.

Abdomen pale, short and almost parallel-sided, shorter than head and thorax together. There are but few dorsal hairs. A slightly coloured sub-marginal band runs the length of the abdomen on each side and is broken at each suture, leaving a clear space in which is a darker, narrow blotch running crosswise. The posterior margin is deeply emarginate and the last segments are compressed on the meson. The genitalia, as before mentioned, are very large, with long rectangular basal portion and two pairs of prominent appendages, the external pair being flattened and blade-like and less chitinized than the other two; the strong muscles reach almost to the thorax.

The female (pl. xv, fig. 7), at first sight, seems to be very different from the male, but upon closer observation, it is seen that this difference is caused by the lack, in the female, of the abnormal developments of the male. Compared to the male, the female is almost characterless. The only break in the continuity of the outline of the head is the slight antenna development, the almost imperceptible protrusion of the eyes and the concave occiput. The front extends further forward than in the male and the two long clypeal hairs are replaced by short ones. The antennae (pl. xv, fig. 7a) are ordinary with the second segment the longest. The hairs that appear on the posterior margin of the metathorax in the male, are apparently lacking in the female. The abdomen is much longer in proportion to the rest of the body than in the male, being longer than the head and thorax together, and is almost parallel-sided, this being a characteristic of the species, as before noted. The last segment is entire with four long hairs, no dorsal hairs are visible.

**Measurements:**

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*Not including genitalia.*
Goniodes sectus, n. sp.

(Text-figs. 1 and 2.)

Males and females from Catena umbratica (Ganges, Darjiling and Kumaon, Himalayas, India). Species with head of male small, flattened in frontal, with temples rounded and female with conspicuous lateral, temporal angles.

Description of male: Colour golden brown, with thorax darker and with red-brown markings. Head small, rounded, about as broad as long, with flattened, though evenly rounded, front and deep antennal emarginations; clypeus with marginal band widest in the centre and turning in before the antennae to form the long, narrow, red-brown antennal blotches, and with six hairs on each side, of which the second and last are the longest; on the anterior edge of the antennal emargination is a long hair. Antennae with heavy first segment bearing a prominent protuberance on its posterior margin, from which arises a sharp spine; second segment as long as the third with its appendage, the appendage being quite long and continuous with the segment proper; last two segments about equal, much reduced, appearing as a two-jointed appendage of the third segment. Eye occupying the prominent posterior angle of the antennal emarginations, with an elongate ocular fleshy, a long hair, and small, rounded, ocular blotch. Head widest before the antennae and narrowing at once behind the eye, or straight for a short distance as is the case in some specimens (see figure); temples compressed, rounded, terminating in two rounded projections behind, each bearing a spine, and into which the marginal band of the concave occiput does not enter; occipital blotches wanting. Temples with two long hairs, one short one before the others and a padicle behind them; dorsal surface of head with four unusually long hairs, two on the clypeus and one near each ocular blotch; also two short ones on the occiput.

Thorax small, much shorter than head and darker. Prothorax quadrangular with sides straight and slightly divergent, bearing a long hair just before the posterior lateral angles.

Metathorax but little narrower than head, with sides rounding inward anteriorly, each bearing two long hairs, and posterior margin convex on the abdomen bearing eight long hairs, the outer two on each side being paired. Posterior pair of legs with long tibiae.

Abdomen round, in older specimens much more so than is shown in the figure, nearly as broad as long; entire surface of a clear golden brown, except the lateral bands which are red-brown. These latter are long and turn in along the anterior margin of each segment. The dorsal hairs arise along the middle of each segment, rather than along the posterior margin as is usual; these hairs near the horizontal portion of the lateral bands are grouped and longer. Last segment rounded, protruding and entire, bearing numerous long hairs and a few short spines. Genitalia slightly diminished, indistinct even in old specimens.
Female with head widest across the temples, which protrude laterally forming prominent angles; antennae weak, set in shallow emarginations. Abdomen somewhat tapering behind with last segment divided.

**Measurements:**

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**Goniodes processus,** n. sp.

(Plate xv, figs. 9, 9b and 9c.)

Two males from *Aneesia tenuis.* (Hopekoi, East Himalayas). A quite distinct form with large head and small thorax.

**Description of male:** Colour yellowish brown, head and thorax darker with central portion of abdomen quite pale and with dark red-brown markings on head and thorax and lighter lateral abdominal bands.

Head as broad as long, somewhat octagonal with prominent clypeus, flattened in front and on the sides and produced back under the antennae into a well-developed hood or trabecular-like process on each side (plate xv, fig. 9). These processes are visible from above, showing through the first antennal segment. Marginal band broad, pale, ending in long, narrow, antennal lobes which reach inward and backward to the mandibles, the latter being set well back of the antennae and distinctly visible; six inconspicuous dorsal and marginal hairs on each side of the clypeus, with several others on the ventral side. Antennae of rather short segments, the first being broad, without appendage and set into deep emarginations of the head; second segment about as long as the first is broad and the third shorter with an appendage given off at almost right angles to the segment; last two segments together, of which the last is the longest, but quite as long as the second of antennae about the same as that of the head. Eye prominent, rounded, with a long hair and small flake, temples widening but slightly behind the eye, being no wider than the head across the trabecular processes, and then soon narrowing concavely, ending in two sharp, well-defined points, between which is included the concave, but slightly annulated occiput, occipital band and rounded blutches prominent.

Thorax small, a little narrower and but little over half as long as the head. Prothorax very short and narrow, being almost entirely included between the two posterior points of the head; lateral margin with one hair. Metathorax quadrangular, short, not half as long as broad, with parallel sides bearing three hairs on a prominent posterior; posterior margin obtusely angled on the abdomen, with four hairs, in groups of two. Legs pale, little developed.

Abdomen truncate, widest at the second and third segments, with first segment longer and last longest and protruding; lateral bands paler than head markings, turning inward and narrowing along the suture, with a narrow, horizontal blotch at that point; transverse blatches present, though but faintly visible, segments three to seven with two long hairs on the posterior margin on each side at the inner edge of the lateral bands; also a row of fine hairs across the central portion of each segment. Genitalia narrow, reaching nearly to the first segment and well-chinned with small appendages.

**Measurements:**

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**Goniodes megacephalus,** n. sp.

(Plate xv, figs. 8 and 8a.)

A single male specimen from *Lophophorus impejanus* Zoological Garden, Calcatta. This is a well-marked new species, most resembling *G. bicuspidatus* Pauget, but plainly different, having longer processes on the first antennal segment, the metathorax not two pointed behind, and the abdomen with heavy transverse blatches. In this species we find the highest development of the *Goniodes* male antenna. Colour golden brown, pale or almost transparent in some places, with dark reddish-brown markings, except the transverse abdominal blatches which are more of a chocolate brown.

**Description of male:** Head broader than long, squarish, with rounded but not prominent front. Clypeus with a long submarginal hair and five very short ones on each side. Marginal band narrow, turning in a short distance before the antennae to form the clypeus, darker, annulated blatches; the clypeus at this point is slightly emarginated. The antennae (Plate xv, fig. 8a), set in emarginations of only moderate depth are highly developed even for this genus. The first segment is large, almost as broad as long with a double-pointed appendage occupying the greater part of the posterior margin; this appendage is highly chinned, the outer prong short and turned inward, the inner one very long, reaching well back on to the temples, narrowing near its extremity though terminating bluntly. Second segment a little shorter than the first and much narrower; third joint and its appendage appears as a single, curved, claw-like segment, with the greatly reduced fourth and fifth segments projecting from the outer margin, appearing as a two-pointed appendage; these last two segments are of
about equal length. The third antennal segment and its appendage do not occur in this species, appear as if in fact if one included this species alone the reason for considering the appendage present at all would not be apparent, but if one would examine the appendage of the third segment in a form such as G. procumbens (described elsewhere in this paper), which is visibly appendage-like, as enlarged so as to be continuous with the segment proper, and imagine the last two joints as much reduced, he would see just such a form as we are now describing, and see the origin of this type. Below the antenna is a rounded ocellar blotch and the clypeus prominent eye which bears posteriorly a short hair. The temples are quite square and are rather darker colored than the rest of the head, and the margin, which is bordered by a pale, broken band ending in a narrow blotch behind the eye, bears two long, stout hairs and three short spines. Occiput concave, slightly sinuous, bare.

Thorax much longer than head. Prothorax trapezoidal with sides divergent and bordered by a dark band; posterior angles acute, bearing a long hair; posterior margin indefinite. Metathorax slightly broader than head, triangular, with apex forming a slightly obtuse angle on the abdomen; anterior lateral margins, curved, with marginal bands which curve in toward the meson: the marginal bands appear within, parallel to those just mentioned. Each of the rounded lateral angle: bears two hairs on a pedicle, while on the posterior margin on each side are three submarginal hairs, two together near the lateral angles and one near the meson. Legs pale, ordinary. The abdomen is shorter than the head and thorax together, is short and rounded, widest at the third segment: on each segment are lateral marginal bands, well defined, those behind the first entering into the segment preceding and curving inward. The large, dark, transverse blotches do not meet in the center, the space left being uncolored; dorsal hairs occur on the first five segments, confined to the central area, and on these segments, near the inner termination of the lateral marginal bands below the spiracles, arise a group of three or four hairs. The last three segments are characterized by the entire and not reaching back as far as the one before, nor that one as far as the one before it, there is a fringe of about twenty-two long hairs across the dorsal surface of the last segment and the usual ones in the lateral angles of the other segments. The gonapophyses are prominent with heavily chitinized ridges reaching to the second abdominal segment.

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Goniodes colchicius, Denny.

Many specimens from Goniodes altissimatus (Mandall, Ceylon, India). Goniodes melanocephalus (Bhutan, E. Himalaya).

Goniodes altissimatus, nitidus, Denny.

Many specimens from Goniodes melanocephalus (Morley, Herat, Central Asia). Goniodes trogica (Bhutan, E. Himalaya).

Goniodes altissimatus, nitidus, Denny.

Many specimens from Lophophora impressa (Mussoorie). Goniodes altissimatus, nitidus, Denny.

Goniodes latissimatus, nitidus, Denny.

Many specimens from Lophophora nitidus (no history). Goniodes latissimatus, nitidus, Denny.

Goniodes curvicornis, nitidus, Denny.

Numerous males and females from Argianus argus (no history, India).

The females of this species, wrongly described by Tschitsch, see our account in this paper, of Goniodes Insectum, nitidus, have a broadly elliptical abdomen, broad head, widest at posterior margins with angular posterior lateral angles. The head is wider than that of the male and not so flattened and has the clypeal margin less flattened and more nearly parallel in outline. The markings of head and body and the distribution and character of the hairs are like those of the male.

Goniodes curvicornis, nitidus, Denny.

Males and females from Lophophora nitidus (no history, India).

Goniodes bicuspidatus, nitidus, Denny.

Numerous males and females from Tragopan medi (Naga, Yunnan, and Mianning Hui, Assam), Tragopan sobrius (China). Tragopan unicolor (Kumaon, W. Himalaya).

rounded, but flattened, with a small dark blotch near the front. Lateral emarginations shallow with anterior angles rounded and surrounded by a large, dark chestnut to black blotch. Temples rounded, with indications of an angle behind, bearing a long marginal hair and, probably, a long surface hair, a distinct postulate being present. Ocellus concave, with two short hairs and marginal blotches but little colored. Mandibles small but heavily chitinized; surface of head with a number of short hairs.

Thorax about as long as head. Prothorax short, flattened behind, with ten hairs; there are also two short spines at the sides and a long spine in the anterior angles. Metathorax quite large, hexagonal, broader than long; on the anterior lateral margins are several spines, while behind is a series of about twelve marginal hairs; there are also several lateral surface hairs. Legs pale in color, with narrow thimble, mesothoracic pair missing in the specimen at hand.

Abdomen elliptical with yellowish transverse bands, interrupted submarginally, leaving a clear space running parallel to the margin of the abdomen; continuations of these transverse bands lateral to the clear space, form indefinite lateral blotches; lateral blotches on last segment lacking, the median band nearly covering the entire surface. Last segment longer than the preceding, rounded, bearing two extremely long hairs, shown curved forward in the accompanying figure, and several short marginal ones; the two preceding segments also bear a long hair on each side; dorsal hairs on each segment weak.

**Measurements:**

<table>
<thead>
<tr>
<th></th>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>31</td>
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<tr>
<td>Prothorax</td>
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<td>20</td>
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<tr>
<td>Metathorax</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Abdomen</td>
<td>83</td>
<td>36</td>
</tr>
</tbody>
</table>

Colpocephalum longicaudatum, Nitzsch.

Males and females from *Argusiana argus* (no history) and domestic pigeon (Calcutta, India).

Colpocephalum appendiculatum, Nitzsch.

One female from *Aratusanis argus* (Penang, Federated Malay States).

Menopon productum, Praget.

Many specimens from *Aratus anastomosatum* (no history), *Aratus pyrana* (no history, India), *Lophura diardi* (no history, India), *Phasianus coronatus* (no history, India), *Phasianus chud (Zoological Garden, Calcutta, India)*.
Menopon subequal. Piegert.
Males and females from *Leucon erythropthalmus* (no history), *Gryllus subdominatus* (Bhutan, E. Himalayas).

Menopon breviripes. Piegert.
Males and females from *Cassidula unicolor* (no history).

Menopon unicolor. Piegert.
One female from *Pistacia terebinthus* (from in captivity Calcutta, India).

Menopon ventralis. Nitza.
Three females from *Artemisia argus* (no history).

Menopon pallidum. Nitza.
Males and females from *Artemisia argus* (no history).

H. MALLOPHAGA FROM CORVIDAE.

**Docolophorus tritoaephalus**, n. sp.

(Plate XIV, Figs. 1 and 2.)

Several males and females from *Gryllus gramineus* (Chitral and Gilgit, S.W. India). This species resembles *D. atra*, n. and *D. extraneus*, Pieg., but differs from the former in having a shorter clypeus, and broader, more rounded temples, and from the latter in having a narrower clypeus; it also differs from both in having a three-toothed clypeal margin, and in the fact that the head is much broader than long. The abdominal lobes are also darker and broader.

Description of female: Head, shape of an equilateral triangle with rounded angles. Clypeus narrow, with clear anterior margin slightly convex or regular. Lateral edges before antennae, straight, diverging, antennal bands indefinite, irregular, interrupted at the sutures, leaving a small clear space on the margin from which a very long hair arises; before the antennae the bands turn inward to join the occipital bands, becoming quite indefinite before they do so, however, that portion of bands near antennae very black. A fine hair arises at the anterior termination of the antennal bands, also a hair on the dorsal surface at the middle of the inner edge of the anterior portion before the sutural interruption, and two more arising on the ventral surface and passing the margin behind that point. Signature with three lobes, the centre one pointed, reaching well down on to the mandibles; central and anterior portions of signature pale. Space in front of the mandibles pale, divided by the signature. Trabeceula well developed, reaching beyond first segment of the antennae (fig. 1a) and slightly curved backward. Antennae long, first segment thick and about equal in length to the second; last three about equal in length, each half as long as the second; first segment light in colour with narrow black margins, the three following with dark transverse bands, the last lighter. Eyes prominent, clear, with a very long hair on the dorsal surface. Occipital band narrow, curving inward, black near the margin at the anterior edge of the eye. Temple broadly and regularly rounded with a narrow, black, marginal band, interrupted by three postspines from which rise the long marginal hairs, and ending in contact with a black ocellar fleck; a fourth marginal hair just below the eye, shorter than the others. Temple of a uniform dark chestnut colour. Occiput almost straight; occipital lobes blackish and occipital bands definite, extending forward, being somewhat indefinite before meeting the antennal bands. Occipital signature prominent, pointed in front. Space between occipital bands pale yellowish in colour.

Thorax shorter than head. Prothorax ordinary, with a long hair on the dorsal surface in each posterior lateral angle, arising from a clear puncta. Lateral margins with dark bands connecting with the internal chitinous structures. Metathorax diamond-shaped, with rounded lateral angles and prominent posterior angle. Posterior margin with a series of about eighteen papillated hairs arising from the edge of the broad submarginal band, this band is interrupted on the meso and is continuous with the narrower lateral marginal bands. Legs well developed, dark in colour, with black markings on the femora and tibiae.

Abdomen elliptical, widest at the fourth segment. Ground colour light, almost transparent in some specimens, with dark chestnut abdominal blotches; blotches rounded, overlapping in front and behind, with the spiracles showing as clear spaces. Dorsal hairs evenly spaced across each segment, the series varying from ten to twenty-four in number. Genital blotch with two large, clear puncta.

Male much smaller than female, with abdomen more rounded. Last segment of abdomen entire.

**Measurements:**

<table>
<thead>
<tr>
<th></th>
<th>Length 161 mm</th>
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<th>Width 9</th>
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<td>34</td>
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<tr>
<td>Prothorax</td>
<td>43</td>
<td>20</td>
<td>42</td>
<td>20</td>
</tr>
<tr>
<td>Metathorax</td>
<td>14</td>
<td>13</td>
<td>20</td>
<td>23</td>
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<tr>
<td>Abdomen</td>
<td>83</td>
<td>78</td>
<td>173</td>
<td>77</td>
</tr>
</tbody>
</table>

**Docolophorus atratus**, Nitza.

Many specimens from *Corixus cornus* (Kashgar, Chinese Turkestan; S. E. Persia), *Corixus splendens* (Calcutta, Guza and Trivan-
drum, S. India), Corus insularis (Katha and Megui, Burma),
Corus macrococcus (Upper Burma; Gilgit, N.W. India),
Corus corea (Ladakh, Little Tibet), Corus cornus (Yarkand,
Chinese Turkestan), Corus sharp (Yarkand), Corus umbrosus
(Bukharaistan), Corus scabulatus (Abyssinia), and Corus dannenii
(Pekin, China).

The specimens from some of these hosts merit being dis-
tinguished under varietal names, but we shall not so designate
them at present.

Dorcophorus fulvus, Nitzsch.

Many specimens from Urocissa flaviventris (Kashmir; Murree,
W. Himalayas; Gooen, 7,000 ft., E. Himalayas), Dendrocita
tilde; (Cachar, Assam and Calcutta, India), Dendrocopa himalayen-
sis (Darjiling; Pekin), Dendrocopa formosa (N. Formosa), Gar-
naeus lanceolatus (Murree, W. Himalayas), Nucifraga multifasciata
(Gilgit, N.W. India), and Pica rustica (Ladakh).

Dorcophorus leontodon, Nitzsch, var. gracilis, Piaget.

Males and females from Urocissa occipitalis (Nepal Valley,
E. Himalayas), and Dendrocopa sinuata (Foochow, China).

Dorcophorus caspius, Nitzsch.

One female from Pica rustica (Punjab, India).

Dorcophorus superciliosus, Nitzsch.

One male and two females from Gracilis implicata (Little
Pamir).

Dorcophorus platystomus, Nitzsch.

One male from Corus cornus (Gilgit, N.W. India).

Dorcophorus rotundatus, Piaget.

One male and two females from Corus splendens (Nepal
Valley, E. Himalayas).

Dorcophorus guttatus, Nitzsch.

Males and females from Corus monocula (Gilgit; Yarkand,
Chinese Turkestan), and Corus macrococcus (Nepal Valley).

Nirmus biguttatus, n. sp.  

(Plate xiv, figs. 2, 2a and 2b.)

Males and females from Gracilis gracilis (Gilgit, Sarlad
and Little Pamir, N.W. Frontier of India; Khamhpjung,
Tibet), also from Nucifraga multifasciata (Gilgit). Differ from

other Corvinae in heavy chitinization of head and body,
showing as heavy, broad, transverse abdominal bands.

Description of male: All coloured portions quite dark with
spaces between markings pale or transparent. Head blantly
comical, semi-parabolic before the antennae with sides of front
flattened. Antennal bands blackish, continuous around the cly-
peus, but uncoloured where they meet in front, narrow, turn-
ing in before the antennae to form a black-edged blotch on
each side. A median, inverted goblet-shaped clear space in
front of the mandibles, bounded on each side by narrow, dark,
not black, internal bands, losing their colour forward where they
meet the transparent portion of the marginal band. Remain-
ing area of head in front of antennae of a uniform, rather dark
brown. Four evenly spaced clypeal hairs on each side of the
central clear space; another smaller one on the angle before
the antennae and two more in front, quite long, extending from
the ventral surface. Antennae differing in the two sexes, being
a third longer in the male, with the first segment longest and
much enlarged; second segment nearly as long and but little
shorter than the last two together; fourth and fifth about
equal, while the third is a little longer than either of these
two; each segment with several short hairs. In the female the
second segment is much the longest and the last is longer than
either of the two preceding. In both sexes the second, third,
and fourth joints are more deeply coloured. Antennal bands
small, consisting of a small black blotch at the forward edge
of each of the prominent eyes, eye with a short hair. Tem-

tles somewhat narrowly rounded, not expanded, with sides
somewhat flattened; the dark, narrow, marginal bands inter-
rupted on the rounded posterior angle, leaving a small clear
space from which arises a long hair; some distance behind
this is a minute prickie. In figure 2 the females appear a
little too much rounded, though there appears to be some varia-
tion in this respect, especially between the two sexes (fig. 2b).
Occiput but slightly coarsely, bare, pale in colour. Occular bands
but partially visible, not meeting the occiput. Space between
bands clear, with signature visible, though indefinite.

Thorax much shorter than head. Dark lateral bands on
both segments, turning in along their posterior margins, those
of the metathorax not meeting on the meson and much heavier
than those of the prothorax. Prothorax ordinary, with a long
hair in each posterior lateral angle; metathorax longer than
prothorax with straight, diverging sides; posterior margin oblique-
lly angled on the abdomen, with a series of about fourteen sub-
marginal hairs. Legs well developed, with long, narrow tibiae
and blackish markings.

Abdomen elliptical, widest at the third and fourth segments,
each segment except the last with a dark blotch on each side,
much darker toward the lateral margin, with clear spaces for the
spines on segments one to seven; in some specimens these
blotches meet at the centre and in others a median clear space is left. The ventral median blotches are visible from the dorsal surface. The last segment is rounded, protruding, bearing numerous long hairs. Each of the other segments with a transverse series of hairs arising along the posterior margin of the lateral blotches, there are also several long hairs in the posterior lateral angles. Gentilia appearing as a quadrangular plate with thickened margins and short genial and external appendages.

Female longer, more linear than male. Antennae as described above; last segment of abdomen bladed, with two small blotches [fig. 25], penultimate segment entirely coloured. In the specimens at hand the space between the blotches is not so clear as in the male, making the blotches appear less definite.

**Measurements:**

- \( \sigma \), Leng. \( 1.62 \) mm. Width. \( 1 \), Leng. \( 1.95 \) mm. Width.
- Head \( 47 \) \( 42 \) \( 35 \) \( 47 \)
- Prothorax \( 22 \) \( 25 \) \( 10 \) \( 24 \)
- Metathorax \( .44 \) \( .37 \) \( .12 \) \( .34 \)
- Abdomen \( 98 \) \( 54 \) \( .22 \) \( .53 \)

**Nematus olivaceus**, Nitzsch.

Many specimens from *Coronis splendens* (Nepal Valley, Trivandrum and Calcutta, India), *Coronis naccobyla*us (Nepal Valley, Poison, 500 ft., Yunnan), *Pleuretis* (Upper Burma), and *Platygnathus lineatus* (Perak. Federated Malay States).

**Nematus marginalis**, Nitzsch.

Many specimens from *Dendroctara rufa* (Calcutta, India; Cachar and Gowhatty, Assam; Burma), *Dendroctara hinnalayensis* (Nepal Valley), and *Dendroctara occipitalis* (Manoud, N.W. India; Upper Burma).

**Nematus varius**, Nitzsch.

Many specimens from *Coronis monodula* (Yarkand and Gilgit), *Coronis fragilis* (Gilgit and Herat), *Coronis corax* (Ladak), and *Pleuretis* (Gilgit and Ladak).

**Nematus nigronigratus**, Piaget.

Males and females from *Gurnaulia immacata* (Upper Burma).

**Nematus uncinnosus**, Nitzsch.

Males and females from *Coronis cornix* (Gilgit).

**Nematus punctatus**, Nitzsch.

A single female of this characteristic gall and two interesting *Nematus* is included in the collection as taken from *Dendroctara rufa*.

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1914.]

**Kellogg & Paini**: *Mallaphaga*. 237

(Calcutta, India). This is a clear case of strangling, the body skin from which the parasite was taken having probably been temporarily near the skin or body of some gall or terat.

**Nematus clypeatus**, n. sp.

(Fig. 14, figs. 3, 3a, and 3b.) A single male specimen from *Coronis corax* (Kachgar, E Turkestan). This species is Lepidopterous in general aspect of head and Nematus as to body.

Description of male: Head tufted conical, transparent, expanded clypeus, the latter being the only part of the body without some colour. Portion of head in front of antennae considerably longer than that behind. A hair on the dorsal surface in the rounded anterior lateral angle of the clear portion of the clypeus, a marginal hair at the beginning of this clear portion and two more submarginal ones, one dorsal and one ventral, just behind, another hair on the margin at the distinct suture and a long one on the ventral surface directly mesial; also a hair on the margin some distance above the antennae and a ventral submarginal one midway between it and the suture. Clypeal signature broad, sides nearly parallel, obtusely pointed behind and somewhat paler than the general colour of the head. A light space before the mandibles, enclosed laterally by incurving internal bands. Antennal bands darkest where they turn inward before the antennae, extending forward a little past the origin of the clear portion of the clypeus and interrupted at the suture. Tracheal acutes acute, slightly shorter than the baso-lateral segment of the antennae. Antennae long, filiform, with first joint short, about the same length as the fourth; second segment longest, about as long as the two following together, and the last segment in length. Eyes inconspicuous with a long hair. Temples flattened, slightly convex with rounded posterior angles; two hairs and a short prickle before these angles and narrow, black marginal bands extending from the posterior hair forward to the eye. Occiput slightly concave with anterior margin of prothorax showing through. Occipital bands pale, not reaching the occiput; space between bands a little lighter in colour than the temples with occipital signature visible.

Thorax: about one-third shorter than head. Prothorax quadrilateral with sides slightly convex. Marginal bands present, turning in before they reach the posterior margin, not meeting on the median; coxal bands distinct, a short hair in the posterior lateral angles. Metathorax with diverging sides and posterior margin obtusely angled on the abdomen. Three hairs arising from a clear muricate in the posterior lateral angle and two more near them with another small one, as shown in fig. 3b. Legs stout with few hairs.

Abdomen, excluding the first segment, elliptical, elongate, widest at the fourth segment; first segment appearing as a constriction, with sides slightly converging, narrower than metasternum.
and much shorter than following segment: four hairs near the meson on the first segment, two near the anterior and two near the posterior margin, the latter being the longer. Second segment the longest, second last the shortest. Each segment with a transverse series of hairs, varying from two to four in number, the external one of each series on segments three to six being very long; there are also several hairs in the posterior lateral angles, increasing in length posteriorly. Each segment with a transverse band extending the full length of segments one to six inclusive, and partially divided on the meson, the division being most complete forward and diminishing in extent posteriorly; in the seventh and eighth segments the bands are narrowed and completely divided. Last segment rounded, entire, with numerous marginal, dorsal and ventral hairs and blotch covering segment. Genitalia with long, stout external appendages, equal in length to the anterior portion.

Measurements:

Length 1.88 mm, Width

Head 50
Prothorax 34
Metathorax 31
Abdomen 47

Niemus rufus, Nitzsch.

A single male from Corus sharpi (Yarkand, Chinese Turkestan). This specimen shows such differences from the description of the type of the species that it should probably be given a varietal name.

Colpocephalum seminatum, Rödlow.

Males and females from Corus splendidus (Trivandrum and Calcutta, India), Corus insulatus (Mergui, Burma), and Corus scopulans (Abysinia).

Menopon insolitum, n. sp.

(Text-Fig. 4.)

One male and one female from Corus maculatus (Mergui, Burma) This species belongs with Pigeot's coro-insolitum group, among which are several species with cuticle desmoded abdominal segments, and with two prominent groups of three or four short spines on the lower side of the first or second abdominal segments. Several of these species are: M. insulatus, Pigeot, M. scopulans, Nitzsch, and M. scopulans, Nitzsch. The present species differs from these in the form of the metathorax, the posterior margin of which is strongly convex, as well as in the shape of the abdominal segments. This unusual condition of thorax and abdomen is found only in the female.

Description of female: Colour of body yellowish brown with lighter legs and head; thorax and abdomen with numerous short marginal spines. Head much wider than long, pale, almost transparent except for the curved ocular bands, mandibles and marginal ocipital band. Pronotum slightly angled on the meson and at the sides, with apparently several short hairs which have been broken off on our specimen, and longer ones before the ocular emarginations; ocular fringe prominent. Temples expanded, widest in front, with three testes from which the hairs have been broken also two short hairs on each side; occiput concave with two short hairs. Thorax just as wide as the head and as long as the first eight abdominal segments. Prothorax with median lateral angles bearing a short spine; posterior margin obscured, though probably convex. Metathorax, including metathorax (which is indicated by a slight lateral marginal emargination), large, with posterior margin highly convex on the abdomen; sides almost straight, the posterior lateral angles armed with several short spines and a long submarginal hair. Colour of thorax darker than either head or abdomen, showing several internal bands.
Legs pale, front femora broad, last femora with a group of many short hairs along the posterior margin.

Abdomen shorter than head and thorax together, with sides evenly rounded, widest about midway, last segment truncate, bearing a fringe of fine hairs. Second and third segments strongly angled behind, the second being acute and the third more rounded; sixth and seventh segments short; segments five to eight with backward projecting posterolateral angles, those of the eighth being quite prominent and each bearing a very long hair. These angles on all segments before the eighth bearing several short spines. Each segment bears a series of hairs across the posterior margin.

The male specimen at hand is very much smaller than the female, is probably not mature, though the genitalia appear well developed. The head is large in proportion to the rest of the body, with ocellar bands and marginal occipital band darker than in the female specimen; a prominent, black ocellar fleck is also present. The metasternum does not extend back over the abdomen as in the female, and the abdominal segments are ordinary. The abdomen is small, elliptical, with last segment entire, convex. The genitalia bear two well-separated processes.

**Measurements:**
(probably juv.), \( \text{Leng. } 1.30 \text{ mm} \) Width, \( \text{Leng. } 1.59 \text{ mm} \) Width.

- Head: 34 47 36 53
- Prothorax: 33 29 13 34
- Metathorax: 28 37 13 57
- Abdomen: 60 47 36 84

**Menopon monochromatium, n. sp.**

(*Text-fig. 5*)

One female from *Garraulius lanceolatus* (Simla, W. Himalaya) and another from *Garraulius gracilis* (Khamtang, Tibet). A small, almost unicoloured species with unmottled distinct black eye flecks and evenly parabolic anterior margin of the head.

Description of female: Ground colour of body yellowish brown, with golden brown markings and pale legs and marginal regions of head. Head much wider than long, semicircular, front with faint indication of a median angle. Clypeus with two fine hairs, one on each side near the m-o-o and one more, one of which is long, on the sides before the region of the ocellar emargination. Ocellar emargination almost completely filled by the eye, the latter with a large, distinct, black fleck. Temples narrow, rounded, bearing four long hairs, three of about half the length and several short ones. Occiput concave, apparently bare, with two small, dark, marginal blotches. Colour of yellowish brown marginals, and darker, more golden near the centre, occipital bands darker, curving inward and forward; mandibles weak.

**Measurements:**

\( \text{Leng. } 2.03 \text{ mm} \) Width.

- Head: 37 67
- Prothorax: 79 50
- Metathorax: 79 56
- Abdomen: 149 85

Fig. 5—*Menopon monochromatium*, Kellogg and Paine. Female.

Thorax narrow, darker than rest of body, with distinct internal bands. Prothorax lenticular, the sides and posterior margin being continuous and rounded and bearing twelve hairs. Metathorax slightly wider, of about equal length, appearing as the first abdominal segment and bearing a submarginal series of about sixteen hairs. Legs pale, with broad femora and narrow tibiae, well furnished with hairs.

Abdomen yellowish brown, long, widest near the middle; each segment with a darker, indefinite, transverse band and
Menopon migrum, Kellog & Paine

Many specimens from *Corbis splendens* (Nepal Valley, Cusa, Tavasdiroon and Calcutta, India), and *Corbis macronotherus* (Foochow, China).

Menopon mesoleuctum, Nitzsch.

Males and females from *Corbis corvis* (Kashgar and Gilgit, Karscum); (Varkhand).

Menopon albiceps, Piegat.

One female from *Corbis aureus* (Foochow, China).

Menopon meniscus, Piegat.

One female from *Pica minor* (Shiraz, Persia).

Menopon picace, Denny.

One female from *Gallus gallus* (Khamhajong, Tibet).

III. MALLOPHAGA FROM MISCELLANEOUS BIRDS.

Lipeurus sericeus, Giebel.

Numerous males and females from *Ullar zonatus* (Dhappa, ur Calcutta, India).

Lipeurus baccatus, Nitzsch.

Many specimens from domestic pigeons (Calcutta, India).

Colpocephalum maculatum, Piegat.

Males and females from *Ullar zonatus* (Dhappa).

Menopon breviceps, Piegat.

Four females from a domestic duck (Bethampur, Marshidabad dist., Bengali).

Nitzschia minor, n sp. *Denny* minor.

(Plate xv. fig. 10).

Males and females from *Cyphius affinis* (Calcutta). This species differs from other *Nitzschia* in having the temples rounded and not expanded nor angulated. It is of small size with no strong markings and does not have a flat clypeal front as in *Carricar's* N. farrimon.

Description of female: Colour pale yellowish brown, head lighter than thorax and abdomen, with no dark markings except ocular flecks and mandibles which are blackish.

Measurements.

<table>
<thead>
<tr>
<th></th>
<th>Length 175 mm. Width</th>
<th>Length 175 mm. Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>47</td>
<td>39</td>
</tr>
<tr>
<td>Prothorax</td>
<td>34</td>
<td>29</td>
</tr>
<tr>
<td>Metathorax</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>Abdomen</td>
<td>28</td>
<td>28</td>
</tr>
</tbody>
</table>

Head shape of triangle with corners cut off, broader than long; front very obtusely but distinctly angled, with six or seven long hairs and several shorter ones; the convexity of the margin at point where palps would project is all but imperceptible and the ocular emargination is shallow with a conspicuous ocular fringe. Temples rounded, not angulated nor expanded, with five long hairs on each side and two short ones, also two short spines. Occipital margin concave, almost straight in the middle with four long hairs. Ground colour pale tawny with small, black, ocular flecks, blackish mandibles, brownish blotsches on each side of the Clypeus, and very small, weakly coloured ocular blotsches.

Thorax just as long as the head. Prothorax trapezoidal with shortest side behind; sides converging, almost straight, and posterior margin slightly rounded; a long hair and two spines in the anterior angles, a hair on the rounded posterior angles and four on the posterior margin. Line of fusion between the meso- and metathorax plainly visible, marked by lateral emarginations and by a suture; metathorax appearing as the first abdominal segment with four short spines along the mesothoracic suture, two stout spines in the posterior lateral angles and a row of hairs across the posterior margin. Legs rather long, concolorous with the thorax, the first pair with broad, short femora and the last pair with a patch of many short hairs, invisible from above, on the under side of the femora.

Abdomens elongate, widening to the fourth segment, then rounding evenly to the last which is truncate and bears a fringe of fine hairs; several short spines on the posterior margin of the first three segments near the lateral angles and each segment with a row of hairs across the posterior margin; posterior lateral angles with the usual long hairs. Colour an even yellowish brown with no blotches visible; narrow, transparent, lateral bands are present. Beneath, the satures are laterally distinct and here is borne on each side a row of from five to eight short spines. In the male the last segment is narrower, more rounded and slightly posteriorly, not truncate.
EXPLANATION OF PLATE XIV.

Fig. 1.—Dectopus thraceophalus, K. & P., σ.

1a. Antenna enlarged


2a. Last segments of female.

2b. Antenna of female.


3a. Antenna enlarged.

3b. Arrangement of metathoracic hairs.


5a. Antenna of female enlarged.

5b. Antenna of male on same scale as fig. 5a.

5c. Showing emargination and hair on temple.

5d. Thorax and abdomen of male.
EXPLANATION OF PLATE XV.

Fig. 6. - *Goniodes neomaculatus*, K. & P., <var>s</var>.
6a. Antenna enlarged.
7a. Antenna enlarged.
S. *Goniodes megaceros*, K. & P., <var>s</var>.
8a. Antenna enlarged.
9a. Antenna enlarged.
9b. From below, showing process on head.