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STUDIES IN NEOTROPICAL MALLOPHAGA (XIII) — THE MENOPONIDAE OF THE NEOTROPICAL PSITTACIDAE (1)

by

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The Mallophaga of the Psittacidae are a very numerous group, and, a apparently, have not been abundantly collected or carefully studied, especially the Amblyceran forms from Neotropical hosts, which are practically unknown.

The fact that this avian family is well represented in a large portion of the tropical and subtropical world has led some authors to infer that because of this universal distribution of the hosts that their Mallophagan parasites must necessarily fall into genera common to both New and Old World parrots. This supposition is not borne out by the facts.

Let us look at the Ischnoceran forms, of which there are now recognized five genera, four of which were described from Old World or African genera of parrots, as follows: *Psittoecus* Conci, *Psittaconirmus* Harrison, *Neopsittaconirmus* Conci and *Echinophilopterus* Ewing. I have collected quite a formidable lot of Mallophaga from Neotropical parrots, and I have yet to take a *single specimen* which could possibly be referred to any one of these four genera. The only Ischnoceran genus now recognized from Neotropical parrots is *Paragoniocotes* which has been rather thoroughly studied by both Dr. Guimarães and myself, but personally I believe that all of the species which have been placed in this genus by Guimarães and myself are not congeneric, and that the genus is in need of a slight revision, as I stated in my own report.

Of the Amblycera parasitic on parrots we now have but two recognized genera for the whole world, *Psittacomenopon* Bedford and *Eomenopon* Harrison. A third genus, *Franciscoloa* Conci, has

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been synonomized with *Psittacomenopon* by Hopkins and Clay. All of these three genera were described from Old World hosts, and no genus has ever been erected for any species of Menoponidae from a Neotropical parrot, in fact, to date there have been described but two species of Menoponidae from South American parrots, *Colpocephalum burmeisteri* Kellogg and *C. anduzei* Stafford, neither of which are *Colpocephalum,* but were both placed under *Psittacomenopon* in the new Checklist, a genus apparently used as a dumping ground, the same as *Amyrsidea.*

I have personally examined both sexes of the genotype of *Psittacomenopon* (*Menopon poicephalum* Bedford), and in addition a pair of *P. heterocephalum* (Nit.), a species very closely related to *poicephalum,* and it seems to me that the outstanding characters for the separation of this genus are the following:

The shape, structure and sexual dimorphism of the head, the dimorphism in the pterothorax and various abdominal segments and the chaetotaxy of the abdomen.

I have many species of Menoponidae from Neotropical parrots, one large group of which have a superficial resemblance to *Psittacomenopon,* but I have yet to find one which has the outstanding generic characters mentioned above. Atfer a very careful check of the 17 species which have been placed under *Psittacomenopon* in the 1952 Checklist, I have come to the conclusion that only the four species listed below are entitled to remain there, as the genus is now characterized, viz.: *P. acuticeps* (Piaget), *poicephalus* (Bedford), *impar* (Piaget) and *heterocephalum* (Nit.). I have not been able to check on *P. africapon* Eichler or *kea* (Kellogg), so I cannot say whether or not they may remain in *Psittacomenopon.*

Regarding *Menopon acuticeps* Piaget, there is no doubt of its correct position under *Psittacomenopon,* but I am fully convinced that its host, *Ara ararauna,* as given by Piaget, is an error, due to straggling. I have many specimens taken on freshly killed birds of this Macaw which belong to three very distinct genera, but none remotely resemble *Menopon acuticeps* Piaget. I am also convinced that no species of *Psittacomenopon,* as now characterized, will ever be found on any Neotropical parrot.

Piaget's type of *Menopon acuticeps,* a single ♀, came from a bird in the Zoological Gardens of Rotterdam. It is a common practice in zoological gardens everywhere to place various species of parrots together in one cage. The friendly nature of parrots in captivity is also well known, with their habit of perching close together, so that it would be a very simple matter for an active species of louse, such as a Menoponidae, to pass from one host to another. Undoubtedly there were various species of Old World parrots in the same cage with the *Ara ararauna,* the supposed host of Piaget's *M. acuti-*

ceps. The fact that but a single ♀ was secured lends further credence to this theory. Eventually the true host of *M. acuticeps* will probably be found, but until it has actually been taken again from a recently killed wild bird, I prefer to list this species as from host unknown.

The large number of Menoponidae from Neotropical Psittacidae which I have been able to study fall into four very distinct groups which should, in my opinion, be recognized generically. The type which is most abundant, species of which I have from 38 different hosts, is represented by *Colpocephalum burmeisteri* Kellogg and *C. anduzei* Stafford, both species well represented in my collection. This type is, generally speaking, much more closely related to *Psittacomenopon* than the other three groups, but nevertheless I do not consider them to be congeneric with it.

Another group, also abundant, which I have from 14 hosts, is entirely different in shape and structure of head, apical segments of abdomen and chaetotaxy.

The third group, taken only on four species of the genus *Ara*, has a fantastic sexual dimorphism, not only of the head, but of the abdomen, while the fourth group has the head entirely different from the other three, and is represented in my collection by four species from three genera of parrots.

Before taking up the new genera I wish to review briefly the characters upon which the genus *Psittacomenopon* was erected, as given by its describer.

Genus *Psittacomenopon* Bedford

(Figs. 1-5)

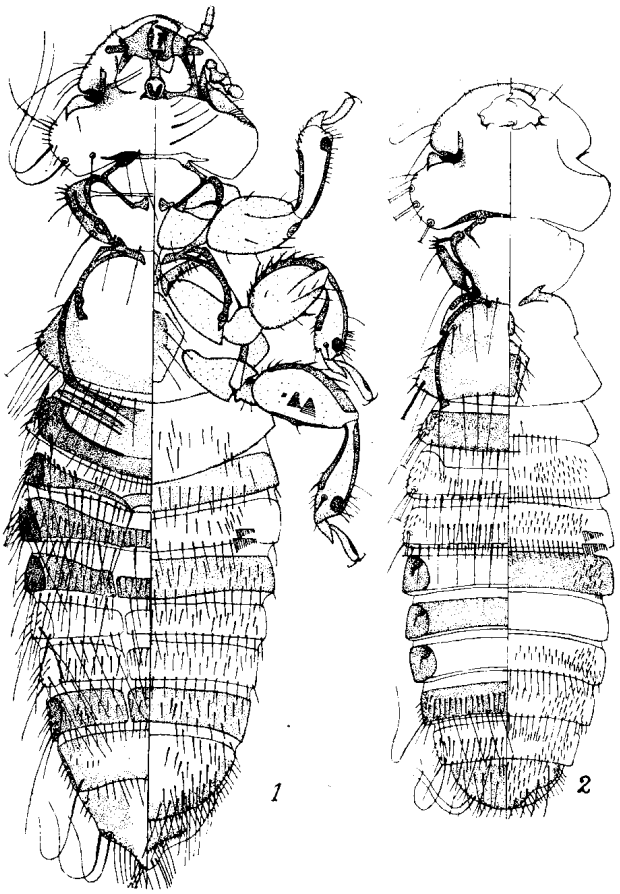
GENOTYPE — *Menopon poicephalum* Bedford. (Host: *Poicephalus meyeri* [*damarensis* Neumann] Damaraland, Africa).

The characters on which this genus was erected by Bedford are, briefly, as follows: Head one third wider at temples than long; forehead rounded; pre-ocular slit well developed; mandible large, both bidentate in ♀, but only one with two teeth in ♂; pharyngeal sclerite and gland well developed, the former lying over mandibles.

Prothorax large and broad, with moderately acute wings; mesothorax very short; metathorax very large, with lateral margins strongly divergent, with posterior margin projecting backwards onto the abdomen in the ♀, almost straight in the ♂.

Legs normal, third femora with three combs on venter. Abdomen of ♀ elongated and slender, pointed posteriorly, first tergite considerably longest (except IX), projecting backward onto second

segment, with several chitinous lines on each side in front; tergites and sternites with well developed transverse plates, the plates on tergites III to VIII divided longitudinally into three areas, and on the apical tergite the plate is divided medially. Tergites with two transverse rows of hairs; sternites with numerous short hairs on 3rd. segment and two combs on each side; apical sternites with two plates fringed with hairs.

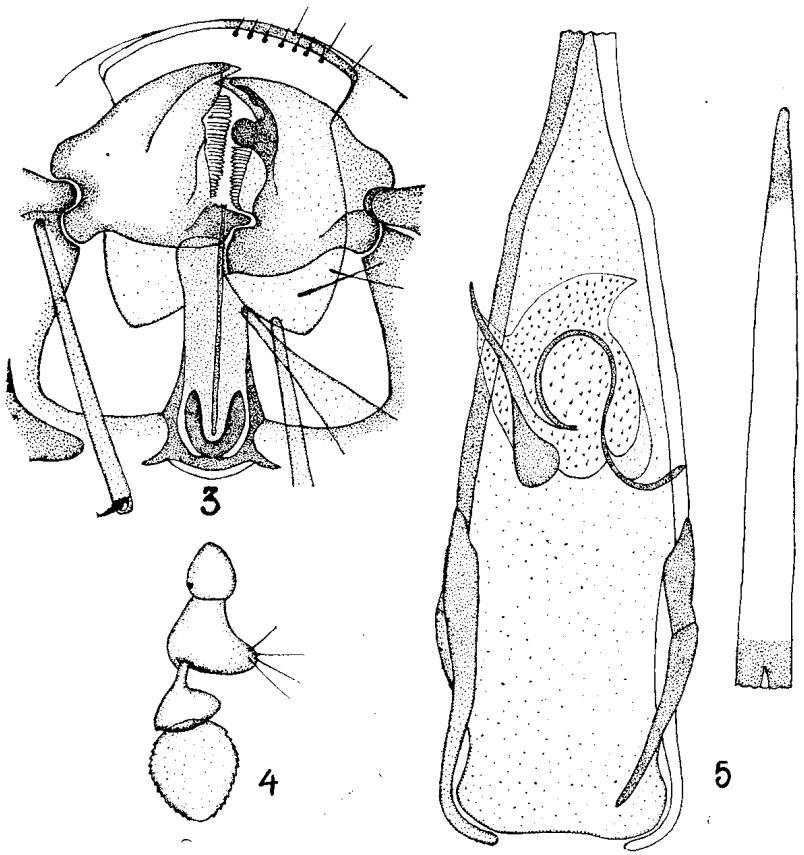


Psittacomenopon poicephalus
Fig. 1 - ♀ ; fig. 2 - ♂.

The abdomen in the male is shorter and narrower than in the ♀ ; 1st segment slightly longer, but does not project backward onto the 2nd, and there are no transverse lines.

Genitalia with basal plate long and narrow; paramers long and narrow and slightly curved.

Some of these characters are common to all Menoponidae found on Neotropical parrots, especially in the new genus *Psittacobrosus* described below, but others are entirely absent or radically different. There are some authors who will take the stand that the dimorphism shown in the abdomen of *Psittacomenopon* is not a generic character, pointing out that striking dimorphism is present in some species of



Psittacomenopon poicephalus

Fig. 3 - ♀, mandibles and pharyngeal glands and sclerite; fig. 4 - ♀, antena; fig. 5 - ♂, genitalia.

the genera *Myrsidea* and *Cracimenopon* Carriker in the structure of the pterothorax and abdomen, but I believe that there are sufficient additional characters in the present case to warrant the separation.

Also, I believe that this abdominal and thoracic dimorphism found in a good many species of *Myrsidea* could very well be utilized

to break up this now excessively large and unwieldly genus, of which very many new species remain to be described.

Genus *Psittacobrosus,* new genus

GENOTYPE — *Psittacobrosus burmeisteri kelloggi,* new subsp. [Host: *Ara ararauna* (Linné)].

DIAGNOSIS — Medium sized Menoponidae found on many genera and species of Neotropical Psittacidae, and is closely related to *Psittacomenopon,* parasitic on certain Old World parrots.

Very slight, if any, sexual dimorphism in the shape of the head, thorax or abdomen, excepting the differences in segments VIII and IX, common to many Menoponidae. Pre-ocular margin of head more or less circular; temples rounded but not strongly expanded laterally and with occipital margin deeply concave; a more or less well developed, deeply pigmented blotch at inner end of pre-ocular slit and a band across occipital margin; palpi long and antennae large, with distal segment extending beyond margin of head and 2nd segments with lateral swelling bearing two fine setae; mandibular condyles widely separated, in normal position (see enlarged fig.).

Prothorax large, winged and with circular posterior margin; pterothorax comparatively small, with sides nearly straight and widely divergent, with posterior margin transverse in both sexes; mesothoracic area very short, sometimes with a meso-metathoracic sternal suture.

Abdomen elongated oval, much larger and somewhat pointed apically in the female and circular in the male; tergites entire across abdomen and of uniform size and shape from I to VIII in both sexes; pleurites rather small, with greater portion seen ventrally in mounted specimens; sternites separated from pleurites by a narrow clear space, but are entire across abdomen. General chaetotaxy fairly coarse, varying in length, but always with numerous short, stout bristles along sides of abdomen, thorax, femora and tibiae, as well as on face of pleurites and sparsely on sternites, more abundant in some species than others; hind femora and sternite III with two long and one short combs of spines. Chaetotaxy of apical segments of abdomen in the females resembling that of *Colpocephalum,* with short, curving bristles along the sides of segments VIII and IX; a closely set row of strong setae along posterior margin o n l y of tergites I to VIII, with few or no setae on their faces; sternites with a more widely spaced row of shorter and more slender setae along posterior margin and a slight scattering of short bristles over their faces.

Legs short and stout, with wide, deeply pigmented borders.

Males much smaller than females but otherwise the same in all structures excepting the shape and chaetotaxy of the apical abdominal segments (see figs.).

The male genitalia in this genus is of at least three distinct types, that of the genotype being perhaps the most common, while that of *P. forpi,* new species, is found only on species parasitic on the smaller parroquets. A third type is found on lice from the genera *Pionus, Amazona* and others.

The characters which separate this genus from *Psittacomenopon* are the following: No sexual dimorphism in shape of head, pterothorax or abdominal segments (excepting VIII and IX); position and structure of mandibular articulation and their supporting armature entirely different (see enlarged figures); tergites I. to VIII in both sexes of similiar shape and entire across abdomen; a single row of strong setae across tergites along their posterior margin only, and with numerous short, thickened, recurved setae along lateral margins of pleurites VIII and IX in the females as in *Colpocephalum.*

Psittacobrosus burmeisteri kelloggi, new subsp.

(Figs. 6-8)

TYPES, male and female adults, from *Ara ararauna* (Linné), collected by the author at Chatarona, Rio Beni, Bolivia, Sept. 18, 1934 (In coll. of author).

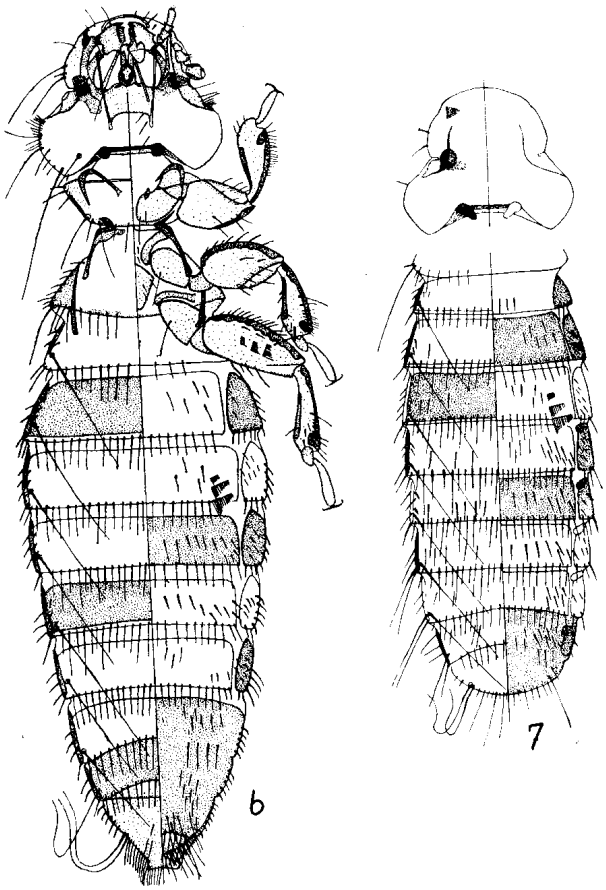
DIAGNOSIS — This race is closely related to *P. burmeisteri burmeisteri* (Kellogg), from *Ara chloroptera.* The generic characterization given above and the figures presented are ample for the recognition of this species. The differences between this race and the nominate form are given below under *P. b. burmeisteri.*

The species is represented by the ♂ holotype, ♀ allotype and 7 ♂ ♂ and 8 ♀ ♀ paratypes. In addition there are 4 ♂ ♂ and 6 ♀ ♀ from the type host collected at Todos Santos(Bolivia; a single ♀ from type host taken at Tierra Alta, Rio Sinu, Colombia, and a large series of both sexes, also from the type host, collected at Abaeté, Pará, Brasil, from the Hopkins collection.

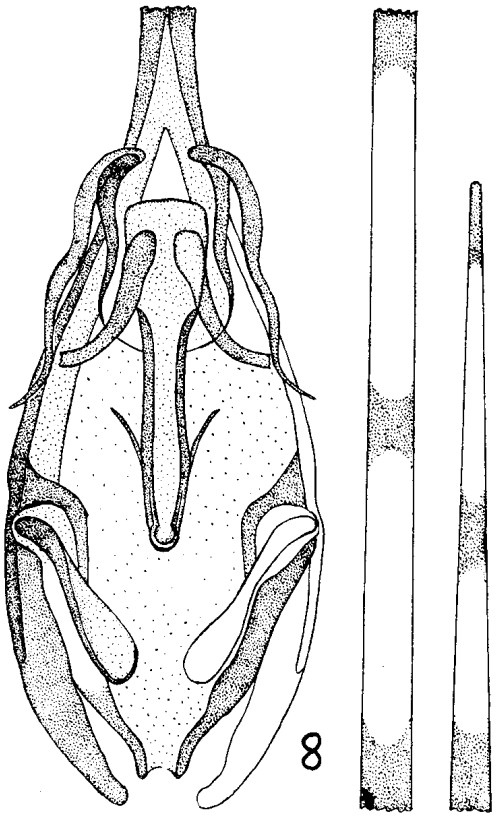
MEASUREMENTS OF THE TYPES:

		length ♂	width ♂	length ♀	width ♀
Body	.....	1.95	—	2.36	—
Head	frons	—	.338	—	.35
	temples	.40	.50	.423	.498
	Occiput	.347	—	.37	—

Prothorax	.195	.328	.205	.37
Pterothorax	.25	.434	.25	.488
Abdomen	1.30	.555	1.56	.685
Antennae	.	—	.	—
Basal plate	.78	.022 to point (shaft)		
Paramers	.13	.132		
Endomeral sac	.14	.12		



Psittacobrosus burmeisteri kellogi
Fig. 6 - ♀ ; fig. 7 - ♂.



Psittacobrosus burmeisteri kellogi
Fig. 8 - ♂, genitalia.

Psittacobrosus burmeisteri burmeisteri (Kellogg)

Colpocephalum burmeisteri Kellogg, Jour. N. Y. Ent. Soc., vol. 14, 1906, p. 48, pl. 2, fig. 5 (Host: *Ara chloroptera* G. R. Gray).

Diagnosis — The differences between this race and *kelloggi* are not striking, but are constant in a large series. The chaetotaxy of the abdomen is shorter and more slender in *burmeisteri* and the setae along posterior margin of tergites fewer in number, this being especially noticeable on tergites VI to VIII where many of the hairs are longer than the width of the succeeding segment. The spines on the femora are much coarser, but fewer in number.

The measurements given by Kellogg agree fairly well with those of my specimens, the differences not being more than covered by individual variation. However, the width of the abdomen in the ♀ as given by Kellogg is an obvious error (1.30).

The measurements of *burmeisteri* also run close to those of *kelloggi,* some being the same and may not be used as criteria for separating the two races.

In the male genitalia there are, however, differences of value. In the basal plate the long shaft, or stem, is wider in the basal portion in *burmeisteri,* while the paramers are considerably shorter (.092 against .13), as well as narrower across their bases, and the endomeral sac is shorter and wider.

MEASUREMENTS OF SPECIMENS

(from bird collected at Caracolicito, Magdalena, Colombia):

	length ♂	width ♂	length ♀	width ♀
Body	1.97	—	2.31	—
Head: frons	—	.347	—	.375
Head: temples	.39	.482	.412	.51
Head: Occiput	.358	—	.37	—
Prothorax	.18	.347	.195	.38
Pterothorax	.23	.456	.26	.488
Abdomen	1.27	.52	1.52	.65
Antennae	.115	—	.108	—
Basal plate	.825	.03 to point (stem)		
Paramers	.092	.117		
Endomeral sac	.112	.143		

The following specimens of this species are in the author's collection: Caracolicito, Antioquia, Colombia, 2 ♂ ♂ and 4 ♀ ♀; La Pinta, Rio Juruan, Venezuela, 3 ♂ ♂ - 1 ♀; Chatarona, Rio Beni, Bolivia, 2 ♀ ♀.

Psittacobrosus burmeisteri ambiguus, new subsp.

TYPES, male and female adults, from *Ara ambigua ambigua* Bechstein, collected by the author at Pavarondacito, Antioquia, Colombia, April 21, 1950 (in U. S. Nat. Mus.).

DIAGNOSIS — Larger than either *P.b.burmeisteri* or *P.b.kelloggi.* However, the greater size of the female in this species is due almost entirely to the size of the abdomen, there being but little difference between the sexes in the measurments of the head and thorax, some being exactly the same (see table of measurements).

In the male all measurements of head and thoracic segments are greater than in *burmeisteri,* while abdomen is wider but of same length. In the female the width of head at antennal fossae is the same as in *burmeisteri,* but the remaining measurements are so-

mewhat greater; the pterothorax is narrower but longer, and abdomen slightly narrower but longer; the antennae are considerably longer [.14 (♂) and .14 (♀) against .115 and .108].

The coloration is uniformly darker, the blotches on the head more prominent and blacker; the lateral borders of the legs wider and more deeply pigmented and the abdominal sclerites darker, especially the pleurites. The chaetotaxy and structure of sternite IX in the female differs considerably from both *kelloggi* and *burmeisteri.*

The male genitalia ave very similar in the three races, differing only in minor details. The paramers are longest in *kelloggi* and shortest in *burmeisteri,* while the basal plate is practically the same in all three forms except being narrower at base of stem in *kelloggi.* The complicated sclerites of the genital sac differ slightly in the three races as well as the supporting rods on each side of the genital sac.

The form of *Psittacobrosus* found on *Ara militaris* is also conspecific with *burmeisteri,* but the ones from *Ara severa* and *A. rubrigena* seem to be specifically distinct.

The material examined from six species of the genus *Ara* may be divided into two groups, those from *chloroptera, militaris, ambigua* and *ararauna* being very closely related and conspecific, but separable subspecifically, while the two from *severa* and *rubrigena* are of the same type, but specifically distinct.

The same situation, more or less, is found in the genus *Epiara* (described on succeeding pages), which is found, apparently, only on the genus *Ara,* where we have specimens from the first four hosts mentioned above which are also very closely related, two possibly being inseparable. The same thing occurs in the genus *Heteromenopon* (described below), of which I have specimens from five species of *Ara,* two of which are possibly inseparable and the other three very closely related.

The subspecies is represented by the ♂ holotype, ♀ allotype and 6 ♂ ♂ and 6 ♀ ♀ paratypes, as well as 3 ♀ ♀ from type host collected at Acandí, Chocó, Colombia.

MEASUREMENTS OF THE TYPES:

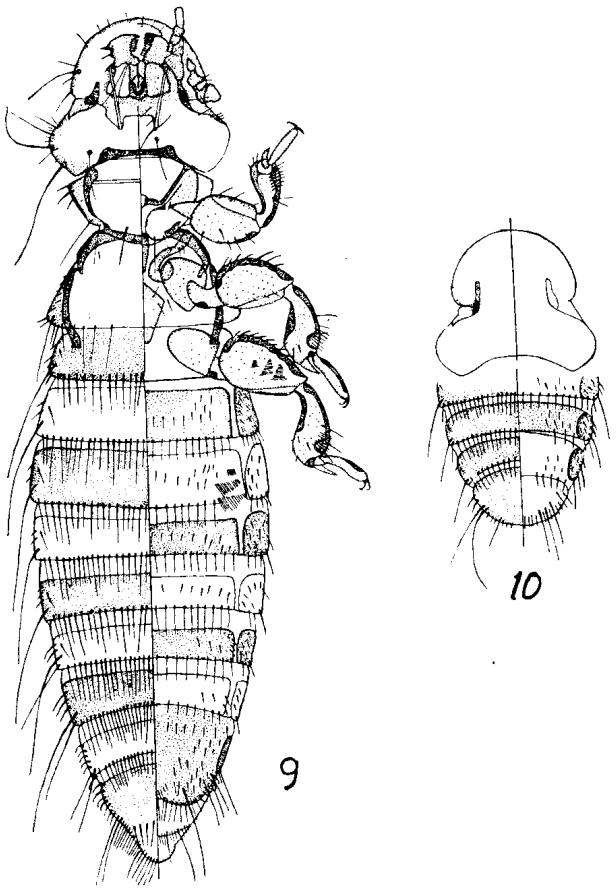
	length ♂	width ♂	length ♀	width ♀
Body	2.05	—	2.41	—
Head: frons	—	.37	—	.37
Head: temples	.415	.52	.423	.53
Head: Occiput	.37	—	.38	—
Prothorax	.205	.39	.205	.40
Pterothorax	.26	.48	.25	.53

Abdomen	1.27	.55	1.54	.53
Antennae	.14	—	.14	—
Basal plate	.80	.03 to point (shaft)		
Paramers	.115	.162		
Endomeral sac	.12	.14		

Psittacobrosus forpi, new species

(Figs. 9-12)

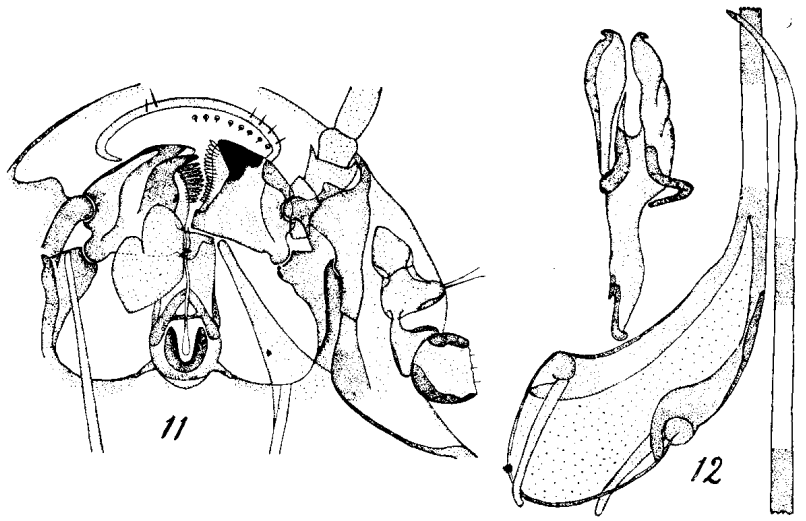
TYPES, male and female adults, from *Forpus c. conspicillatus* (Lafresnaye), collected by the author at La Gloria, Magdalena, Colombia, May 14, 1943 (in coll. U. S. Nat. Mus.).



Psittacobrosus forpi
Fig. 9 - ♀ ; fig. 10 - ♂.

DIAGNOSIS — Very much smaller than *burmeisteri*, with female, as usual, much larger than the male. The eye is less prominent and the pre-ocular slit, while long, is not open as in *burmeisteri* but has the two edges slightly overlapping; the ocular blotches are smaller and less deeply pigmented; the antennae are porportionally longer and thicker, especially distal segment; the thoracic segments are actually longer and with the pterothorax wider in the female (.26 by .51 againt .26 by .488).

The tip of the abdomen in female is narrowly circular, not rectangular, and in the male is narrower and more circular; sternal plate VIII in female is much shorter and with chaetotaxy shorter



Psittacobrosus forpi

Fig. 11 - ♀, mouth parts, antenna and palpi; fig. 12 - ♂, genitalia.

and more abundant. The sternites are narrower than the tergites, with wider hyaline interspaces (same width in *burmeisteri*).

The male genitalia are very different, and this character alone is sufficient to easily distiguish *forpi* from the *burmeisteri* group. The position of the genitalia, as shown in the figure, is the normal one inside the body, as shown by all eight males examined, and is the same in other species parasitic on the smaller parroquets. The genitalia of *P. anduzei* (Stafford) is of this type.

The paramers are attached on the dorsal side of the basal plate, not at sides, while the lateral supporting rods of the endomeral

sac are wanting. The internal sclerite is also very different (see fig.) and is always seen outside of the genitalia, as shown in the figure. Species represented by ♂ holotype, ♀ allotype and 7 ♂ ♂ and 4 ♀ ♀ paratypes, also 1 ♀ from the type host collected at La Plata, Huila.

MEASUREMENTS OF THE TYPES:

		length ♂	width ♂	length ♀	width ♀
Body		1.76	—	2.15	—
Head	frons	—	.326	—	.347
	temples	.36	.412	.423	.434
	Occiput	.347	—	.40	—
Prothorax		.195	.34	.22	.37
Pterothorax		.24	.423	.26	.51
Abdomen		1.03	.456	1.32	.597
Antennae		.12	—	.12	—
Basal plate		.65	.016 to point		(shaft)
Paramers		.076	.04		
Endomeral sac		.092	.093		

Genus *Epiara,* new genus

GENOTYPE — *Epiara dimorpha,* new species (Host: *Ara chloroptera* G. R. Gray).

DIAGNOSIS — Rather large Menoponidae parasitic (as far as now known) only on the avian genus *Ara,* specimens having been taken by the author on four species of that genus of Macaws. The female is much larger than the male, with strongly developed sexual dimorphism of head, abdomen and abdominal chaetotaxy. The preantennal area in female much reduced and narrowed apically, while in the male this area is broad, with wide, flattened frons; preocular slit rudimentary; mandibles heavy and set at extreme front of head, and with a type of articulation unique in my experience (see enlarged figure).

Mandibular palpi very long, with three apical segments beyond margin of head; antennae also very large, with distal segment completely exposed.

Prothorax rather small, winged, with slight postero-lateral angles; pterothorax with very short mesothoracic area, sides straight and widely divergent, with posterior margin slightly convex in female, transverse in male. Abdomen elongated oval, pointed apically

in female and rounded in male, and much larger in female, with segments I to III, VIII and IX much wider than IV to VII (see fig.), with I to III almost bare of setae excepting on pleurites and posterior margin of tergites, while the remaining segments possess a bewildering assortment of long and short hairs, short bristles and heavy, peg-like spines.

In the male the abdominal segments are normal, of more or less equal length and with very different chaetotaxy, there being numerous spines along lateral margins, with one to two very long hairs in lateral angles and another just inside pleurites, but submarginal; there are five long hairs on posterior margin of tergites IV to VI, with but one on III and VII, all interspersed with closely set short setae, and many short, rather thick setae scattered over their face on II to VIII. The sternites possess a row of short setae along posterior margin and numerous short setae scattered over their faces. There are three well developed combs of spines on venter of hind femora and three on sternite III, the latter longer in the females and with a short fourth. The tergites are entire, the pleurites largely visible on ventral surface and slightly separated from the sternites.

Male genitalia of medium size, of type commonly found on the Menoponidae, with rather short, very slender basal plate (as in all of the Menoponidae of the parrots treated in this paper), short, straight paramers, a short, wide endomeral sac and a peculiarly shaped internal sclerite within sac.

I suspect that there will be criticism of some of the characters used for the separation of this genus, even to the extent of making it a synonym of *Psittacomenopon,* but this will not change my own views on the subject.

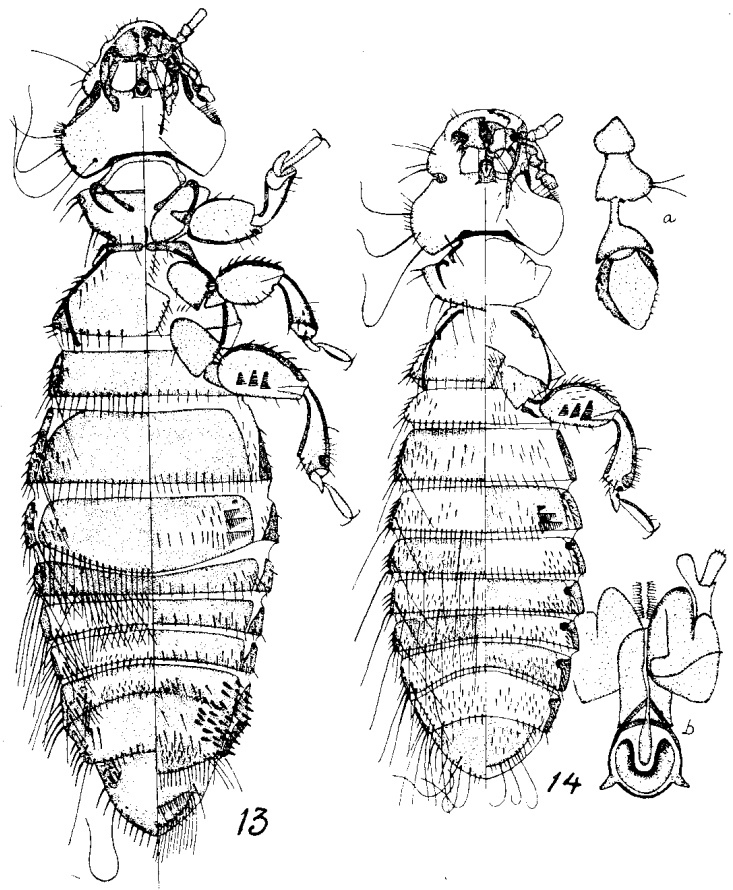
Epiara dimorpha, new species

(Figs. 13-16)

TYPES, male and female, from *Ara militaris militaris* (Linné), collected by the author on Cerro San Lorenzo, Magdalena, Colombia, Nov. 24, 1942 (in coll. of the author).

DIAGNOSIS — The characterization of the genus *Epiara,* as given above, together with the figures and table of measurements below, are ample for the recognition of this species without further lengthy description. Represented by the ♂ holotype, ♀ allotype, and 5 ♀ ♀ paratpes. In addition to this species, taken on *Ara militaris,* I have specimens of the genus from *Ara chloroptera, A. ararauna,*

and *A. ambigua*. Those from *ararauna* are extremely close to the present species, *dimorpha*, and may possibly be inseparable, but those from the other two hosts are distinct species, but with the same generic characters.

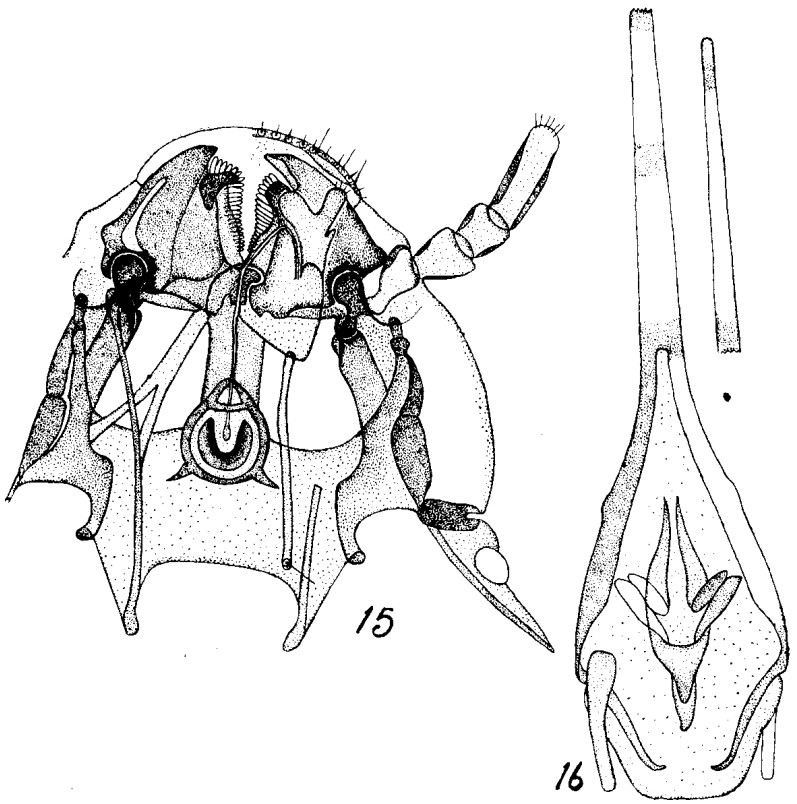


Epiara dimorpha
Fig. 13 - ♀ ; fig. 14 - ♂ .

MEASUREMENTS OF THE TYPES:

		length ♂	width ♂	length ♀	width ♀
Body	.....	1.75	—	2.14	—
Head	frons	—	.217	—	.185
	temples	.375	.41	.41	.435
	Occiput	.33	—	.358	—

Prothorax	.205	.35	.23	.37
Pterothorax	.205	.435	.25	.50
Abdomen	1.04	.53	1.30	.67
Antennae	.13	.04	.12	.023
Basal plate	.564	.026 to a point (shaft)		
Paramers	.082	.105		
Endomeral sac	.077	.115		



Epiara dimorpha

Fig. 15 - ♀, mandibles and associated structures; fig. 16 - ♂, genitalia.

Genus *Heterokodeia,* new genus

GENOTYPE — *Heterokodeia spinosa,* new species (Host: *Ara chloroptera* G. R. Gray).

DIAGNOSIS — Medium sized Menoponidae parasitic on certain species of Neotropical Psittacidae. Head with preantennal area short, frons ranging from flatly convex to rounded with a slight

medium point; sides of temples ranging from slightly convex to almost straight; head but little wider than prothorax, as long as or longer than wide; preocular slit entirely absent, the preocular notch ranging from prominent to obsolete, and occipital margin deeply concave. Mandibles heavy, sharply pointed and set close to frontal margin of head, with the two articulation widely separated but attached to a single wide bar running from frontal margin back to middle of head (see fig.).

Apical segment of mandibular palpi and of antennae elongated and parallel-sided and extending beyond margin of head; several long hairs along sides of temples, interspersed with short setae; line of setae along inner edge of antennary fossae short and sparse; no gular plate and the three hairs on each side of the gular area short.

Prothorax large, winged and circular from lateral angles backward. Pterothorax not much longer than prothorax but much wider, with strongly divergent, straight sides and posterior margin; meso and metanotum entirely absent.

Abdomen elongated oval in both sexes, in some species almost parallel-sided, with apical segment broad and flatly rounded in both sexes, more flattened in the females.

Tergites faintly, but uniformly colored and entire across abdomen; pleurites on ventral surface and sternites apparently entire, but sometimes narrowly separated from pleurites. Legs of medium size with many spines and short, thick bristles on femora and tibiae and with one strong spine at distal end of 2nd. and 3rd. tibiae.

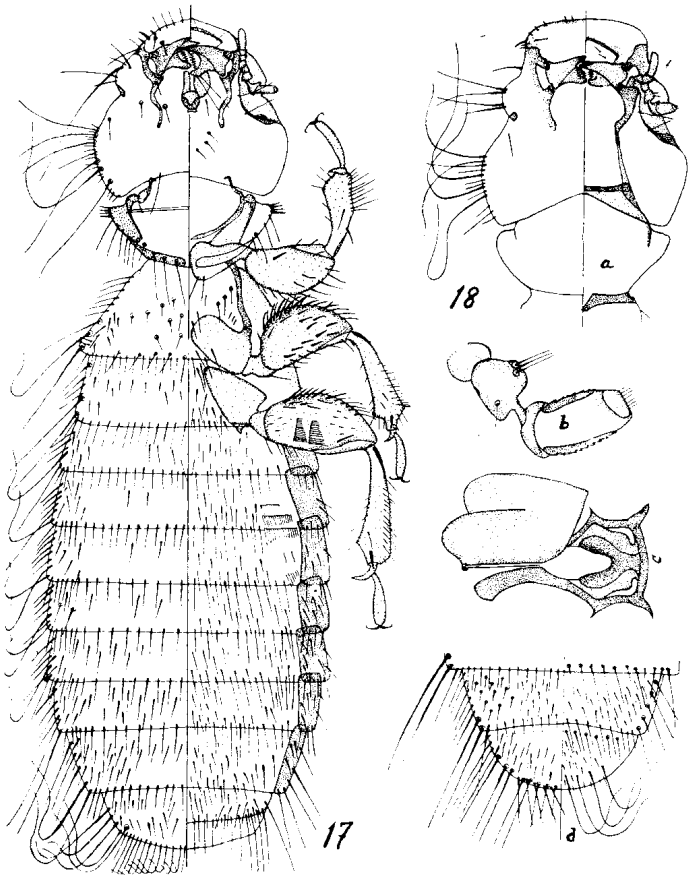
Two combs of spines on venter of hind femora and two or three on sternite III, with sometimes a small comb on IV. Numerous small, pustulated setae on dorsal surface of head, pterothorax and surface of pleurites; many thicker setae along lateral margin of thorax and abdomen, with one or two much longer hairs at posterior angles of pterothorax and abdominal segments; a single row of medium length setae (½ to 1/3 the width of segment) along posterior margin of tergites and sternites; shorter setae acattered irregularly over face of tergites, sparsely on tergites I to VI, more thickly on VII to IX; sternites sometimes with numerous short setae on their face (as in the genotype), but somentimes almost devoid of such setae (see *H. chiriri*).

The males are slightly l a r g e r than the females (very unusual) in the three known species of the genus. In the genotype there is a very strong sexual dimorphism in the shape of the head, but very little in the other two known species (see figs.).

Heterokodeia spinosa, new species

(Figs. 17-19)

TYPES, male and female adults, from *Ara chloroptera* G. R. Gray, collected by the author at La Pinta, Rio Juruan, Venezuela, March 28, 1910 (in coll. of author).



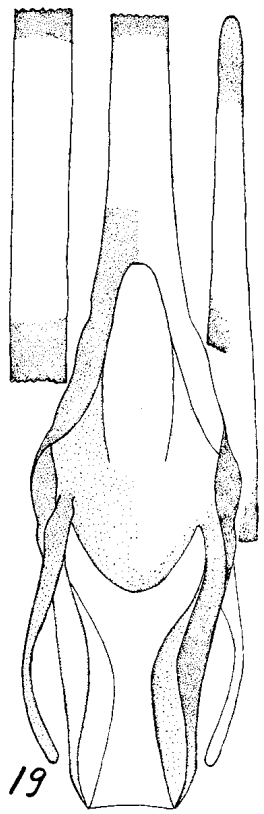
Heterokodeia spinosa

Fig. 17 - ♀ ; fig. 18 - head and prothorax ♂ (a) ; antenæ (b) ; pharyngeal sclerite and gland (c) ; tip of ♂ abdomen (d).

DIAGNOSIS — Entire body uniformly but faintly pigmented, with no hyaline areas; abdominal tergites entire across abdomen, with pleurites entirely ventral and with sternites apparently entire and closely fused with pleurites.

Head strongly dimorphic, the female having the frons narrow, somewhat flatly conical and with a slight median point, while in the

male it is wider and flatly convex, with preantennal area much longer, the distance between mandibles and frontal margin being twice as great in the male as in the female, while the mandibles in the male are smaller. In the male the head is as wide as long (.575), with frons .358, while in the female it is wider than long (.51 by .564), with frons .43. The pharyngeal glands lie between the main body of the sclerite and the mandibles, not over the mandibles, as in the other genera of this group (see fig.).



Heterokodeia spinosa

Fig. 19 - ♂, genitalia (less than ½ of basal plate shown).

The tibiae are somewhat pointed distally in this species, with a noticable angle on inner edge at widest point; there are "no marginal bands on the legs" and very few pigmented areas on the head or thorax, and the pleurites are not deeply colored.

The male sex is larger than the female in all measurements except the width of the abdomen (♂ abdomen, 1.54

by .79; ♀, 1.49 by .825). Except for the dimorphism of the head the sexes are very similiar in structure and chaetotaxy, even the apical segments of the abdomen are not strikingly different in shape or chaetotaxy (see figs.).

The generic characterization and the above description, together with the figures given, are ample for the recognition of this unusual species. It is represented by the ♂ holotype, ♀ allotype and 5 ♀ ♀ paratypes.

MEASUREMENTS OF THE TYPES:

	length ♂	width ♂	length ♀	width ♀
Body	2.55	—	2.46	—
Head: frons	—	.358	—	.434
Head: temples	.575	.575	.51	.564
Head: Occiput	.50	—	.456	—
Prothorax	.314	.495	.26	.475
Pterothorax	.325	.64	.29	.63
Abdomen	1.54	.79	1.49	.825
Antennae	.16	—	.14	—
Basal plate	.81	.033	to .015	(shaft)
Paramers	.163	.108		
Endomeral sac	.17	.119		

Heterokodeia chiriri, new species

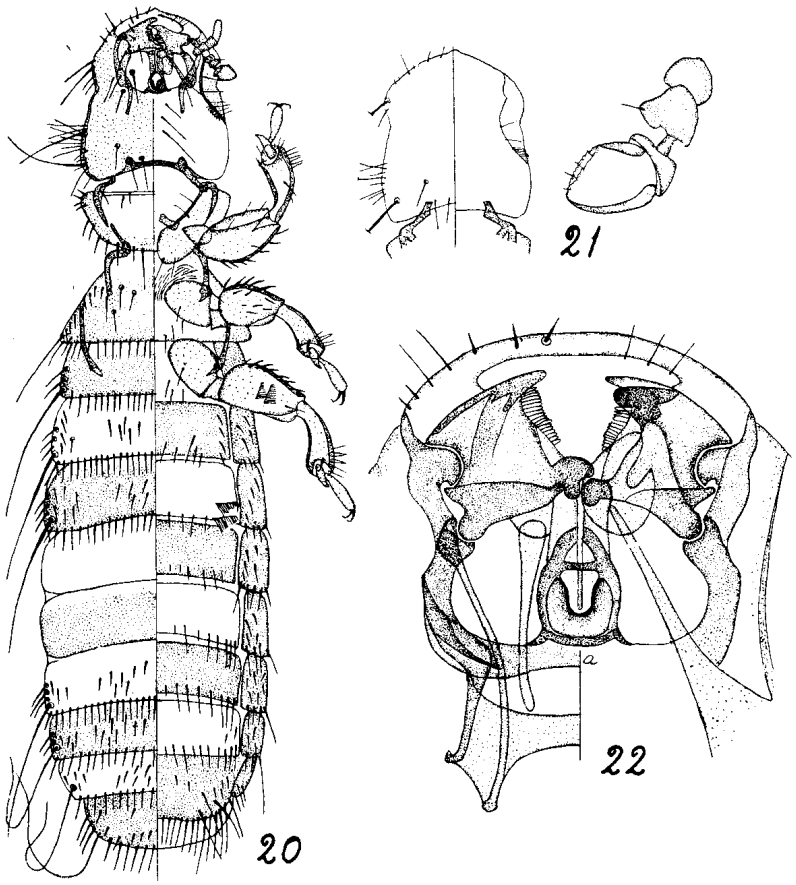
(Figs. 20-23)

TYPES, male and female adults, from *Brotogerys versicolorurus chiriri* (Vieillot), collected by the author at Chatarona, Rio Beni, Bolivia, Sept. 22, 1934 (in coll. of author).

DIAGNOSIS — Smaller than *H. spinosa,* with male larger than female, as in that species. The head is very differently shaped, the temples being but slightly convex laterally and head but very little wider than prothorax; the ocular emargination is very slight, with frons nearly as wide as temples so that the sides of the head are almost straight. The amount of sexual dimorphism in the head is very slight, the general shape being the same in both sexes, but in the male it is slightly wider, especially at the frons.

The apical segment of the antennae is much shorter than in *spinosa,* and of different shape (see fig.); mandibular condyles and manner of attachment similiar (see enlarged fig.). There are only two long hairs on the temples but numerous setae of medium length; fringe of setae on antennal fossae short, with only about 6 hairs of medium length and some very short, fine setae at posterior end.

The thorax is similar in shape to that of *spinosa,* but with fewer setae on dorsal surface of pterothorax and the fringe of setae along sides of that segments replaced by shorter, thicker, submarginal bristles on dorsal surface.



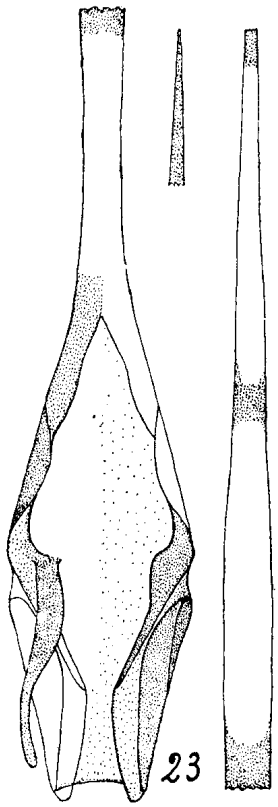
Heterokodeia chiriri

Fig. 20 - ♀ ; fig. 21 - ♂, head and antenna; fig. 22 - mandibles, pharyngeal glands and sclerite.

The abdomen is less oval in shape, more parallel-sided, but with shape of apical segments similar in the two sexes as in *spinosa* (see fig.). Structure of tergites and pleurites similar to those of spinosa, but they are more strongly pigmented; the sternites are entire but separated from the pleurites. The abdominal chaetotaxy differs considerably from *spinosa,* there being but 1 very long, submarginal hair in postero-lateral angle of tergites, and with fewer,

shorter and more spine-like setae on lateral margins; the setae along posterior margins of tergites are shorter, thicker, and more closely set; there are fewer scattered setae on dorsal surface (of tergites), and almost none on face of sternites, with the row along the margin more sparse; there are 2 long combs of spines on venter of 3rd femur and 3 on sternite III, with a small one on IV.

Legs short and stout, with deeply pigmented bands on both sides of tibiae and outer margin of femora, and with numerous setae



Heterokodeia chiriri
Fig. 23 - ♂, genitalia.

on tibiae and spines on outer margin of femora; the distal end of all tibiae are peculiarly shaped, being swollen, rounded and truncate, with the tarsi set in the centre (rather the trochanter). As stated above, there are few differences between the sexes, either in shape of head, abdomen or chaetotaxy, other than on abdominal segment IX.

The male genitalia is also of the same pattern as in *spinosa,* but smaller (see fig.). Represented by ♂ holotype, ♀ allotype, 4 ♂ ♂ and 5 ♀ ♀ paratypes.

MEASUREMENTS OF THE TYPES:

	length ♂	width ♂	length ♀	width ♀
Body	2.26	—	1.99	—
frons	—	.326	—	.303
Head temples	.40	.36	.39	.35
Occiput	.37	—	.36	—
Prothorax	.206	.35	.195	.326
Pterothorax	.23	.434	.217	.445
Abdomen	1.50	.54	1.21	.54
Antennae	.11	—	.10	—
Basal plate	.74	.026 to point		(shaft)
Paramers	.112	.08		
Endomeral sac	.112	.09		

Heterokodeia subsimilis, new species

(Figs. 24-25)

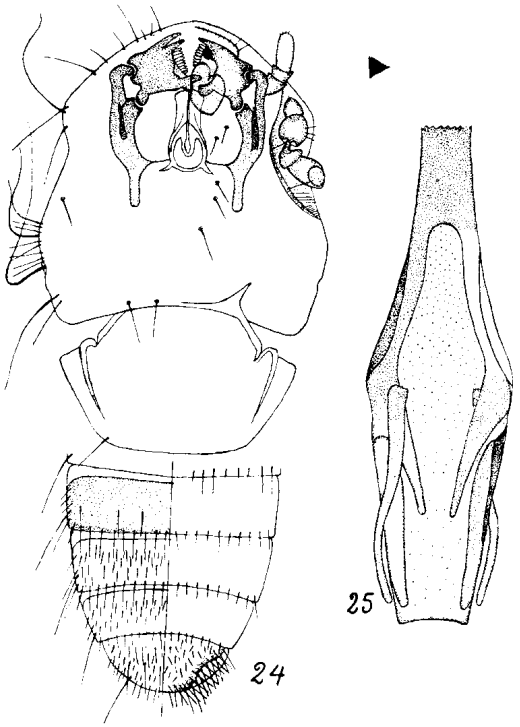
TYPES, male and female adults, from *Aratinga* l. *leucopthalmus* (P. L. S. Müller), collected by the author at Chatarona, Rio Beni, Bolivia, Sept. 20, 1934 (in coll. of author).

DIAGNOSIS — Very similiar to *H. chiriri* but differing in many small details. The total body length is the same; the head is longer at occiput in both sexes, but almost the same at temples; the frons is wider in the male (.35 againt .326), but same in female; head wider at temples in both sexes; the prothorax is smaller in the male, shorter in the female; pterothorax same in male and almost the same in female.

General outline of head similiar but temples slightly more convex. The general chaetotaxy seems to be similiar, although there is a rudimentary 3rd. comb on hind femora and 3rd. sternite; the setae along posterior margin of tergites are fewer in number and there are almost no short setae on face of tergites I to VI, but many more on VII to IX; pleurites are more faintly pigmented and difficult to differentiate.

The male genitalia has the basal plate shorter (.56 and .67 against .74); the paramers are shorter and endomeral sac longer. The genitalia of the type is extruded and distorted. The figure given was made from the single ♂ paratype.

Species represented by the ♂ holotype, ♀ allotype and 1 ♂ paratype.



Heterokodeia subsimilis

Fig. 24 - ♂, head and thorax enlarged twice usual scale; tip of abdomen usual scale; fig. 25 - ♂ genitalia.

MEASUREMENTS OF THE TYPES:

	length ♂	width ♂	length ♀	width ♀
Body	2.26	—	2.04	—
frons	—	.35	—	.303
Head temples	.412	.40	.40	.37
Occiput	.391	—	.385	—
Prothorax	.185	.326	.174	.325
Pterothorax	.24	.434	.217	.456
Abdomen	1.47	.586	1.33	.50
Antennae	.12	—	.108	—
Basal plate	.56	.026 to point		
Paramers	.07	.05		
Endomeral sac	.13	.06		

Genus *Heteromenopon,* new genus

GENOTYPE — *Heteromenopon sincipitalis,* new species. [(Host: *Ara ararauna* (Linné)].

DIAGNOSIS — Rather large Menoponidae with small, short head, nearly twice as wide as long; the pre-antennal margin bluntly conical, with sides either slightly concave or convex; temples rounded, short and expanded laterally, with occipital margin deeply concave.

Preocular slit present, but shallow; mandible small, set well forward, with condoyles small and normally placed. Pharyngeal sclerite more or less an inverted T, with glands very poorly developed (see fig.), as in *Menacanthus.* Palpi and antennae small, the latter completely concealed within the fossae; second segment of antennae with lateral swelling and two setae; apical segment small, rounded and with tip truncate.

Prothorax large, winged, uniformly circular behind lateral angles; pterothorax small, sides straight and divergent and posterior margin slightly convex, with mesothoracic area wide; metanotum large, with many short setae.

Abdomen elongated oval and of similar shape in both sexes, differing only in the structure of sternites VII to IX and their chaetotaxy (see fig.); tergites entire across abdomen but separated by wide hyaline areas in anterior portion of segments; pleurites small, dorsally placed and closely fused with tergites; sternites widely separated from pleurites, continuous across abdomen, faintly pigmented and slightly wider than tergites.

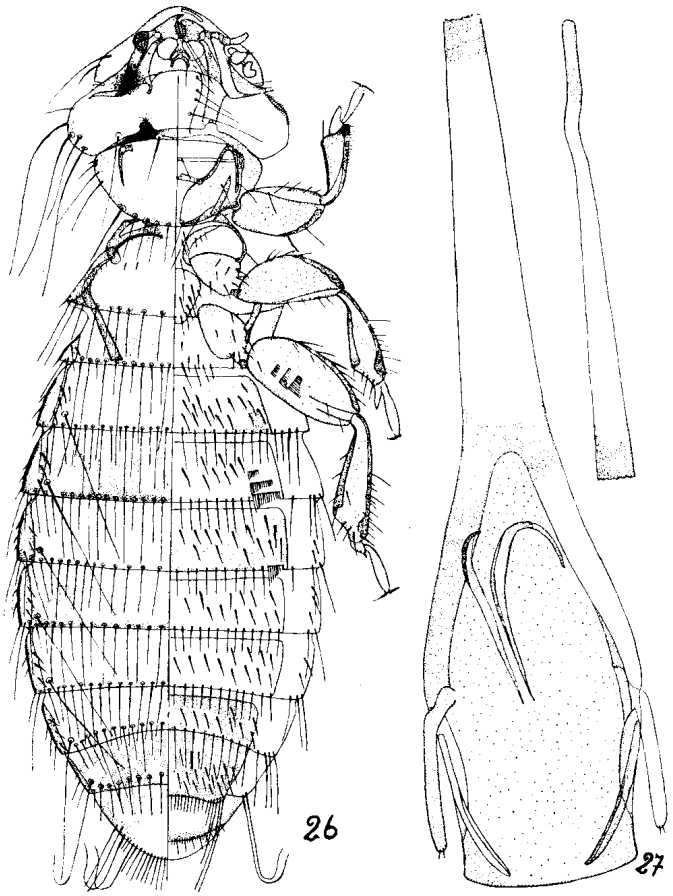
Legs rather short and stout, the femora and tibiae being about equal in length. Chaetotaxy normal, with fairly long, slender hairs on temples, posterior margin of tergites and lateral angles of abdomen, with those on posterior margin of sternites much shorter and more slender; short stout bristles scattered over face of sternites, or else a more or less uniformly spaced row across face of sternites; three well developed combs of spines on venter of hind femora and sternite III, with one comb on IV in some species.

Except for size of body and chaetotaxy of abdominal segments VIII and IX the sexes are practically identical. The male genitalia is very similiar in general structure to that of *Menacanthus,* with short, straight, slender paramers, large endomeral sac and long slender basal plate tapering to a slender point; the internal sclerite is very rudimentary in structure. I have specimens of this genus from 14 species of Neotropical parrots.

Heteromenopon sincipitalis, new species

(Figs. 26-29)

TYPES, male and female adults, from *Ara ararauna* (Linné), collected by the author at Todos Santos, Rio Chapáre, Bolivia, August 11, 1937 (in coll. of author).

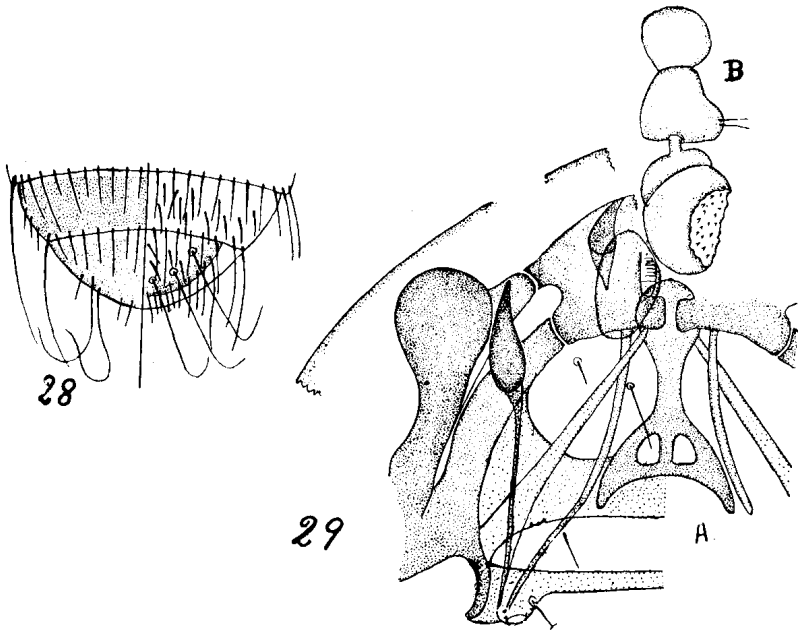


Heteromenopon sincipitalis

Fig. 26 - ♀ ; fig. 27 - ♂, genitalia.

DIAGNOSIS — This is one of the few species of the genus which has the preantennal portion of the head with sides slightly concave (usually they are convex); there is a heavily chitinized band extending from the base of the palpi backwards along inner edge of

antennary fossae which is dark brown at anterior end and pitchy black along edge of fossae inside the ocular slit; there is a pitchy-black spot at each side of the occiput, joined by a slightly paler band. The lateral bands of the thorax and the supporting struts of the coxae and leg margins are deeply pigmented (brown), while the body as a whole (including abdominal sclerites) is not deeply colored.



Heteromenopon sincipitalis

Fig. 28 - ♂, tip of abdomen; fig. 29 - Portion of mandibles and pharyngeal sclerite (a); antenna (b).

In addition to the three combs on sternite III there is a well developed comb on IV; the chaetotaxy may be clearly seen in the figure, an unusual feature being the single, long, pustulated, submarginally set hair on tergites II to VIII at inner edge of pleurites.

The articulation of the mandibles, the pharyngeal sclerite and glands and the complicated arrangement of struts and bands which support them, are shown in the enlarged figure. The male genitalia needs no additional explanation. The characterization of the genus, together with the above remarks, in connection with the figures presented are more than sufficient for the recognition of this species and the genus to which it belongs.

Species represented by ♂ holotype, ♀ alloytpe, 6 ♀ ♀ paratypes and 1 ♀ from another individual of the type host.

MEASUREMENTS OF THE TYPES:

		length ♂	width ♂	length ♀	width ♀
Body		2.00	—	2.46	—
Head	Occiput	—	.445	—	.477
	temples	.38	.57	.415	.62
	frons	.336	—	.38	—
Prothorax		.23	.423	.26	.49
Pterothorax		.26	.52	.26	.595
Abdomen		1.29	.766	1.58	.81
Antennae		.12	—	.12	—
Basal plate		.71	.036 to .015 (shaft)		
Paramers		.13	.143		
Endomeral sac		.18	.14		