

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

By V. 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.<sup>1</sup> The determinations of the Mallophagan parasites, together with descriptions of the new species found among them, are presented in this paper.

The collecting of dead 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 Pediculines", 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-

<sup>1</sup> Specimens labelled "no history" are, with few exceptions, the skins of birds that have died in captivity in India.—V. L.

mens of the host species. It is on the basis of such intensive collections as these that anything like an inclusive knowledge of the relation 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 writers wish to express their recognition of the courtesy of Superintendent Annandale in permitting them to examine so interesting a Mallophagan collection.

## I. MALLOPHAGA FROM PHASIANIDAE.

### *Nirmus nigromarginatus*, Piaget.

One female from *Gallus sonnerati* (no history, India).

### *Gonicocotes indicus*, n. sp.

(Plate xiv, fig. 4.)

One male specimen from *Arboricola rufigularis* (Jorpokri, East Himalayas). A bright-coloured, prettily patterned new form with rounded lateral margins and conspicuous, straight, backward-projecting posterior angles on the head. The figure represents the insect as somewhat too dull, the abdomen especially appearing considerably brighter in the specimen. This is a large species for *Gonicocotes*.

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 markings. 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. Six fine hairs on each side on 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 longest and fourth shortest; 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; ocular blotch quite dark with distinct margins. Temples 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, pustulated hairs on the lateral margins of the temples 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. Occiput sinuous, 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

anterior angles rounded, sides diverging and slightly concave with posterior angles protruding somewhat and bearing a pustulated hair. Posterior margin but slightly concave, bare. Metathorax with rounded angles, especially the anterior, and sides parallel; posterior margin obtusely angled on the abdomen. Two long hairs on each side, rising from a large, prominent, protruding pustule situated midway on the lateral margin; two other shorter ones on each side near the posterior margin, arising from a sub-marginal pustule 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 longer than any of those following, with straight, diverging sides, and broad slightly coloured marginal bands. Second to seventh segments with pale marginal bands giving rise to internal appendages, turning inward along the anterior margins and appearing as sharp, transversely linear lateral abdominal blotches dark in colour; these transverse appendages are produced forward into the segment preceding in the form of semicircular, plate-like processes. Segments one to seven with a transverse row of short hairs, limited between the lateral blotches 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 posterior lateral angle, except the first, most of them projecting from the ventral surface. Last segment rounded, entire, with numerous dorsal and ventral hairs. Genitalia prominent, extending nearly the length of the abdomen, with long, sharp appendages.

#### Measurements:

	♂.	Length	2.75mm.	Width.
Head			.83	.83
Prothorax			.23	.57
Metathorax			.34	.74
Abdomen			1.53	1.26

### *Gonicocotes nirmoides*, n. sp.

(Plate xiv, figs. 5, 5a, 5b, 5c, and 5d.)

Several males and females from *Lophophorus impevanus* (Zoological Garden, Calcutta). This well-marked form is characterized by the shape of the head, which is short and rounded in front with round, not angulated, 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 trabecular angles; second segment longest, about as long as the two following together; third and last nearly equal and the fourth but little shorter (fig. 5a). 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. 5c); 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 blotches at either end.

Thorax much shorter than head, with dark marginal bands. Prothorax with sides rounded and protruding, bearing a pustulate hair. Metathorax but little longer than prothorax, with diverging sides and acute posterior lateral angles bearing a pustule with three long hairs; another pustule 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 blotches, leaving a narrow light space on the meson, this space not so apparent in some specimens, however. A series of about six hairs across 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 the 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. 5d).

Measurements:

	♂, Length 1.69 mm. Width.		♀ Length 2.06 mm. Width.	
Head	.54	.54	.57	.64
Prothorax	.13	.33	.10	.34
Metathorax	.17	.50	.17	.52
Abdomen	.85	.87	1.18	.95

*Goniocotes chrysocephalus*, Giebel.

Specimens from *Argusianus argus* (Perak, Federated Malay States), *Lophura hardi* (no history, India), *Gemmaeus andersoni* (no history), *Gemmaeus albicristatus* (Mundali, Garhwal, 8500 ft., W. Himalayas, India), *Phasianus sommeringi scintillans* (no history).

*Goniocotes hologaster*, Nitzsch.

Specimens from *Gallus gallus* (Gaya dist., Bihar).

*Goniocotes rectangulatus*, Nitzsch.

One male from *Pavo nigripennis* (no history, India).

*Lipeurus variabilis*, Nitzsch.

Specimens from *Gemmaeus melanonotus* (Darjiling, Bhutan, India), *Gemmaeus swinhoei* (no history), *Argusianus argus* (no history), *Phasianus torquatus* (birds in captivity, Calcutta, India), *Pavo nigripennis* (no history, India); also specimens which can be assigned to *variabilis*, but constitute one or more varieties of the specimens from *Chrysolophus pictus* (China), *Lophura ignita* (Zoological Garden, Calcutta, India), *Pavo nigripennis* (Zoological Garden, Calcutta, India) and a domestic fowl, (Calcutta, India).

*Lipeurus rubrofasciatus*, Piaget.

One female from *Arboricola rufigularis* (Jorpokri, 7600 ft., E. Himalayas).

*Lipeurus intermedius*, Piaget.

Male and female from *Pucrasia macrolopha* (Near Simla, W. Himalayas, India).

*Goniodes neumannia*, n. sp.

(Plate xv, figs. 6, 6a, 7 and 7a.)

Two males, eighteen females and two young from a single specimen of *Argusianus argus* (no history) and three females from another specimen of the same host from Perak, Federated Malay States. This is a curious new form lying rather between *Lipeurus* and *Goniodes*, 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 Taschenberg (*Die Mallophagen*; 1882, pp. 32-34) mistakenly describes as the female of *Goniodes curvicornis*, Nitzsch, on the basis of a single specimen taken by Nitzsch, with a male of *curvicornis* from "*Argus giganteus*" (which is *Argusianus argus*), and five specimens taken by Ruy, also with a male of *curvicornis*, from a dried skin of the same host. The males of *curvicornis* differ so much from these specimens that Taschenberg says that "males and females of *curvicornis* 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

*curvicornis*. It is simply an unusual coincidence that males of *curvicornis* without females of the same species, and females of another species (our new one) have been taken without the males, but the pheasants are so heavily parasitized, *Argusianus 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. curvicornis*, together with males, in the present lot. They were taken from *Argusianus 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 margins, and the antennae are very large and bear forked processes on the first segment, and the appendage of the third segment is strongly chitinized, very long and pointed so as to be almost claw-like; the last two segments appear as appendages to the third. The genitalia of the male are large, and in both specimens that we have are exerted. This exertion is probably unnatural but may, because of the small size of the abdomen and unusual size of the genitalia, be natural. The general colour of both sexes is pale yellow with but 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 brownish marginal band, terminating in two antennal blotches; a rather long hair and four short ones on the clypeus on each side. The antennae (plate xv, fig. 6a) are set in, rather deep emarginations; the first joint is very large, as long as all the succeeding together, and bears midway on its posterior margin a most prominent forked appendage bearing a stout spine between the two forks; 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 antenna 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 fleck and a short spine. Behind the eye the sides of the head are slightly concave and bear a short spine. On the rounded temples are 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; colour 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, triangular-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 colour 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 submarginal 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 cross-wise. 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 (plate 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 breaks in the continuity of the outline of the head in this sex are the slight antennal emarginations, 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 (plate 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:

♂, Length <sup>1</sup>	17 mm.	Width	♀, Length 1.95 mm.	Width.
Head	50	39	52	47
Prothorax	22	48	16	47
Metathorax	26	52	25	52
Abdomen	86	76	109	70
Genitalia, exposed portion.	37	19		

<sup>1</sup> Not including genitalia.

*Goniodes sectus*, n. sp.

(Text-figs. 1 and 2.)

Males and females from *Catreus wallichii* (Garhwal, Darjiling and Kumaon, Himalayas, India). Species with head of male small, flattened in front, 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

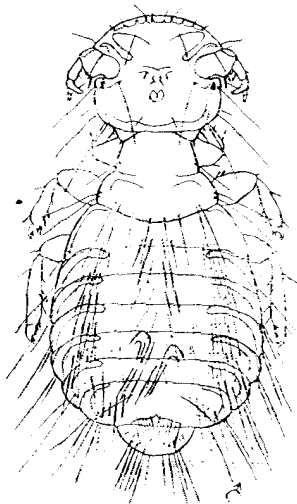


FIG. 1.—*Goniodes sectus*. Kellogg and Paine: Male.

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 emarginations 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 fleck, 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 prickle 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.

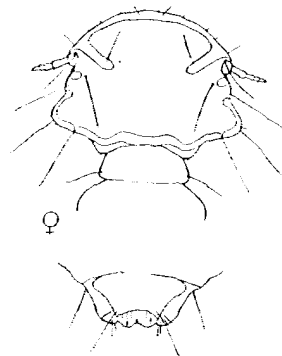


FIG. 2.—*Goniodes sectus*. Kellogg and Paine. Head and last segments of abdomen of female.

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 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; those 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 chitinized, 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:

	♂, Length	3.24 mm.	Width,	♀, Length	3.56 mm.	Width.
Head	.96		.97	..	.96	1.34
Prothorax	.28		.69	..	.28	.69
Metathorax	.39		.96	..	.41	.95
Abdomen	1.76		1.83	..	2.28	1.73

*Goniodes processus*, n. sp.

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

Two males from *Arboricola ruficularis* (Jorpokri, 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 hook, or trabecula-like process on each side (plate xv, fig. 9b); these processes are visible from above, showing through the first antennal segment. Marginal band broad, pale, ending in long, narrow, antennal blotches which reach inward and backward to the mandibles, the latter being set well back of the antennae and indistinctly visible; six inconspicuous dorsal and marginal hairs on each side of the clypeus, with several others on the ventral side. Antennae with 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 longer, not quite as long as the second; colour of antennae about the same as that of the head. Eye prominent, rounded, with a long hair and small fleck; 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 produced points, between which is included the concave, but slightly sinuous occiput; occipital band and rounded blotches 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 pustule; 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 longest 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 blotches 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 chitinized with small appendages.

Measurements:

	♂, Length	3.08 mm.	Width.
Head	.96		.95
Prothorax	.24		.69
Metathorax	.37		.89
Abdomen	2.60		1.39

*Goniodes megaceros*, n. sp.

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

A single male specimen from *Lophophorus impeyanus* Zoological Garden Calcutta. This is a well marked new species, most resembling *G. bicuspis* Piaget, but plainly different, having longer processes on the first antennal segment, the metathorax not two pointed behind, and the abdomen with heavy transverse blotches. 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 blotches 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 narrow, darker, antennal blotches; the clypeus at this point is slightly emarginate. 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 chitinized, 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-jointed appendage; these last two segments are of

about equal length. The third antennal segment and its appendage do not, in this species, appear as such: in fact if one considered this species alone the reason for considering the appendage present at all would not be apparent, but if one would imagine the appendage of the third segment in a form such as *G. processus* (described elsewhere in this paper), which is visibly appendage-like, as enlarged so as to become 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 ocular blotch and the clear prominent eye which bears posteriorly a short hair. The temples are quite square and are rather darker coloured 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 coxal bands appear within, parallel to those just mentioned. Each of the rounded lateral angles bears two hairs on a pustule, 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 chitinized, those behind the first entering into the segment preceding and curving inward. The large, dark, transverse blotches do not meet in the centre, the space left being uncoloured; 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, arises a group of three or four hairs. The last three segments are compressed, the last 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 genitalia are prominent with heavily chitinized rods reaching to the second abdominal segment.

#### Measurements:

	♂, Length	♀, 40 mm.	Width
Head	1.33		1.58
Prothorax	.58		1.20
Metathorax	1.60		1.75
Abdomen	2.08		2.46

#### *Goniodes colchicus*, Denay.

Many specimens from *Gennaeus alboaristatus* (Mundali, Garhwal, 8500 ft. India, Simla, W. Himalayas), and *Gennaeus leucomelanus* (Nepal), *Gennaeus melanonotus* (Bhutan, E. Himalayas), *Phasianus humiae* (Ruby Mines, Burma), *Chrysolophus pictus* (China).

#### *Goniodes dissimilis*, Nitzsch.

Many specimens from *Phasianus principalis* (Morghal, Herat, Central Asia), *Phasianus torquata* (birds in captivity, Calcutta, India), *Phasianus soemmerringi scintillans* (no history), *Ithaginis orientis* (Sikkim, E. Himalayas), *Gallus sounerati* (Bangalore, S. India), and domestic fowl (Calcutta, India).

#### *Goniodes eurygaster*, Piaget.

Many specimens from *Lophophorus imbecilis* (Mussoorie, Kumaon, W. Himalayas; Sikkim, Darjiling, E. Himalayas).

#### *Goniodes latifasciatus*, Piaget.

Many specimens from *Lophura ignita* (no history, India), *Polyplectron bicalcaratum* (no history, India), *Acornis erythrophthalmus* (no history, India).

#### *Goniodes curvicornis*, Nitzsch.

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

The females of this species, wrongly described by Taschenberg<sup>1</sup> (see our account, in this paper, of *Goniodes neumantia*, n. sp.) have a broadly elliptical abdomen, broad head, widest at posterior margin with angulated postero-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 parabolic in outline. The markings of head and body and the distribution and character of the hairs are like those of the male.

#### *Goniodes cervicornis*, Giebel.

Males and females from *Lophura diardi* (no history, India).

#### *Goniodes bicuspidatus*, Piaget.

Numerous males and females from *Tragopan bluthi* (Naga, Haka, and Mishmi Hills, Assam), *Tragopan caboti* (China), *Tragopan satyra* (Kumaon, W. Himalayas).

<sup>1</sup> Die Mallophagen, 1882, pp. 32-34.

*Goniodes falcicornis*, Nitzsch.

Two females from *Pavo nigripennis* (Zoological Garden, Calcutta, India).

*Colpocephalum thoracicum*, n. sp.

(Text-fig. 3.)

A single female from *Pavo muticus* (Burma). An extremely small species, but from blotches, etc., certainly an adult. But five

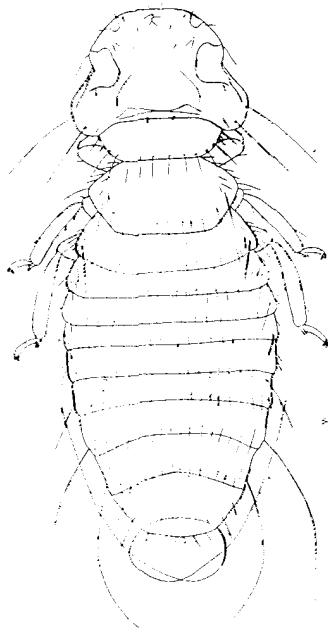


FIG. 3.—*Colpocephalum thoracicum*. Kellogg and Paine. Female.

other species of *Colpocephalum* have been recorded from the *Phasianidae*.

Description of female: Color pale yellow, uneven, in some places transparent, with blackish blotches on head. Head broader than long, widest across the temples; front flattened, straight; sides before the notch-like lateral emarginations slightly

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 indication of an angle behind, bearing a long marginal hair and, probably, a long surface hair, a distinct pustule being present. Occiput 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 tibiae; 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, laterad of 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:*

	♂, Length	1.33 mm.	Width.
Head		.31	.43
Prothorax		.12	.30
Metathorax		.16	.36
Abdomen		.83	.56

*Colpocephalum longicaudum*, Nitzsch.

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

*Colpocephalum appendiculatum*, Nitzsch.

One female from *Argusianus argus* (Perak, Federated Malay States).

*Menopon productum*, Piaget.

Many specimens from *Acomus erythrophthalmus* (no history), *Acomus pyronotus* (no history, India), *Lophura diardi* (no history, India), *Phasianus sommeringi scintillans* (no history, India), *Phasianus eliotti* (Zoological Garden, Calcutta, India),



*Lophura ignita* (Zoological Garden, Calcutta, India), *Gallus sonnerati* (Bangalore, S. India), *Chrysolophus pictus* (China).

**Menopon subequale, Piaget.**

Males and females from *Acomus erythrophthalmus* (no history), *Gennaëus melanonotus* (Bhutan, E. Himalayas).

**Menopon brevipes, Piaget.**

Males and females from *Crossoptilon mantchuricum* (no history).

**Menopon unicolor, Piaget.**

One female from *Phasianus torquatus* (bird in captivity Calcutta, India).

**Menopon ventrali, Nitzsch.**

Three females from *Argusianus argus* (no history).

**Menopon pallidum, Nitzsch.**

Males and females from domestic fowl (Calcutta, India).

II. MALLOPHAGA FROM CORVIDAE.

**Docophorus thryptocephalus, n. sp.**

(Plate xiv, figs. 1 and 1a.)

Several males and females from *Graculus graculus* (Chitral and Gilgit, N.W. India). This species resembles *D. atratus*, N., and *D. extraneus*, Piag., 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-lobed clypeal signature and in the fact that the head is much broader than long. The abdominal blotches 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 irregular. Lateral edges before antennae straight, diverging; antennal bands indefinite, irregular, interrupted at the suture, leaving a small clear space on the margin from which a very long hair arises; before the trabeculae 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. Trabeculae 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. Eye prominent, clear, with a very long hair on the dorsal surface. Ocular band narrow, curving inward, black near the margin at the anterior edge of the eye. Temples broadly and regularly rounded with a narrow, black, marginal band, interrupted by three pustules from which rise the long marginal hairs, and ending in contact with a black ocular fleck; a fourth marginal hair just below the eye, shorter than the others. Temples of a uniform dark chestnut colour. Occiput almost straight; occipital blotches blackish and occipital bands definite, extending forward, becoming 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 pustule. 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 pustulated hairs arising from the edge of the broad submarginal band; this band is interrupted on the meson 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 pustules.

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

Measurements:

	♂, Length 1.61 mm.	Width .54	♀, Length 2.01 mm.	Width .67
Head	.50	.54	.54	.67
Prothorax	.12	.29	.12	.29
Metathorax	.14	.45	.26	.23
Abdomen	.89	.78	1.25	.71

**Docophorus atratus, Nitzsch.**

Many specimens from *Corvus cornix* (Kashgar, Chinese Turkestan; S. E. Persia), *Corvus splendens* (Calcutta, Guna and Trivan-

drum, S. India), *Corvus insolens* (Katha and Mergui, Burma), *Corvus macrorhynchus* (Upper Burma; Gilgit, N.W. India), *Corvus corax* (Ladak, Little Tibet), *Corvus corone* (Yarkand, Chinese Turkestan), *Corvus sharpi* (Yarkand), *Corvus umbrinus* (Baluchistan), *Corvus scapularis* (Abyssinia), and *Corvus danuricus* (Pekin, China).

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

#### *Docophorus fulvus*, Nitzsch.

Many specimens from *Urocissa flavirostris* (Kashmir; Murree, W. Himalayas; Ghoom, 7500 ft., E. Himalayas), *Dendrocitta rufa* (Cachar, Assam and Calcutta, India), *Dendrocitta himalayensis* (Darjiling; Perak), *Dendrocitta formosae* (N. Formosa), *Garulus lanceolatus* (Murree, W. Himalayas), *Nucifraga multipunctata* (Gilgit, N.W. India), and *Pica rustica* (Ladak).

#### *Docophorus leontodon*, Nitzsch, var. *graculæ*, Piaget.

Males and females from *Urocissa occipitalis* (Nepal Valley, E. Himalayas), and *Dendrocitta sinensis* (Foochow, China).

#### *Docophorus crassipes*, Nitzsch.

One female from *Pica rustica* (Punjab, India).

#### *Docophorus superciliosus*, Nitzsch.

One male and two females from *Graculus graculus* (Little Pamir).

#### *Docophorus platystomus*, Nitzsch.

One male from *Corvus cornix* (Gilgit, N.W. India).

#### *Docophorus rotundatus*, Piaget.

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

#### *Docophorus guttatus*, Nitzsch.

Males and females from *Corvus monedula* (Gilgit; Yarkand, Chinese Turkestan), and *Corvus macrorhynchus* (Nepal Valley).

#### *Nirmus biguttatus*, n. sp.

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

Males and females from *Graculus graculus* (Gilgit, Sarhad and Little Pamir, N. W. Frontier of India; Khambajong, Tibet), also from *Nucifraga multipunctata* (Gilgit). Differs from

other Corvine *Nirmi* 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 bluntly conical, semi-parabolic before the antennae with sides of front flattened. Antennal bands blackish, continuous around the clypeus, but uncoloured where they meet in front, narrow, turning 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. Remaining 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 darkly 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. Temples somewhat narrowly rounded, not expanded, with sides somewhat flattened; the dark, narrow, marginal bands interrupted on the rounded posterior angle, leaving a small clear space from which arises a long hair; some distance behind this is a minute prickle. In figure 2 the temples appear a little too much rounded, though there appears to be some variation in this respect, especially between the two sexes (fig. 2b). Occiput but slightly concave, bare, pale in colour. Ocular 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 obtusely 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 margins with clear spaces for the spiracles 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. Genitalia appearing as a quadrangular plate with thickened margins and short penis and external appendages.

Female longer, more linear than male. Antennae as described above; last segment of abdomen bilobed, with two small blotches (fig. 2a); 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:

	♂, Leng.	1.62 mm.	Width.	♀, Leng.	1.92 mm.	Width.
Head	.47		.42	.50		.47
Prothorax	.12		.25	.10		.24
Metathorax	.14		.37	.12		.34
Abdomen	.98		.54	1.22		.52

*Nirmus olivaceus*, Nitzsch.

Many specimens from *Corvus splendens* (Nepal Valley, Trivandrum and Calcutta, India), *Corvus macrorhynchus* (Nepal Valley, Pensee, 3300 ft., Yunnan), *Pica rustica* (Upper Burma), and *Platysmurus leucopterus* (Perak, Federated Malay States).

*Nirmus marginalis*, Nitzsch.

Many specimens from *Dendrocitta rufa* (Calcutta, India; Cachar and Gowhatty, Assam; Burma), *Dendrocitta himalayensis* (Nepal Valley), and *Urocissa occipitalis* (Maundi, N.W. India; Upper Burma).

*Nirmus varius*, Nitzsch.

Many specimens from *Corvus monedula* (Yarkand and Gilgit), *Corvus frugilegus* (Gilgit and Herat), *Corvus corax* (Ladak), and *Pica rustica* (Gilgit and Ladak).

*Nirmus nigrosignatus*, Piaget.

Males and females from *Garrulus leucotes* (Upper Burma).

*Nirmus uncinosus*, Nitzsch.

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

*Nirmus punctatus*, Nitzsch.

A single female of this characteristic gull- and tern-infesting *Nirmus* is included in the collection as taken from *Dendrocitta rufa*

(Calcutta, India). This is a clear case of straggling, the bird skin from which the parasite was taken having probably been temporarily near the skin or body of some gull or tern.

*Nirmus clypeatus*, n. sp.

(Plate xiv, figs. 3, 3a and 3b.)

A single male specimen from *Corvus cornix* (Kashgar, E. Turkestan). This species is Lipeuroid in general aspect of head and Nirmoid as to hind body.

Description of male: Head truncate conical, with 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 mesad; 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. Trabeculae acute, slightly shorter than the basal 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 second 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 quadri-lateral with sides slightly convex. Marginal bands present, turning in before they reach the posterior margin, not meeting on the meson; 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 pustule 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 metathorax

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	.29
Prothorax	.11	.21
Metathorax	.16	.29
Abdomen	1.11	.47

*Nirmus rufus*, Nitzsch.

A single male from *Corvus 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 semicinctum*, Rudow.

Males and females from *Corvus splendens* (Trivandrum and Calcutta, India), *Corvus insolens* (Mergui, Burma), and *Corvus scapulatatus* (Abyssinia).

*Menopon insolitum*, n. sp.

(Text-fig. 4.)

One male and one female from *Corvus insolens* (Mergui, Burma). This species belongs with Piaget's crow-infesting group, among which are several species with curiously deformed 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. trinotum*, Piaget, *M. anathorax*, Nitzsch, and *M. mesoleucum*, 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 occipital band. Front slightly angled on the meson and at the sides, with apparently several short hairs which have been broken off in our specimen, and longer ones before the ocular emarginations; ocular fringe prominent. Temples expanded, widest in front, with three pustules from which the hairs have been

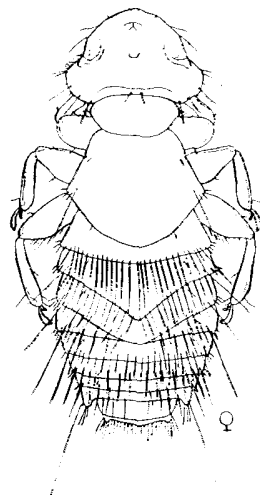


FIG. 4.—*Menopon insolitum*, Kellogg and Paine: Female.

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 mesothorax (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 paler, 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 postero-lateral 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 ocular bands and marginal occipital band darker than in the female specimen; a prominent, black ocular fleck is also present. The metathorax 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.), ♂	Leng. 1.30 mm.	Width. .9	Leng. 1.59 mm.	Width.
Head	.34	.47	.36	.53
Prothorax	.13	.29	.13	.34
Metathorax	.28	.37	.43	.52
Abdomen	.60	.47	.80	.64

*Menopon monochromatum*, n. sp.

(Text-fig. 5.)

One female from *Garrulus lanceolatus* (Simla, W. Himalayas) and another from *Graculus graculus* (Khambajong, Tibet). A small, almost unicoloured species with unusually 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, semilunar, front with but faint indication of a median angle. Clypeus with two fine hairs, one on each side near the meson and five more, one of which is long, on the sides before the region of the ocular emargination. Ocular 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 spines. Occiput concave, apparently bare, with two small, dark, marginal blotches. Colour pale yellowish brown marginally, and darker, more golden near the centre; ocular bands dark, curving inward and forward; mandibles weak.

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

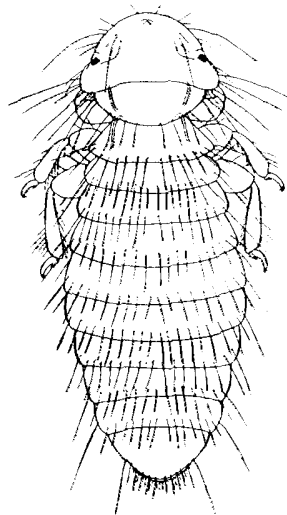


FIG. 5.—*Menopon monochromatum*. Kellogg and Paine: Female.

indefinite, interrupted marginal band. All segments, except the last, of about equal length, the last longer and rounded behind, bearing a fringe of hairs. Each segment with a transverse, submarginal series of hairs, the lateral ones the longest.

*Measurements:*

♀, Length 2.03 mm.	Width.
Head	.67
Prothorax	.50
Metathorax	.56
Abdomen	.83

**Menopon nigrum**, Kellogg & Paine.

Many specimens from *Corvus splendens* (Nepal Valley, Guna, Trivandrum and Calcutta, India), and *Corvus macrorhynchus* (Foochow, China).

*Menopon mesoleucum*, Nitzsch.

Males and females from *Corvus cornix* (Kashgar and Gilgit), *Corvus corone* (Yarkand).

**Menopon albiceps**, Piaget.

One female from *Garrulus sinensis* (Foochow, China).

**Menopon meniscus**, Piaget.

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

**Menopon picae**, Denny.

One male from *Graculus graculus* (Khambajong, Tibet).

## III. MALLOPHAGA FROM MISCELLANEOUS BIRDS.

**Lipeurus secretarius**, Giebel.

Numerous males and females from *Vultur monachus* (Dhappa, nr. Calcutta, India).

**Lipeurus baculus**, Nitzsch.

Many specimens from domestic pigeons (Calcutta, India).

**Colpocephalum maculatum**, Piaget.

Males and females from *Vultur monachus* (Dhappa).

**Menopon breviceps**, Piaget.

Four females from a domestic duck (Berhampur, Murshidabad dist., Bengal).

**Nitschchia minor**, n. sp. *Dennyus minor*.

(Plate xv. fig. 10).

Males and females from *Cybselus affinis* (Calcutta). This species differs from other *Nitschchias* 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 *Carriker's N. laifrons*.

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.

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 concavity of the margin at point where palpi would project is all but imperceptible and the ocular emarginations are shallow with a conspicuous ocular fringe. Temples rounded, not angulated nor expanded, with five long hairs on each side and two short ones, and 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 blotches on each side of the clypeus, and very small, weakly coloured ocular blotches.

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.

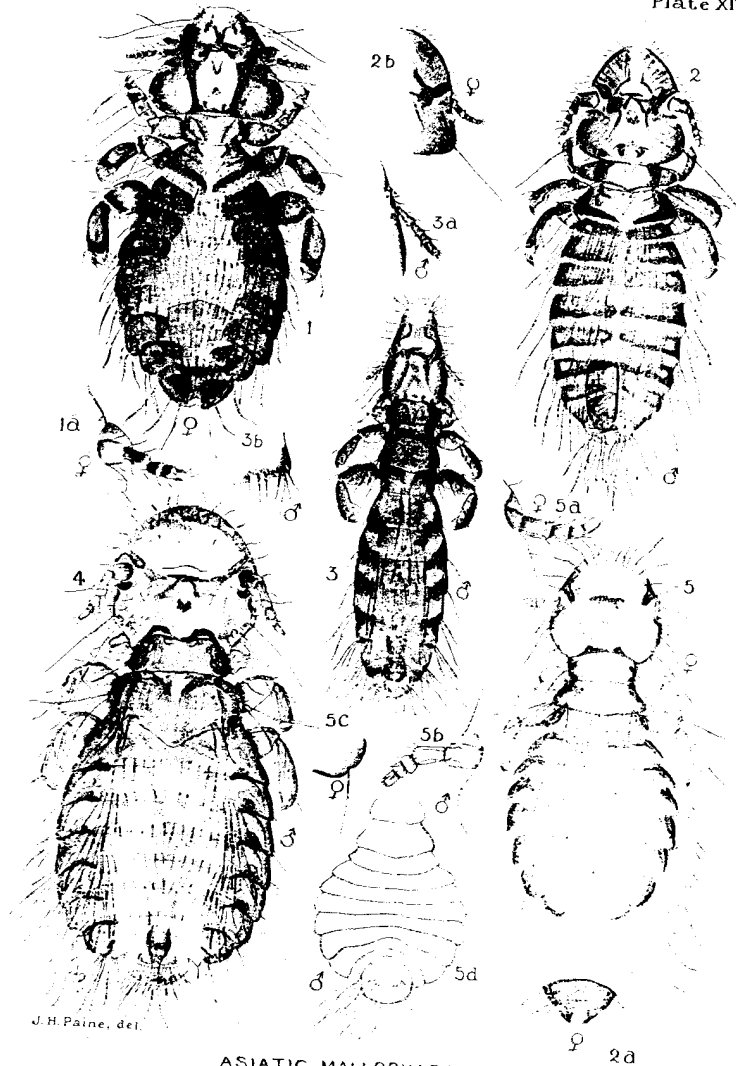
Abdomen elongate, widening to the fourth segment, then rounding evenly to the last which is truncate and bears a fringe of fine hairs; several short spines on the posterior margin of the first three segments near the lateral angles and each segment with a row of hairs across the posterior margin; posterior lateral angles with the usual long hairs. Colour an even yellowish brown with no blotches visible; narrow, transparent, lateral bands are present. Beneath, the sutures 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 protruding, not truncate.

## Measurements:

	♀, Length 1.92 mm.	Width.	♂, Length 1.75 mm.	Width.
Head	.47	.59	.39	.52
Prothorax	.23	.36	.22	.32
Metathorax	.32	.58	.27	.48
Abdomen	.90	.71	.87	.71

EXPLANATION OF PLATE XIV.

- FIG. 1.—*Docophorus thryptocephalus*, K. & P., ♀.  
 .. 1a. Antenna enlarged  
 .. 2.—*Nirmus biguttatus*, K. & P., ♂.  
 .. 2a. Last segments of female.  
 .. 2b. Antenna of female.  
 .. 3.—*Nirmus clypeatus*, K. & P., ♂.  
 .. 3a. Antenna enlarged.  
 .. 3b. Arrangement of metathoracic hairs.  
 .. 4.—*Goniocotes indicus*, K. & P., ♂.  
 .. 5.—*Goniocotes nirmoides*, K. & P., ♀.  
 .. 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.  
 .. 5e. Thorax and abdomen of female.



J. H. Paine, del.

ASIATIC MALLOPHAGA.

EXPLANATION OF PLATE XV.

- FIG. 6.—*Goniodes neumannia*, K. & P., ♂.
- „ 6a. Antenna enlarged.
- „ 7.—*Goniodes neumannia*, K. & P., ♀.
- „ 7a. Antenna enlarged.
- „ 8.—*Goniodes megaceros*, K. & P., ♂.
- „ 8a. Antenna enlarged.
- „ 9.—*Goniodes processus*, K. & P., ♂.
- „ 9a. Antenna enlarged.
- „ 9b. From below, showing process on head.
- „ 10 *Nitzschia minor*, K. & P., ♀.



\*  
fig 10.  
*D. minor*

J. H. Paine, del.

ASIATIC MALLOPHAGA.