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ISCHNOCERA (MALLOPHAGA) INFESTING PARROTS (PSITTACIFORMES) IV. GENUS *ECHINOPHILOPTERUS* EWING, 1927

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ABSTRACT

The species of Echinophilopterus, a genus of parrot lice, are revised; a new species found on a coraciiform is described. The genus is characterized and the following new species are described: emersoni (host Geoffroyus heteroclitus hyacinthinus), clayae (Prioniturus platurus), brygooi (Coracopsis vasa) and inexpectatus (Uratelornis chimaera, Brachypteraciidae, Coraciiformes). Lectotypes are elected for chapini Ewing, 1927, inko Uchida, 1948, protrusus (Piaget, 1871), assimilis (Piaget, 1880), forficuloides (Piaget, 1880), angustoclypeatus (Piaget, 1880) and buphthalmus (Piaget, 1885). The following synonymies are proposed: tanygnathi Ewing, 1927, dorotheae Eichler, 1943, tota Ansari, 1947, and inko Uchida, 1948, are considered synonyms of chapini Ewing, 1927; assimilis Piaget, 1880, of protrusus Piaget, 1871. The following species are considered unrecognizable: Docophorus aracarae Coinde, 1859; D. arcunotatus Neumann, 1891; D. chelorrhynchus Giebel, 1874; and D. gilvus Nitzsch, 1866. The most probable hosts are discussed for the following species: assimilis (Ectetus roratus); buphthalmus (Poicephalus sp.); dorotheae (Psittacula derbiana); forficuloides (Probosciger aterrimus); inko (Psittacula or Tanygnathus).

INTRODUCTION

Ewing established the genus *Echinophilopterus* in 1927 for those parrot-infesting "Philopteri" that have the abdomen studded below with short stout spines. Besides the two new species then described, he suggested that some species of Piaget's "forficulatus" group should be included in the new genus. *E. chapini*, described in the same paper, was selected as type species of the genus. In 1941, Conci erected the genus *Forficuloides* to include the same group of species, but with *Docophorus forficula* Piaget, 1871, as the type species. In the following year Conci (1942) synonymized his genus with *Echinophilopterus*, since the two had been created for the same ensemble of species. However, studying the species included by Hopkins & Clay (1952) in the genus *Echinophilopterus*, Guimarães (1974) concluded that *forficula*, type species of *Forficuloecus*, deserved to be included in a separate taxon, thus validating Conci's genus.

Besides the persons and institutions whose help was acknowledged in my 1974 paper, I thank Prof. Dr. W. Eichler (Museum für Naturkunde an der Humboldt-Universität, Berlin, DDR) for the loan of the type specimen of *Echinophilopterus dorotheae*; Dr. Shun-Ichi Ueno and Prof. Dr. Yoshihiro Hirashima (National Science Museum, Natural History, Tokyo, and Kyushu University, Fukuoka, Japan) for locating Dr. Uchida's materials and for the loan of syntypes

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of *Echinophlopterus inko*; Prof. Dr. R. L. C. Pilgrim (University of Canterbury, Christchurch, New Zealand) for loan of specimens; and Dr. E. R. Brygoo (Muséum National d'Histoire Naturelle, Paris) for clearing up questions about host species of Mallophaga collected by himself in Madagascar. Dr. P. E. Vanzolini kindly translated the Portuguese manuscript.

The names of parrots are based on Forshaw (1973).

Echinophlopterus Ewing, 1927

Echinophlopterus Ewing, 1927: 92; Conci, 1942: 40; Guimarães, 1974: 125 (key).

Philopteroid species. Front part of head forceps-like, with branches formed by the hyaline margin, dorsally supported by the fore end of pre-marginal carina and ventrally by the fused ventral and marginal carinae; anterior dorsal plate always present, with distinct margins, pointed or slightly rounded behind. Gular plate well developed. Transverse carina and postantennal suture present; temporal carinae present, never fused with the transverse carina. *Coni* well developed, with distal end rounded or rather pointed, horizontal or very slightly turned backwards. Setae of the temporal margin: o.s. short; m.t.s.1 short and on the eye, m.t.s.2 and m.t.s.4 long or median sized, m.t.s.3, 5 and 6 short. Antennae similar in both sexes.

Prothorax broader than long, with one seta on each latero-posterior corner.

Pterothorax broader than long, with divergent lateral margins, with one spiniform and one sensory setae; posterior margin with three, some time four and even six setae on each side; two and sometimes three others on each latero-posterior corner. Two pairs of sternal setae.

Abdomen with tergites I to VII widely interrupted on the mid-dorsum; tergite VIII entire in the female, entire or interrupted in the male. Sternal plates of the female reduced to a pair of small, little sclerotized plates, laterally placed; in the male, besides sternal plates, similar to those of the female, there are, in the more sclerotized individuals, plates, not always quite conspicuous, crossing transversely the posterior sternites, as shown in the figure. One group of at least three tergo-central setae always present on each side of segments I to VII; tergo-lateral setae, one on each side, present on segments III to VI or VII; the setae of the latero-posterior corners may be present from the second or third segment back. Ventral surface of abdomen with or without spiniform setae on the three anterior segments.

Female always with a pair of plates behind the vulva, variable in shape and size; also with a group of stout setae, varying in size, placed behind and laterally to each plate. Vulva and genital region variable.

Male genital opening always dorsal. Male genitalia rather simple; the parameres may be short (showing a double curvature, first sharply inwards and then outwards) or a little longer (with a less sharp bend), or still long, straight or slightly turned inwards. Mesosome always with two complex structures: the penian and the endomeral complexes. The first is funnel-shaped, showing one pair of short setae on each side; the endomeral complex appears on each side of the penian complex as a plate with a rounded margin, with one pair of small setae. Although these structures are quite uniform throughout the genus, there is some variation in detail.

Type species: *Echinophlopterus chapini* Ewing, 1927.

The generic characters above are based on the study of specimens collected on the following host species, subfamilies Psittacinae and Kakatoecinae: *Polytelis*

swainsonii, *Polytelis anthopeplus*, *Eclectus roratus roratus*, *Eclectus roratus pectoralis* (= *polychloros*), *Eclectus roratus (goodsoni)*, *Eclectus* sp., *Tanygnathus m. muelleri* (= *s. sumatranus*), *Tanygnathus megalorhynchos*, *Tanygnathus megalorhynchos djampeae*, *Tanygnathus megalorhynchos sumbensis*, *Tanygnathus lucionensis talautensis*, *Psittacula derbiana*, *Psittacula alexandri fasciata*, *Psittacula krameri borealis*, *Psittacula krameri manillensis*, *Psittacula eupatria eupatria*, *Psittacula eupatria nipalensis*, *Psittacula eupatria (siamensis)*, *Psittacula himalayana himalayana*, *Psittacula himalayana finschii*, *Psittacula cyanocephala*, *Coracopsis nigra nigra*, *Coracopsis vasa* subsp., *Psittacus erythacus erythacus*, *Poicephalus gullelmi massaicus*, *Poicephalus meyeri (neavei)*, *Poicephalus meyeri* subsp., *Poicephalus rufiventris* subsp., *Geoffroyus geoffroyi jobiensis*, *Geoffroyus geoffroyi aruensis*, *Geoffroyus heteroclitus hyacinthinus*, *Geoffroyus simplex*, *Prioniturus platurus platurus*, *Prioniturus montanus waterstradii*, *Prioniturus montanus malindangensis*, *Probosciger aterrimus goliath* and *Probosciger aterrimus stenolophus*.

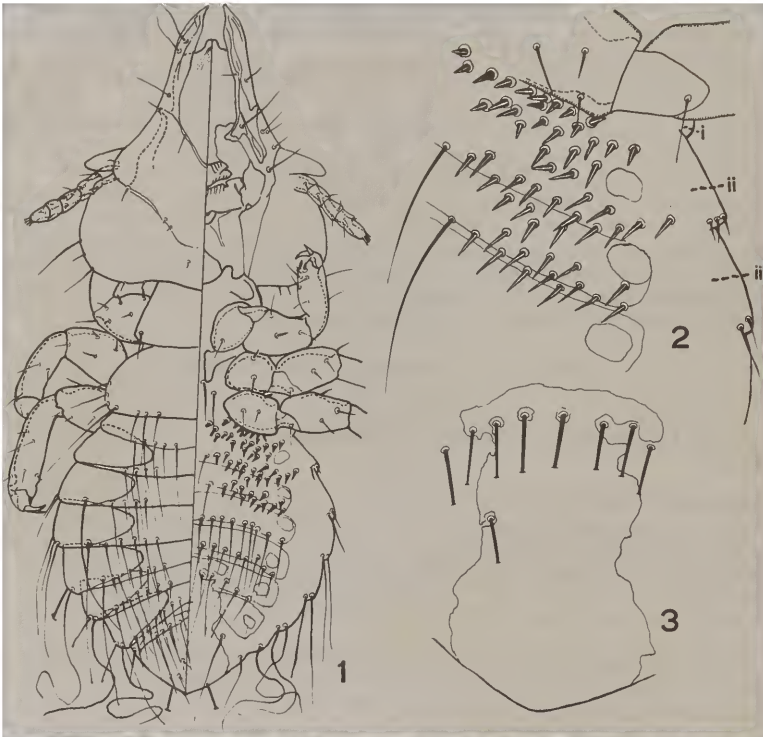
***Echinophilopterus chapini* Ewing, 1927**

(Figs. 1-5, 15, 16)

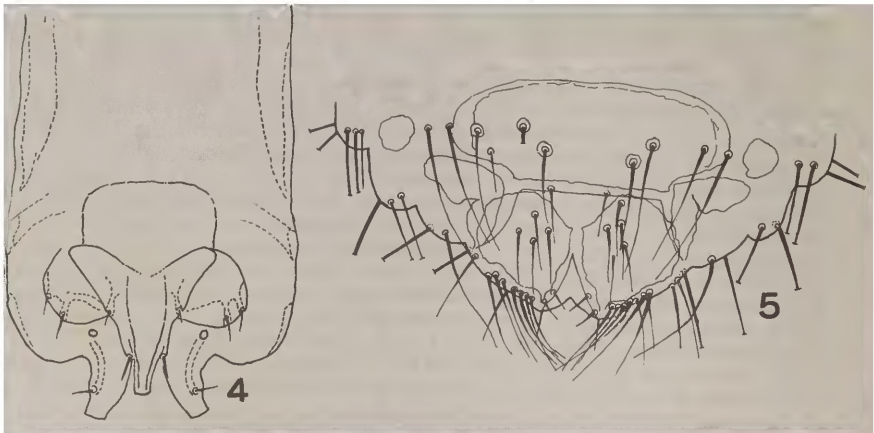
Type host *Tanygnathus m. muelleri* (S. Mueller) = *Tanygnathus s. sumatranus* (Raffles).

Echinophilopterus chapini Ewing, 1927: 93; Conci, 1942: 40; Hopkins & Clay, 1952: 128. *Echinophilopterus tanygnathi* Ewing, 1927: 93; Conci, 1942: 40; Hopkins & Clay, 1952: 128. Type host *Tanygnathus burbridgei* (sic) = *T. sumatranus burbridgei* Sharpe, *syn. N.* *Echinophilopterus dorotheae* Eichler, 1943: 113; Hopkins & Clay, 1952: 128. *syn. N.* *Echinophilopterus tota* Ansari, 1947: 263; Hopkins & Clay, 1952: 128. *syn. N.* *Echinophilopterus inko* Uchida, 1948: 314; Hopkins & Clay, 1952: 128. *syn. N.*

This is the type species of the genus, described on two males and two females taken from skins of "*Tanygnathus muelleri*" collected in the Celebes. I have examined these syntypes and, additionally, the type specimen of *Echinophilopterus dorotheae* and the syntypes of *E. inko* (7 males, 4 females, 1 specimen without the abdomen and 1 immature). I saw, furthermore: (i) 14 males, 18 females and 3 immatures, on the type host species, from the Celebes (zoo specimens), Meinertzhagen Collection 13323 (British Museum); (ii) 2 males on *Tanygnathus megalorhynchos megalorhynchos*, from Waigeu, Meinertzhagen Collection 10913 (British Museum); (iii) 2 males and 3 females collected on *Tanygnathus megalorhynchos sumbensis*, from Sumba, Meinertzhagen Collection 10912 (British Museum); (iv) 1 male, 1 female, on *Tanygnathus megalorhynchos djampae* from Kalao, Meinertzhagen Collection 10914 (British Museum); (v) 4 males and 13 females on *Tanygnathus lucionensis talautensis* from Puerto Princesa, Palawan Is., Philippines, F. G. Werner coll. (field number 2422) and Hoogstraal-Werner coll. (field numbers 2423-2424) (Field Museum of Natural History); (vi) 2 males and 3 females, on *Tanygnathus lucionensis talautensis*, Palawan Is., Philippines, 3/9/1947 (K. C. Emerson Collection); (vii) 1 male and 1 female, on *Tanygnathus lucionensis talautensis* from Brooks Point, Palawan Is., Philippines, Max Thompson coll. 2/IV/1932 (K. C. Emerson Collection); (viii) 1 male and 4 females, on *Psittacula h. himalayana* (Lesson), from Kamu (1450 m), Nuristan, Afghanistan, Klockenhoff, 16/VII/1963 (British Museum 1966-272); (ix) 2 males on *Psittacula himalayana finschii* (Hume) from Phu Lom Lo Mt., Ban Maeo, Kok Sathon, Dan Sai, Loei, Thailand, R. E. Elbel 29/III/1954 (K. C. Emerson Collection); (x) 1 female, on the same host, from Pang Nam Un, Bun Yun, Nan, Thailand, R. Elbel & H. G. Deigman 18/I/1953 (K. C. Emerson Collection); (xi) 1 male, on *Psittacula krameri borealis* (Neumann) from Oating, Assam, 4/II/1952, Meinertzhagen Collection 19911 (British Museum); (xii) 8 males, 5 females and 1 immature, on the

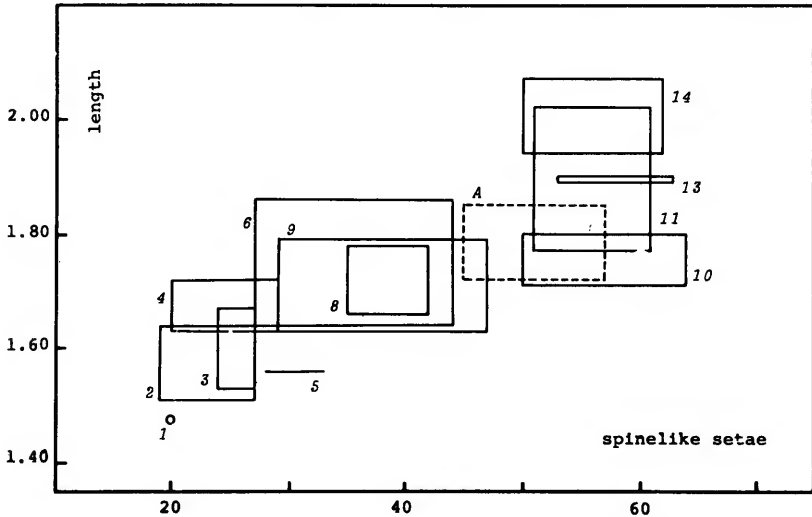


Figs. 1-3. *Echinophilopterus chapini*. 1, lectotype, male. 2, spiniform setae of the three anterior abdominal sternites, lectotype. 3, genital plate, lectotype.



Figs. 4-5. *Echinophilopterus chapini*. 4, male genitalia. 5, genital area of the female.

same host, from Nepal, Meinertzhagen Collection 9405-9406 (British Museum); (xiii) 2 males and 5 females, on *Psittacula krameri manillensis* (Bechstein) from Bombay, India, February 1937, Meinertzhagen Collection 8469-8470 (British Museum); (xiv) 7 males and 6 females on the same host species, from Deccan, India, February 1937, Meinertzhagen Collection 8544-8569 (British Museum); (xv) 13 males and 7 females, on *Psittacula eupatria nipalensis* (Hodgson), from Nepal, March 1937, Meinertzhagen Collection 9397-9364 (British Museum); (xvi) 1 female, on *Psittacula e. eupatria* (L.) from Ceylon, March 1935, Meinertzhagen Collection 3490 (British Museum); (xvii) 8 males and 8 females, on *Psittacula eupatria [siamensis]* (Kloss) from Khlong Khlung, Kamphaeng Phet, Thailand, R. E. Elbel & H. G. Deigman, 30 April, 1953 (K. C. Emerson Collection); (xviii) 1 male, on the same host species, from Ban Non, Ban Kaeng, Chaiyaphum, Phu Khieo, Thailand, R. E. Elbel, 16 December, 1952 (K. C. Emerson Collection); (xix) 5 males and 11 females, on a captive *Psittacula derbiana* (Fraser), R.S. Balter (British Museum 1969-101); (xx) 1 male and 3 females, on *Psittacula alexandri fasciata* from Myitkyina, 12 mi E, Upper Burma, H.S. Fuller 21/I/1945 (British Museum 161); (xxi) 4 males and 3 females, on the same host species, from Hin Laem, Tha Kanun, Khanchanaburi, Thailand, R.E. Elbel & H.G. Deigman 19/XI/1952 (K.C. Emerson Collection); (xxii) 2 males and 10 females, on the same host, from Pang Nan Un, Ban Yun, Nan, Thailand, R.E



Graph 1. Total body length against number of spinelike setae, Ischnocera from parrots, males arranged per host species. Each rectangle represents the ranges of both variates. Both sides of the body separately considered.

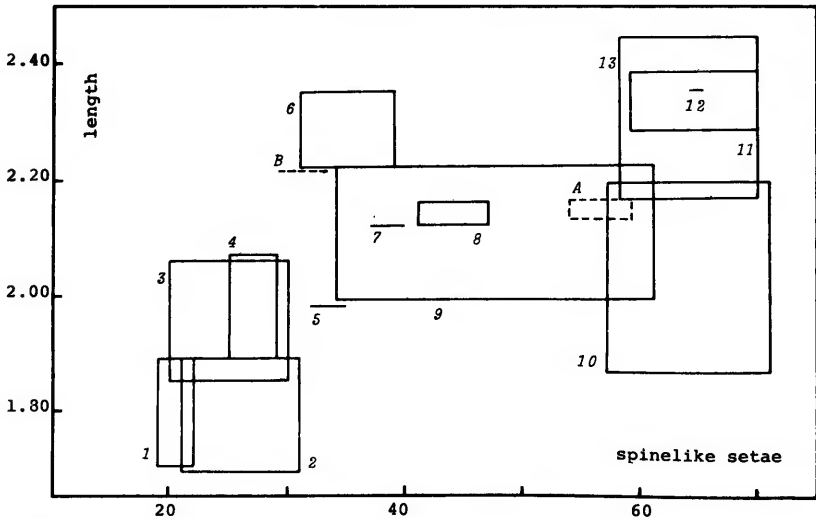
1, *Psittacula h. himalayana* (1 specimen - one side). 2, *P. krameri borealis* (3). 3 *P. krameri manillensis* (2). 4, *P. eupatria nipalensis* (3). 5, *P. himalayana finschii* (2). 6, *P. derbiana* (5). 8, *P. eupatria siamensis* (3). 9, *P. alexandri fasciata* (9). 10, *Tanygnathus m. muelleri* (=s. *sumatranus*) (5). 11, *T. lucionensis talautensis* (4). 13, *T. megalorhynchos sumbensis* (2). 14, *T. m. megalorhynchos* (2). No known host: A, *Echinophlopterus inko* (3).

Elbel & H.G. Deigman 18-20/I/1953 (K.C. Emerson Collection); (xxiii) 1 female, on the same host, from Chiang Saeh Kao, Chiang Rai, Thailand, R.E. Elbel & H.G. Deigman (K.C. Emerson Collection); (xxiv) 2 males and 2 females, on the same host, from Si Than, Wang Saphung, Loei, Thailand, R.E. Elbel & B. Lekagul (K.C. Emerson Collection); (xxv) 3 females, on the same host, from Ban Nong Wai, Na Phung, Dan Sai, Loei, Thailand, R.E. Elbel 18/XI/1954 (K.C. Emerson Collection); (xxvi) 1 male and 1 female, on the same host, from Muankluang, Kapoe, Ranong, Thailand, Wanit Songprakob 22/XII/1962 (K.C. Emerson Collection); (xxvii) 3 males and 3 females, on the same host, from the same locality, 4/I/1963 (K.C. Emerson Collection).

I may have made mistakes in copying from the labels the names of the individual Thai localities, but the province names have been checked against Taylor & Elbel's (1958) map.

Ewing's four syntypes are mounted on a single slide labelled as "type" (Cat. n° 40139). I select as lectotype the male on the upper left corner, on which figs. 1, 2, 3 were based.

The type of *E. tanygnathi*, described by Ewing in the same paper, was collected on a skin on *Tanygnathus burbridgei* (*sic*) from Mt. Bud Dajo, Sulu Island, Philippine Islands. Its description was based on a single female, Cat. n° 40140. Ewing says that it differs from *chapini* "in having longer central process on anterior end of signature of clypeus, in having shorter and differently shaped



Graph 2. Total body length against number of spinelike setae, Ischnocera from parrots, females arranged per host species. Each rectangle represents the ranges of both variates. Both sides of the body separately considered.

1, *Psittacula h. himalayana* (3 specimens). 2, *P. krameri borealis* (2). 3, *P. krameri manillensis* (4). 4, *P. eupatria nipalensis* (1). 5, *P. himalayana finschii* (1). 6, *P. derbiana* (6). 7, *P. e. eupatria* (1). 8, *P. eupatria siamensis* (3). 9, *P. alexandri fasciata* (9). 10, *Tanygnathus m. muelleri* (=s. *sumatranus*) (4). 11, *T. lucionensis talautensis* (4). 12, *T. megalorhynchos djampae* (1). 13, *T. megalorhynchos sumbensis* (2). No known host: A, *Echinophlopterus inko* (2). B, *Echinophlopterus dorotheae* (1).

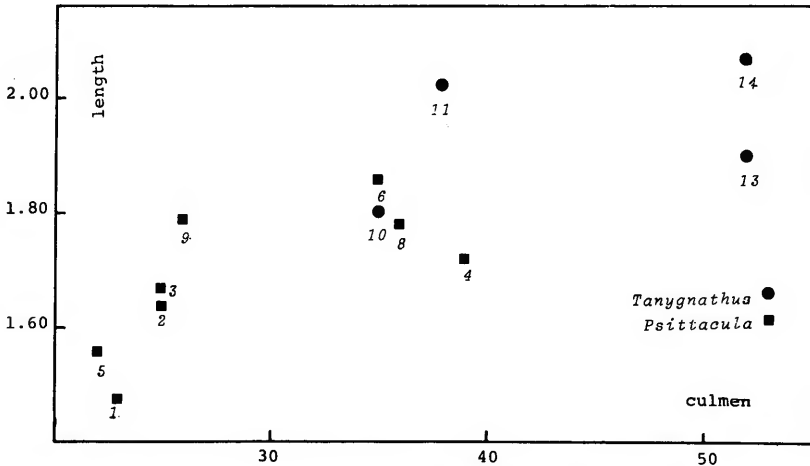
trabeculae and in some minor characters". Dr. T. Clay, who examined the types of the two species, advised me that *E. tanygnathi* is, most probably, a synonym of *E. chapini*. This view is strengthened by the fact that I could not find any differences between *Echinophlopterus chapini* and the specimens of *Echinophlopterus* found on any of the species of *Tanygnathus* and *Psittacula* listed above.

The type specimen of *E. dorotheae* is mounted on a small slide (47 x 28 mm), on which are written, with China ink, the name of species, the sex and the number 221a. Although the type specimen, a female, was collected on a skin of *Urocissa erythrorhyncha* (a bird belonging to the Corvidae), all circumstances recorded by Eichler lead to the conclusion that the true host species of *E. dorotheae* is *Psittacula derbiana*, as mentioned by Hopkins & Clay, 1952.

Echinophlopterus tota Ansari, 1947, was based on two females collected on a specimen of *Psittacula krameri manillensis* shot at Lyallpur, West Pakistan. Hopkins & Clay (1952) cite as host *P. k. borealis*, the subspecies of *krameri* found in Pakistan – *manillensis* occurring in Ceylon, the Rameswaran Is. and the Indian subcontinent south of 20°N. Unfortunately I had no access to the syntypes.

I received the syntypes of *inko*, collected on a captive parrot, in alcohol. A male lectotype has been selected and mounted; three more couples were also mounted on slides. Four mounted specimens (the lectotype, one further male and two females) and six alcoholic specimens (3 males, one female, one headless specimen and one immature) were returned to the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan. Two males and one female are deposited in this Museum's collection.

It is probable that Uchida's specimens had been previously kept in some preservative other than alcohol, because it was very difficult to mount them: the contents of the gut were not dissolved even when left in potash for a long time.



Graph 3. Length of largest parasite against largest culmen length of host (*Psittacula* and *Tanygnathus*). Males. 1, *Psittacula h. himalayana*. 2, *P. krameri borealis*. 3, *P. krameri manillensis*. 4, *P. eupatria nipalensis*. 5, *P. himalayana finschii*. 6, *P. derbiana*, 8, *P. eupatria siamensis*. 9, *P. alexandri fasciata*. 10, *Tanygnathus m. muelleri* (=s. *sumatranus*). 11, *T. lucionensis talautensis*. 13, *T. megalorhynchos sumbensis*. 14, *T. m. megalorhynchos*.

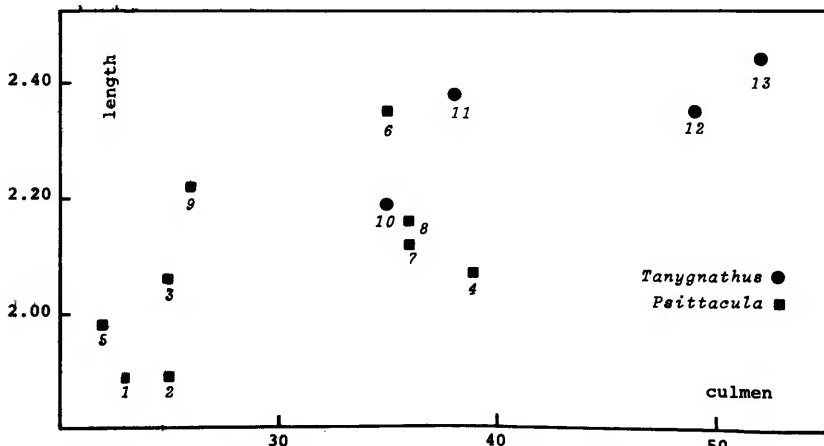
As said, I was not able to find any differences between the type specimens of *E. chapini* and the *Echinophilopterus* collected on the parrots above mentioned. It is true that the materials are not always adequate for a conclusive comparison, but even in the best of conditions the variability in general shape, chaetotaxy, shape of plates and genital apparatus did not afford grounds on which to identify individual taxa.

It was not always possible to count exactly the spinelike setae, because some of the mounts were not favorable, or, more frequently, because remains of food in the gut obscured the view. Thus in some cases (e. g. the only male from *Psittacula h. himalayana*), the counts are only approximate.

I was at first inclined to consider the lice from *Psittacula h. himalayana* and from *Tanygnathus megalorhynchos sumbensis* as different taxa from *E. chapini*, given the body length (1.48-1.90 mm in males, 1.89-2.44 mm in females) and the number of spiniform setae (respectively 20-63 and 22-70).

Plotting the body length against the number of setae (each side of the body taken individually) (Graphs 1 and 2), it is to be seen that, in the case of the males (Graph 1), a clear relationship exists between the two variables, and that there are no breaks that would characterize individual taxa. In the case of the females (Graph 2) there is one discrepancy in the relationship: the lice from *Psittacula derbiana* have too few setae for their body length. This discrepancy is not enough, however, to characterize a separate taxon.

Having noticed that the *Echinophilopterus* from *Tanygnathus* are in general larger than those of *Psittacula*, and believing (on account of their body shape) that they inhabit the head and neck of the host, I plotted the length of the largest louse against the largest length of the culmen of the host (taken from Forshaw, 1973) — the latter measurement being an estimate of head size. I also tried, as usual, wing length, as an estimate of birds size; the results are about the same.



Graph 4. Length of largest parasite against largest culmen length of host (*Psittacula* and *Tanygnathus*). Females. 1, *Psittacula h. himalayana*. 2, *P. krameri borealis*. 3, *P. krameri manillensis*. 4, *P. eupatria nipalensis*. 5, *P. himalayana finschii*. 6, *P. derbiana*. 7, *P. e. eupatria*. 8, *P. eupatria siamensis*. 9, *P. alexandri fasciata*. 10, *Tanygnathus m. muelleri* (=s. *sumatranus*). 11, *T. lucionensis talautensis*. 12, *T. megalorhynchos djampae*. 13, *T. megalorhynchos sumbensis*.

Graphs 3 and 4 indicate that the two variables are indeed correlated. There is one discrepancy among the males (*Tanygnathus lucionensis talautensis*) and one among the females (*Psittacula derbiana*).

Graphs 1-2 also indicate that, while the type host of *E. inko* may be either a *Psittacula* or a *Tanygnathus*, that of *E. dorotheae* must be *Psittacula derbiana*. The discrepancy found in the females of the latter might be thought to justify the validation of *E. dorotheae*, but the males are so close to those from *Tanygnathus s. sumatranus* (host of *E. chapini*) that the recognition of the taxon seems unwarranted.

The parameres of *E. chapini* are short, strongly turned inward, and then bent backward and slightly outward; the mesosome is composed of two pieces: a median one, conical, has the apex turned back; the other appears as two wings with rounded margins, one on either side of the anterior half of the conical piece. Each of those pieces has two pairs of small setae on each side.

The female genitalia show a genital plate slightly darker than the tegument, 2.6 times broader than long, with rounded lateral margins; 4-5 setae on each side; vulva with the anterior and lateral margins roughly trapezoidal; subgenital plates rounded, with 5-6 scattered setae on each.

The measurements of the types are given on Table I.

TABLE 1. Measurements (length and width) of *E. chapini*

	lectotype		male		female		female	
	l	w	l	w	l	w	l	w
total	1.71	-	1.71	-	1.86	-	2.13	-
head	.68	.66	.71	.68	.72	.68	.75	.72
prothorax	.18	.37	.20	.38	.20	.38	.20	.40
pterothorax	.19	.51	.20	.53	.21	.53	.22	.55
abdomen	.69	.74	.64	.77	.77	.86	.99	.91

***Echinophlopterus protrusus* (Piaget, 1871)**

(Figs. 6-9)

Type host *Eclectus r. roratus* (P. L. S. Müller)

Docophorus protrusus Piaget, 1871: 119, pl. 6, fig. 4; Piaget, 1880: 33, pl. II, figs. 2, 2^a, 4; Neumann, 1891: 84; Kellogg, 1908: 18.

Docophorus assimilis Piaget, 1880: 35, pl. II, figs. 6, 8; Kellogg, 1908: 10. *syn. N.*

Phlopterus protrusus; Harrison, 1916: 102.

Phlopterus assimilis; Harrison, 1916: 88.

Echinophlopterus protrusus; Conci, 1942: 44; Hopkins & Clay, 1952: 128.

Echinophlopterus assimilis; Conci, 1942: 40; Hopkins & Clay, 1952: 127.

I select as lectotype of this species one male mounted on slide 618 of the Piaget Collection in the British Museum. The slide contains also an immature. Both specimens were collected on *Eclectus puniceus* (now *E. r. roratus*). There is

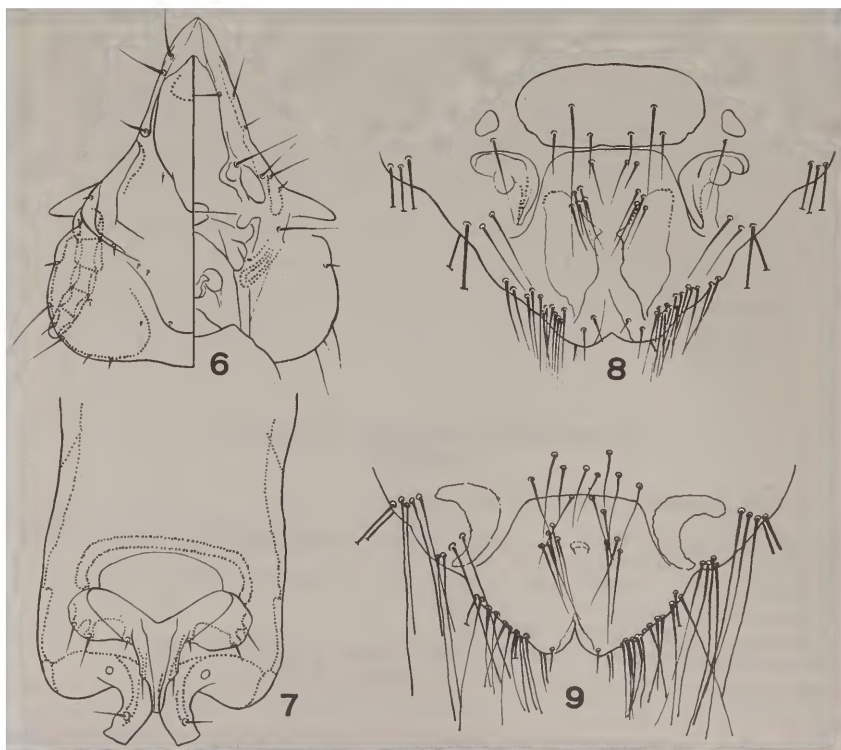
in the same collection another slide, number 619, with 2 specimens, one immature and one teneral male, collected on *E. sinensis* (now *E. roratus pectoralis*).

I have also examined 12 males, 12 females and 7 immatures collected on *E. roratus pectoralis*; they are numbers 13387 and 13467 of the Meinertzhagen Collection, in the British Museum.

An additional couple, also in the British Museum, collected on *E. roratus*, probably subspecies *goodsoni*, from Valoka, Cape Hoskins, New Britain, is referred to the species with much doubt.

In the original description (1871) Piaget does not refer the presence of spiniform setae on the ventral aspect of the abdomen, and says that the abdominal segments do not present series of long setae on the dorsal surface — which is confirmed by the illustration. In 1880, however, he described short and stout spines (spiniform setae) on the ventral surface of the three anterior abdominal segments, and only 2-2 setae per segment on the dorsal aspect.

The only fully developed male identified by Piaget as *protrusus* that I have been able to see has 55-54 spiniform setae on the ventral aspect of the abdomen, and a larger number of setae on the tergites: I 13; II 4-4; III 4-3; IV 5-4; V 5-7; VI 7-9; VII 7-8. As in all species of *Echinophilopterus* there is a naked area in the middle of the row; on tergite I this area is very small.



Figs. 6-9. *Echinophilopterus protrusus*. 6, head of male. 7, male genitalia. 8, genital area of the female. 9, genital area of the female lectotype of *Docophorus assimilis*.

I place *assimilis* in the synonymy of *protrusus* with some doubt. The former was described from *Paradiseus viridis* (now *P. chaliboea*) but Piaget (1880: 35) remarks: "comme cet oiseau habitait une cage voisine de celle d'un Cacatou qui était infesté, je soupçonne que j'ai eu devant moi déserteurs de ce dernier".

It is very strange that Piaget, having at hand an infested parrot, which he guessed should be the source of the lice found on the *Paradiseus*, still considered the latter as the type host of the new species, and did not describe any specimens from the cockatoo. Anyway, it is safe to say that neither bird is the true host of *assimilis*. *Paradiseus* is an oscine passeriform, not known to carry *Echinophlopterus*. As to the cockatoo, only one *Echinophlopterus*, *E. forficuloides*, is known from the whole cacatuine group, in spite of the fact that their characteristic lice belong to a related genus.

Piaget also mentions and figures 3 setae and some spines on the temporal margin of *assimilis*. No *Echinophlopterus* (including the specimen in the Piaget collection identified as *assimilis*) has 3 setae on the temporal margin; all forms have only two median long setae, m.t.s.2 and m.t.s.4.

Piaget's figure and his remarks on the resemblances between *assimilis* and *protrusus* make it clear that the former is a species of *Echinophlopterus* as presently understood.

The only extant specimen identified by Piaget as *assimilis* is a female, whose sclerotized parts are completely faded; however what can be discerned of its genitalia is identical to that of *protrusus*. The only differences to be found in Piaget's description are in the number of setae in the rows on the dorsal aspect of the abdomen (2-4 per segment in *protrusus*, 12-14 in *assimilis*) and the spacing on the midline.

An examination of female *assimilis* and male *protrusus* in the Piaget collection reveals variability of the number of setae on each side of the midline. In the female we have I 15; II 6-7; III 5-6; IV 8-6; V 8-6; VI 5-6; VII 5-5. In the male lectotype, respectively 13, 4-4, 4-3, 5-4, 5-7, 7-9 and 7-8. In a *protrusus* female chosen randomly from the Meinertzhagen collection, the number of setae is 15, 5-4, 6-6, 6-5, 7-6, 6-5, 5-6.

The total number of spiniform setae also varies between the two sides of the abdomen. In *assimilis* it is 60-62; in 5 females of *protrusus* 65-57, 59-56, 57-58, 62-50 and 66-64.

TABLE 2. Measurements (length and width) of *E. protrusus*

	lectotype <i>protrusus</i>		lectotype <i>assimilis</i>		male		female	
	l	w	l	w	l	w	l	w
total	2.01	-	2.14	-	1.91	-	2.35	-
head	.77	.75	.80	.75	.76	.70	.81	.80
prothorax	.40*	.47	.40*	.50	.35*	.42	.37*	.47
pterothorax		.59		.65		.58		.62
abdomen	.83	.80	.94	.89	.79	.88	1.18	1.10

* prothorax + pterothorax

As to the total length, taken from the dorsal anterior plate to the tip of the abdomen, the *assimilis* female measures 2.140 mm; 10 females of *protrusus* vary from 2.100 to 2.350 mm.

These remarks show that it is difficult to separate *assimilis* and *protrusus* on the basis of the only available specimen of the former. By synonymizing the two species one eliminates one form whose host is undoubtedly erroneous, and whose only extant specimen is so poorly preserved as to render further comparisons very little fruitful.

The only specimen in the Piaget collection (slide nº 308) is hereby formally designated as the lectotype of *Docophorus assimilis*.

E. protrusus is very close to *chapini*: it is not easy to separate them, especially males, whose genitalia are extremely similar (compare figs. 4 and 7). The sub-vulvar plates, however, are diagnostic: in *protrusus* they are elongate, pointed behind, while in *chapini* they are globose.

Measurements of the lectotypes of *protrusus* and *assimilis* and of a couple randomly chosen are given in Table 2.



Figs. 10-11. *Echinophilopterus forficuloides*. 10, male. 11, female.

***Echinophlopterus forficuloides* (Piaget, 1880)**
(Figs. 10-14, 17)

Type host: probably *Probosciger aterrimus* ssp.

Docophorus forficuloides Piaget, 1880: 72, 663, pl. 5, fig. 6; Kellogg, 1908: 14; Neumann, 1890: 60.

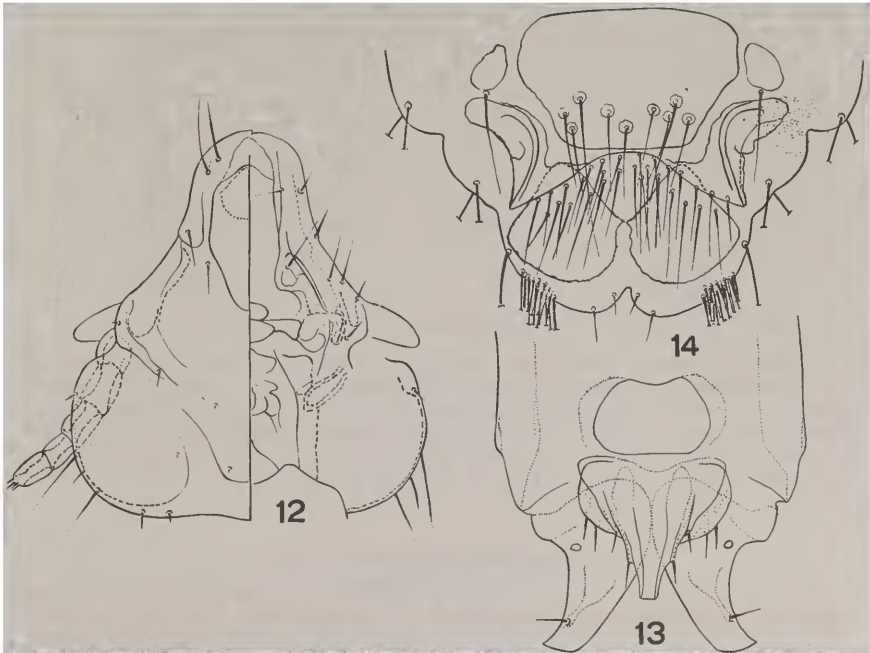
Philopterus forficuloides; Harrison, 1916: 94.

Echinophlopterus forficuloides; Conci, 1942: 40; Hopkins & Clay, 1952: 128.

This species was based on one male and one female found on an *Alcedo* (not identified down to species) from Java, at the Leiden Museum. Judging from the specimens in the British Museum and from Piaget's figures, there is no doubt that we have here an *Echinophlopterus*, whose true host obviously cannot be that mentioned in the original description.

The male, number 589 of the Piaget Collection (in the British Museum) is hereby designated the lectotype of the species. The other specimen in the Piaget Collection labelled as *forficuloides* is an immature.

I compared the lectotype with the other species of *Echinophlopterus* and reached the conclusion that it does not differ from the lice found on *Probosciger aterrimus goliath* (Kuhl) and *P. a. stenolophus* (van Oort). It is thus very probable that *P. aterrimus* is the true host of *forficuloides*; similarly it is probable that the find by Neumann of *forficuloides* on *Microglossum alecto* (now *Probosciger aterrimus alecto*) is an authentic one.



Figs. 12-14. *Echinophlopterus forficuloides*. 12, head of male. 13, male genitalia. 14, genital area of the female.

E. forficuloides is one of the larger species of the genus. Its bands and plates are rather darkened and the setae (at least those of the genital plates in both sexes) are set in lighter round spots. The spiniform setae of the ventral aspect are not very numerous (lectotype: I 15-15, II 8-10, III 6-6; male I 15-15, II 10-9, III 8-7; female: I 13-15, II 9-10, III 7-8; male: I 15-15, II 10-9, III 8-7; female: I 11-12, II 11-9, III 8-4). Contrary to what is seen in *E. protrusus*, they are assembled in well separated groups. The genital apparatus of the male is similar to that of the remaining species, but the parameres are longer and less curved than those of *protrusus*; the genital plate of the male is broad, presenting two irregular, pronounced notches on each side of the lateral margin.

The genital region of the female differs from that of the other species: the free margin of the vulva follows a continuous line curved toward the front; behind and parallel to it there are two irregular rows of setae; the sub-vulvar plates are globose; the genital plate is roughly trapezoidal and shows several setae set in lighter areas.

Piaget mentions in the original description three setae on each temporal margin; these are shown in his figure. In all specimens seen by me, including the lectotype, there are only two long setae on each temporal margin: m.t.s.2 and m.t.s.4.

The measurements are given on Table 3.

TABLE 3. Measurements (length and width) of

	<i>E. forficuloides</i>					
	lectotype		male		female	
	l	w	l	w	l	w
total	2.23	-	2.27	-	2.54	-
head	.80	.83	.84	.86	.85	.85
prothorax	.38*	.49	.38*	.50	.41*	.49
pterothorax		.65		.64		.65
abdomen	1.12	.97	1.04	1.05	1.29	1.04
prothorax + pterothorax						

Besides Piaget's specimens I examined a further 5 males and 4 females (Meinertzhagen Collection number 13491) collected on *Probosciger aterrimus stenolophus* (van Oort) from New Guinea; 4 males and 5 females (Meinertzhagen Collection number 13378) on *Probosciger aterrimus goliath* (Kuhl) from New Guinea; and 1 female (K.C. Emerson Collection), on *Probosciger aterrimus* ssp., from Mt. Bosavi, Highlands District, Papua, 26 May 1973.

Echinophlopterus clayae, sp. n.

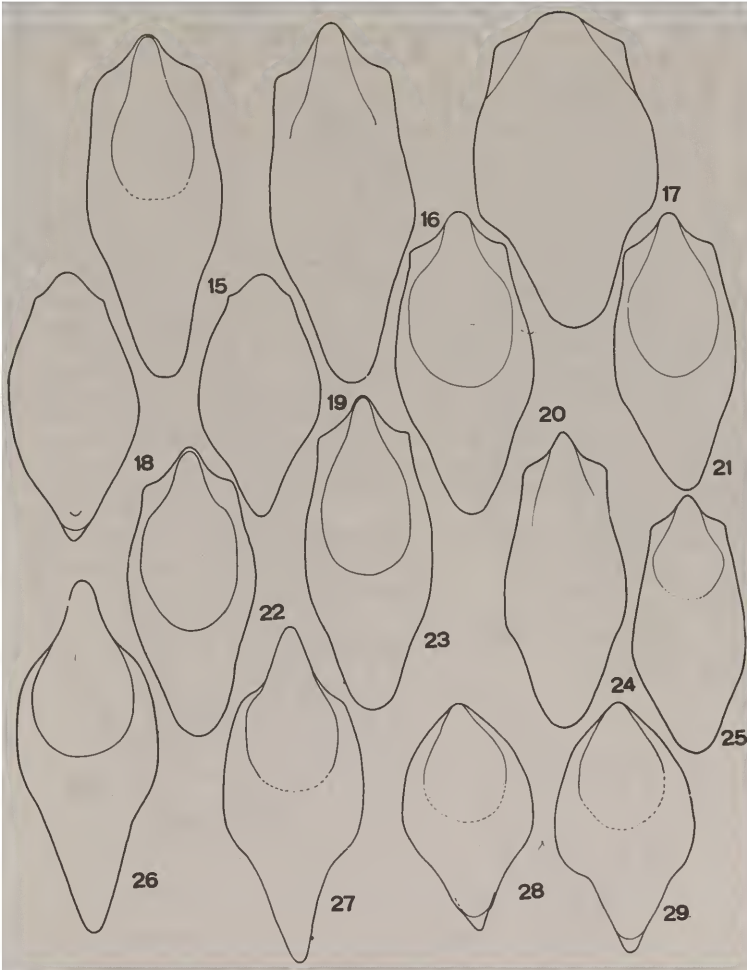
(Figs. 20-23, 30-32)

Type host *Prioniturus platurus* (Vieillot)

This species is much smaller than the one above; the genital region of the female is quite similar, but has only one row of setae along the posterior limit of

the vulva, instead of 2 as in *E. protrusus*; the sub-vulvar plates are also different in the two species. The male copulatory apparatus is elongate, especially the parameres, that are almost straight. The anterior dorsal plates differ in shape.

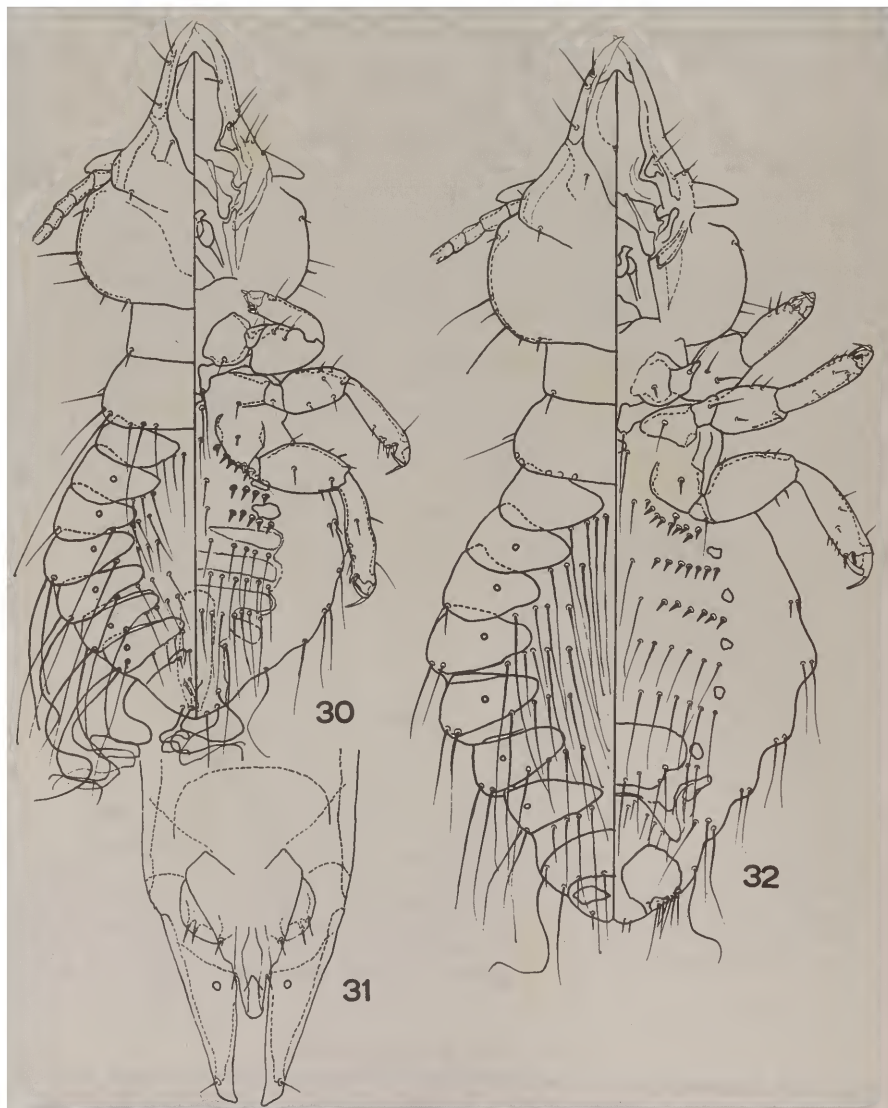
Description – Male (figs. 21, 22, 30, 31). Head, prothorax and pterothorax as described for the genus; dorsal anterior plate slightly rounded behind; *coni* distally rounded, slightly turned backward; m.t.s.2 and m.t.s.4 of median size.



Figs. 15-29. *Echinophlopterus*, dorsal anterior plate. *E. chapini*: 15, male; 16, female. *E. forficuloides*: 17, female. *E. angustoclypeatus*: 18, female; 19, male. *E. clayae*, sp.n.: 20, female allotype; 21, male holotype; 22, male paratype; 23, female paratype. *E. emersoni*, sp.n.: 24, female allotype; 25, male holotype. *E. brygooi*, sp.n.: 26, female allotype; 27, male holotype. *E. inexpectatus*, sp.n.: 28, male holotype, 29, female allotype.

Pterothorax with 3 setae on each side of the posterior margin and two others on each latero-posterior corner.

Abdomen with tergite VIII interrupted on the midline; 3 tergo-central setae on each side of tergites I to V, 3-4 on tergites VI and VII; the innermost setae of



Figs. 30-32. *Echinophilopterus clayae*, sp.n.: 30, male holotype. 31, male genitalia, paratype. 32, female allotype.

the 3 first rows rather long; setae on the latero-posterior corner present from the third segment back; ventral surface of the three first abdominal segments with respectively 6-12/7-11, 7-10/4-11, and 4-9/4-9 spine-like setae on each side.

Genitalia (fig. 31) with long parameres, perhaps the longest in the genus.

Female similar to the male, but with 1 or 2 additional setae on the rows of the abdominal tergites; ventral surface of the 3 first abdominal segments with 9-13/9-12, 6-11/7-11, and 5-10/6-8 spine-like setae. Female genitalia similar to *E. forficuloides*, but with only one row of setae on the margin; sub-vulvar plates globose.

Type material: Holotype male, allotype female, and paratypes 1 male, 1 female, collected on *Prioniturus platurus* (Vieillot) from the Celebes (London Zoo), November 1955, British Museum 758; plus the following paratypes: 1 male, 1 female, same data as the type, in the Museu de Zoologia, Universidade de São Paulo; 7 males, 6 females, 4 immatures, on the same host, from the Celebes, Meinertzhagen Collection 13322, in the British Museum; 2 males, 2 females, on the same host, from the Celebes, E. A. Chapin and A.S. Aloe coll., in the K. C. Emerson Collection; 2 males and 2 females, on *Prioniturus montanus waterstradti*, from Davao, Mindanao, Philippines, August 9, 1946, in the K. C. Emerson Collection; 4 males, 4 females, on *P.m. waterstradti* from McKinley Mt, E slope, Davao, Mindanao, Philippines, M. Celestino coll. IX.1946, and Hoogstraal coll. 9.VIII.1946, in the Field Museum of Natural History; 1 male, 1 female, same data as above, in the Museu de Zoologia, Universidade de São Paulo; 4 males, 5 females, on *Prioniturus montanus malindagensis*, from Mutya, Masawan, Philippines, Rabor & Gonzales coll. 20.XII.1961 and 24.XII.1961, in the K.C. Emerson Collection; 1 male, 1 female, with the same data as above, in the Museu de Zoologia, Universidade de São Paulo.

I have further examined 3 males and 1 female in the K. C. Emerson Collection, collected on *Cynopterus brachyotis*, a pteropid bat, with the same data as the last mentioned parrot. Obviously this is either a mistake in labelling or an accident in collecting.

The species is named in honor of Dr. Theresa Clay.

The measurements are given on Table 4.

TABLE 4. Measurements (length and width)

of *E. clayae*

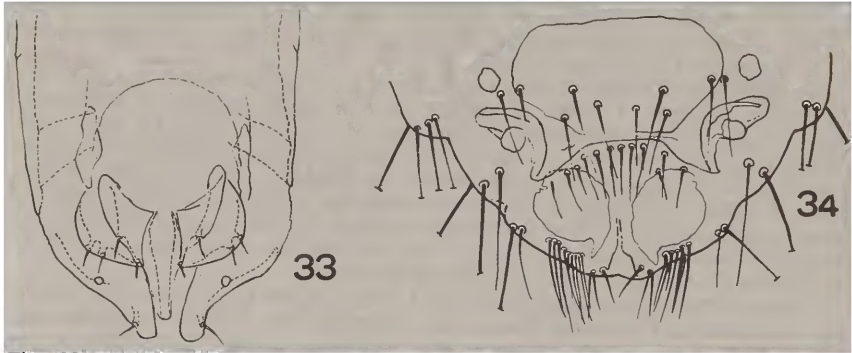
	holotype		allotype	
	male		female	
	l	w	l	w
total	1.57	-	2.03	-
head	.61	.56	.67	.70
prothorax	.14	.34	.15	.36
pterothorax	.15	.44	.17	.51
abdomen	.67	.78	1.04	.93

***Echinophlopterus emersoni*, sp. n.**
(Figs. 24, 25, 33-34)

Type host *Geoffroyus heteroclitus hyacinthinus* Mayr

Very similar to *E. clayae* even in the shape of the anterior dorsal plate; the females can be distinguished only by the distribution of the setae of the genital region. The males, however, differ not only in the genitalia, but also in the chaetotaxy of the abdomen: in *clayae* the innermost setae of the tergo-central rows are elongate only on the first three segments, while in the present species they are elongate on the first four or five segments, and again on the seventh.

The parameres of *emersoni* are intermediate between those of *clayae* and *chapini*; they are shorter than in *clayae*, and have the outer margins curved toward the middle, but not quite as much as in *chapini*.



Figs. 33-34. *Echinophlopterus emersoni*, sp.n. 33, male genitalia, holotype. 34, genital area of the female allotype.

The holotype (male) has 12-15, 10-9 and 5-8 spiniform setae on the ventral aspect of the 3 first segments; the allotype has 13-15, 11-10 and 8-8 setae.

The measurements are given on Table 5.

TABLE 5. Measurements (length and width) of

E. emersoni

	holotype		allotype		paratypes (Jobi)			
	male		female		male		female	
	l	w	l	w	l	w	l	w
total	1.50	-	1.90	-	1.52	-	1.78	-
head	.57	.52	.65	.59	.58	.53	.62	.51
prothorax	.13	.34	.15	.37	.14	.33	.14	.34
pterothorax	.12	.43	.19	.50	.14	.45	.17	.47
abdomen	.67	.64	.93	.86	.66	.67	.92	.80

Type material: Holotype male, allotype female and 2 female paratypes collected on *Geoffroyus heteroclitus hyacinthinus* Mayr, from Tigoa, Rennell Is., J. D. Bradley coll., November 1952, plus 2 males and 2 females on *G. geoffroyi jobiensis* (A.M. Meyer), from Jobi (Meinertzhagen Collection 13471) in the British Museum; 1 male collected on *G. simplex* (A.B. Meyer), from Mt. Bosavi, S: Highlands District, Papua, 3 June, 1973, in the K. C. Emerson Collection.

The species is named in honor of Dr. K. C. Emerson.

***Echinophilopterus angustoclypeatus* (Piaget, 1880)**

(Figs. 18, 19, 35, 36)

Type host *Polytelis swainsonii* (Desmarest)

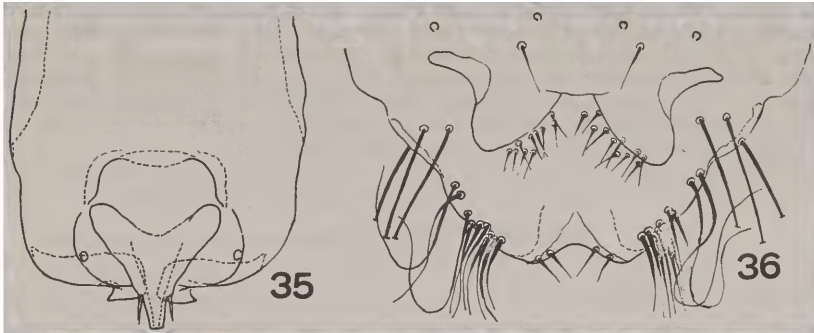
Docophorus angustoclypeatus Piaget, 1880: 34, pl. 2, fig. 3; Kellogg, 1908: 10.

Phlopterus angustoclypeatus; Harrison, 1916: 87

Echinophilopterus angustoclypeatus; Conci, 1942: 40; Hopkins & Clay, 1952: 127.

There are in the Piaget Collection, in the British Museum, 3 slides, on which are mounted, respectively, one couple, one female and one female, labelled *Docophorus angustoclypeatus*, with host *Platycercus barrabandi* (now *Polytelis swainsonii*). I have these specimens before me and, although their plates are completely faded, Piaget's description leaves no doubt as to their identity.

Piaget (1880: 34) says, with reference to the spiniform setae of the ventral aspect of the abdomen: "À la face ventrale les 3 premiers segments de la femelle n'ont presque plus d'épines, le mâle plus aucune". In fact, the specimens examined show no spiniform setae, contrary to what is seen in other species, such as *assimilis*, *protrusus*, *forficuloides* and *chapini*. However, the outermost setae of the



Figs. 35-36. *Echinophilopterus angustoclypeatus*. 35, male genitalia, lectotype. 36, genital area of the female.

3 first rows on the ventral surface are smaller than the others and vary from 1 to 3 in the male and from 2 to 5 in the female.

I have figured as well as the material permitted the copulatory apparatus of the only male, but I am sure the parameres must be longer than drawn. Seen under a dissecting scope, they are seen to have the distal end turned dorsally, resulting in the aspects seen in fig. 35.

The genital region of the female is represented without the characteristic spots, since they are not visible on the specimens examined.

I select as lectotype the male mounted on slide 504 of the Piaget Collection (in the British Museum); the remaining females are to be considered paralectotypes.

The measurements are given on Table 6.

TABLE 6. Measurements (length and width)
of *E. angustoclypeatus*

	lectotype			
	male		female	
	l	w	l	w
total	1.61	-	1.92	-
head	.62	.59	.66	.66
prothorax		.36		.40
pterothorax	.25*	.50	.29*	.56
abdomen	.74	.80	.96	.88

* prothorax + pterothorax

I have examined a further 3 males and 3 females collected on *Polytelis swainsonii* (Desmarest) from Australia, J.R.J., sent for study by Prof. R.L.C. Pilgrim.

I provisionally identify as belonging to this species 5 males and 2 females in the Harrison Collection (in the British Museum), collected on *Polytelis melanura* (now *Polytelis anthopeplus* (Lear)) from a zoo. These specimens are not in very good shape, and cannot be adequately compared with the type series, but they seem to be smaller than the Piaget sample. The parameres of some specimens seem to be in a more ventral position, and so appear longer than those of the type. In order to elucidate the taxonomic position of these specimens it will be necessary to examine specimens from freshly killed hosts.

***Echinophilopterus brygooi*, sp. n.**

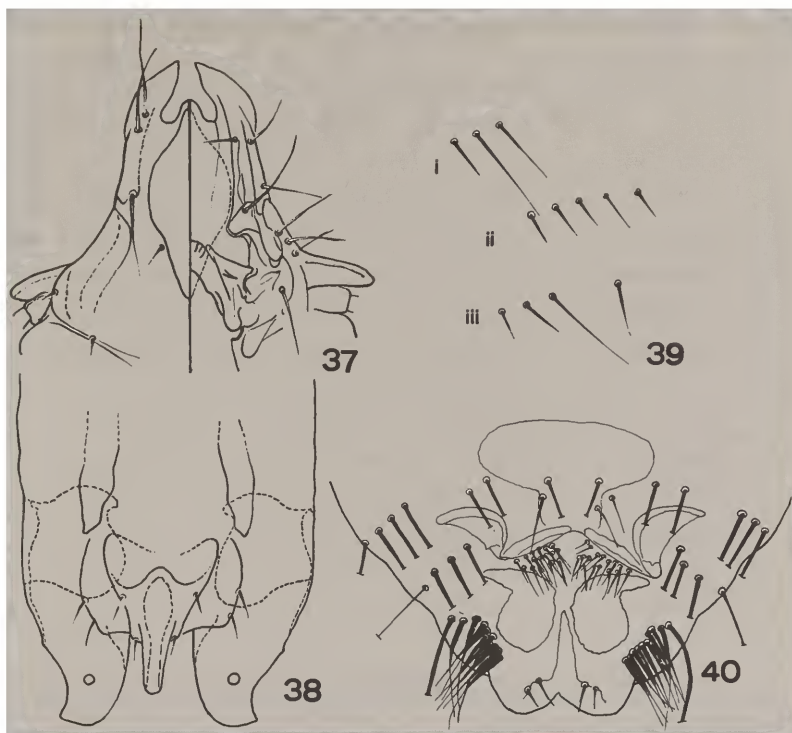
(Fig. 26, 27, 37-40)

Type host *Coracopsis vasa* ssp.

Characterized by the shape of the anterior dorsal plate, by the spiniform setae of the abdomen (which are nothing but short setae), by the shape and position of the ventro-lateral setae on each side of the terminal region of the female abdomen, and by the genitalia of both sexes.

Description: Head and thorax as in the majority of the species of the genus. The anterior dorsal plate is more sharply narrowed, in front as well as behind, than in the other species (figs. 26, 27). The temporal setae (m.t.s.2 and m.t.s.4) are long.

Latero-posterior setae present from the second abdominal segment back, as in *chapini* and *forficuloides*. The spiniform setae, so characteristic in the majority of the species of the genus, in this species resemble those of *angustoclypeatus*, *inexpectatus* and *buphthalmus*, in being nothing but short common setae; they



Figs. 37-40. *Erhinophlopterus brygooi*, sp.n. 37, head of male, paratype, anterior part. 38, male genitalia, holotype. 39, setae of first three abdominal sternites of the female paratype. 40, genital area of the female allotype.

vary in number from 3 to 7 on the 3 rows, but frequently they appear as in fig. 39, some of the setae being of median length or quite long.

The measurements are given on Table 7.

Type material: Holotype male and allotype female, collected on *Coracopsis vasa* ssp., from Andrambovato, Madagascar, J. T. Tipton coll., January 7, 1952, in the K. C. Emerson Collection; the following paratypes: 1 male and 1 female, same data as the type, in the Museu de Zoologia, Universidade de São Paulo; 3 males and 3 females, same host species and locality as the type, Rakota and Tipton coll., January 10, 1952, in the K. C. Emerson Collection; one couple, data as above, in the Museu de Zoologia, Universidade de São Paulo; 1 male on the same host species, from Bemangidy, Ft. Dauphin Distr., H. Hoogstraal coll., December 26, 1948, in the K. C. Emerson Collection; 3 males and 1 female, on the same host-species, from Morondava and Belo sur Mer, E. R. Brygoo coll., September, 1959, in the Muséum National d'Histoire Naturelle, Paris; 1 male, 1 female and 1 immature, collected on *Coracopsis n. nigra* (Linné), no locality, Meinertzhagen Collection number 13483 (in the British Museum). All from Madagascar.

TABLE 7. Measurements (length and width) of *E. brygooi*

	holotype		allotype		paratypes			
	male		female		male		female	
	l	w	l	w	l	w	l	w
total	1.98	-	2.32	-	1.87	-	2.21	-
head	.78	.68	.80	.71	.68	.62	.77	.70
prothorax	.19	.43	.19	.43	.19	.38	.18	.42
pterothorax	.20	.54	.21	.56	.18	.52	.20	.55
abdomen	.83	.90	1.13	1.05	.83	.86	1.05	.97
	ex <i>C. nigra</i>							
	male		female					
total	1.60	-	1.85	-				
head	.64	.56	.65	.59				
prothorax	.12	.35	.12	.36				
pterothorax	.16	.45	.19	.47				
abdomen	.70	.71	.90	.80				

I have examined a further 3 males and 3 females said to have been collected on *Ara rubrogenys* from Bolivia (Meinertzhagen Collection 13485). This is evidently a mistake in labelling.

The species is named in honor of dr. E. R. Brygoo.

***Echinophilopterus inexpectatus*, sp. n.**
(Figs. 28, 29, 41-43)

Type host *Uratelornis chimaera* Rothschild

This is the smallest and the least "philopteroid" among the species of *Echinophilopterus*. It differs from the remainder of the genus in the relatively elongate head, in the shape of the anterior dorsal plate, in the number of setae on the posterior margin of the pterothorax, in the narrower abdomen, and in the shape of the genitalia of both sexes.

Description: Head elongate, but at the level of the anterior dorsal plate broader than in the other species; anterior dorsal plate relatively short and with pointed hind end; *coni* with distinctly narrowed distal end; m.t.s.2 and m.t.s.4 long.

Pterothorax with 5-6 setae on each side of the posterior margin, and with 2 setae on each latero-posterior corner.

Abdomen relatively narrow. The setae of the rows on the sides of the posterior margin of the tergites are very asymmetrical in number and shape; some are very short, some almost as long as the tergo-laterals. The spiniform setae on the ventral aspect resemble those of *brygooi*, i.e., they are common setae, only shorter than the others.

TABLE 8. Measurements (length and width) of *E. inexpectatus*

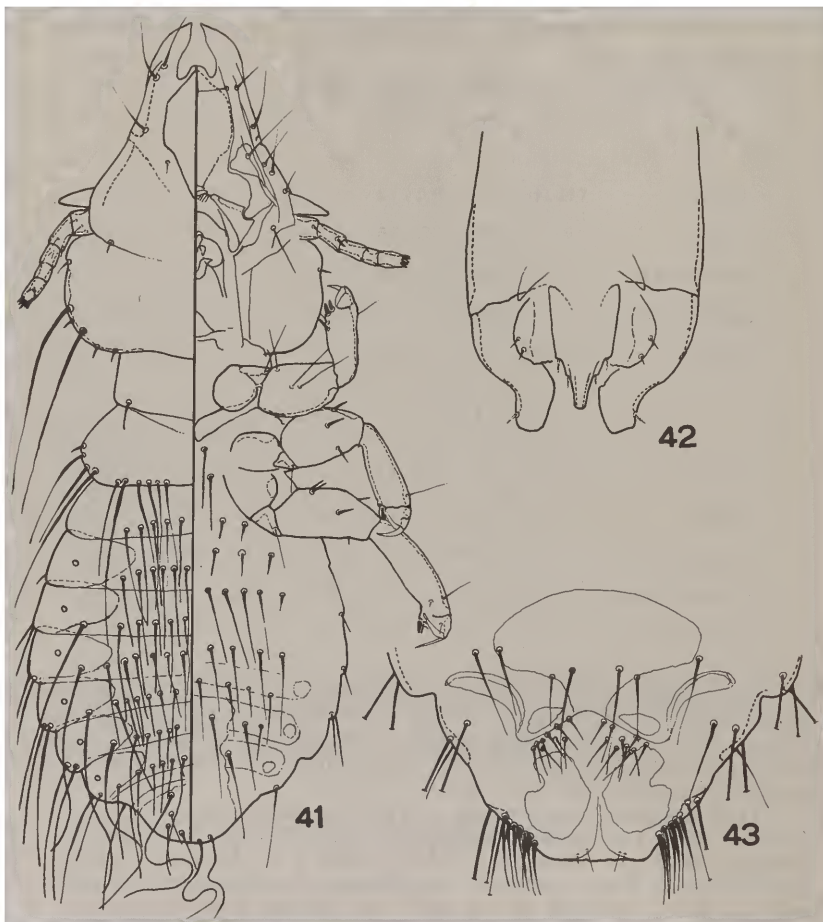
	holotype		allotype					
	male		female					
	l	w	l	w				
total	1.46	-	1.72	-				
head	.53	.47	.58	.52				
prothorax	.10	.28	.12	.31				
pterothorax	.13	.38	.15	.43				
abdomen	.64	.58	.87	.67				
	male		male		female		female	
total	1.43	-	1.48	-	1.54	-	1.64	-
head	.52	.47	.53	.46	.56	.50	.57	.52
prothorax	.11	.29	.13	.30	.10	.28	.10	.31
pterothorax	.11	.40	.15	.43	.15	.39	.13	.43
abdomen	.68	.58	.68	.59	.72	.56	.80	.64

The genitalia of both sexes resemble those of *brygooi*. The parameres are slightly more curved, but not so broad; the mesosome is not so calyciform as in *brygooi*, or as in the remaining species, as the margins of the basal portion are almost parallel. In the female genitalia there are fewer setae than in *brygooi*; the anterior part of the sub-vulvar plates is blunter.

Type material: Holotype male and allotype female collected on *Uratelornis chimaera*, from Lac Ihotry, Madagascar, 12.IX.1965, E. R. Brygoo coll., presently in the British Museum, to be deposited in the Muséum National d'Histoire Naturelle, Paris; paratypes, two females, with the same data as the type, and two males collected on the same host species, from Madagascar, S. O., viii.1962, E. R. Brygoo coll., in the British Museum.

The measurements are given in Table 8.

Remarks: *Uratelornis* belongs to the family Brachypteraciidae (Coraciiformes); the presence of a new species of *Echinophlopterus* on a non-psittaciform bird left me initially in considerable doubt about the authenticity of the host species. As a matter of course I consulted dr. E. R. Brygoo, the collector. In letters dated June and July 1977 he kindly advised me that "les seuls mallophages de Psittacides que j'ai eu l'occasion de manipuler sont ceux de *Coracopsis vasa* que j'adressais à Miss Th. Clay". These are the specimens of *Echinophlopterus brygooi*, described above, and some specimens referred by Brygoo to *Psittacomenopon* sp., which I think might be *Coramenopogon coracopsis* (Mjöberg). Dr. Brygoo further advises me that he received the *Uratelornis* from Ch. A. Domergue (who had never collected parrots) and that he (Brygoo) had not handled parrots at the time of collecting the *Uratelornis* lice, and never collected mallophaga on *Agapornis* (see below).



Figs. 41-43. *Echinophilopterus inexpectatus*, sp.n. 41, male holotype. 42, male genitalia, paratype. 43, genital area of the female allotype.

These data establish beyond doubt that the specimens of this new form were collected independently on the same host at least twice (in 1962 and in 1965) and that post-mortem contamination is out of question.

The species clearly belongs to *Echinophilopterus*, a genus otherwise restricted to parrots. Its occurrence on a coraciiform may be explained in two ways. Firstly, the primary host may be a parrot, from which the louse would have spread to and become established in the population of *Uratelornis*, without having been found yet on the primary host. Alternatively, the species on *Uratelornis* would have been acquired from a parrot, but differentiated on the new host. In either case we would have continued secondary infestation.

There are only 2 genera of psittaciforms in Madagascar: *Coracopsis* and *Aga-*

pornis. The first known *Echinophiloaterus* from *Coracopsis* is *E. brygooi*, described above. No *Echinophiloaterus* is known from *Agapornis*, neither in Madagascar nor in Africa.

Uratelornis occurs in the sub-desertic region of the southwest of Madagascar, where its distribution (Rand, 1936) overlaps that of *Agapornis cana alectanea*. The latter may have been the source of the lice that colonized *Uratelornis*.

On the other hand, the similarity between these two Madagascan species of lice (*brygooi* and *inexpectatus*) may indicate that *Uratelornis* received its lice from *Coracopsis*, and that speciation followed.

A choice between these alternatives will be made possible only by a study of the mallophaga of *Uratelornis* over the entire range of the host, and by the discovery of mallophaga on *Agapornis* in Madagascar.

***Echinophiloaterus buphthalmus* (Piaget, 1885)**
(Figs. 46-48)

Type host *Poicephalus* sp.

Docophorus buphthalmus Piaget, 1885: 2, pl. 1, fig. 3; Kellogg, 1908: 11.

Philopterus buphthalmus; Harrison, 1916: 90.

? *Uncifrons buphthalmus*; Guimarães, 1942: 87.

Echinophiloaterus buphthalmus; Hopkins & Clay, 1952: 127.

This species was described with basis on one female found on *Sterna* sp. Piaget himself thought the specimen was a "déserteur", as it is clearly related to the lice found on parrots. The original description and illustration leave no doubt that the species belongs in *Echinophiloaterus*.

The only specimen in the Piaget Collection (in the British Museum), slide number 513, is here designated as the lectotype of *Docophorus buphthalmus*.

A comparison of this specimen with other materials reveals that it is indistinguishable from lice found on *Psittacus*, and on at least some species of *Poicephalus*, all of them African birds. The case of "*Echinophiloaterus gilvus*", whose host is said to be *Psittacus erythacus*, will be discussed below.

E. buphthalmus is a very characteristic species, that differs from its congeners in having the pre-antennal portion of the head shortened (somewhat resembling the species of *Psittoecus*), in completely lacking spiniform setae on the ventral aspect of the abdomen, and in the elongation of the parameres and of the endomere. The shortening of the anterior part of the head results in a modification of the shape of the anterior dorsal plate, which becomes rounder in front and pointed, almost abruptly, behind. The chaetotaxy is identical to that of the other species, although m.t.s.2 and m.t.s.4 are much longer.

The absence of true spiniform setae brings this species close to *E. angustoclypeatus* and to *E. brygooi*, from *Coracopsis*; elongate parameres and endomere are found *E. clayae*, from *Prioniturus*. The genital region of the female shows also some resemblance to that of *angustoclypeatus* and *brygooi*.

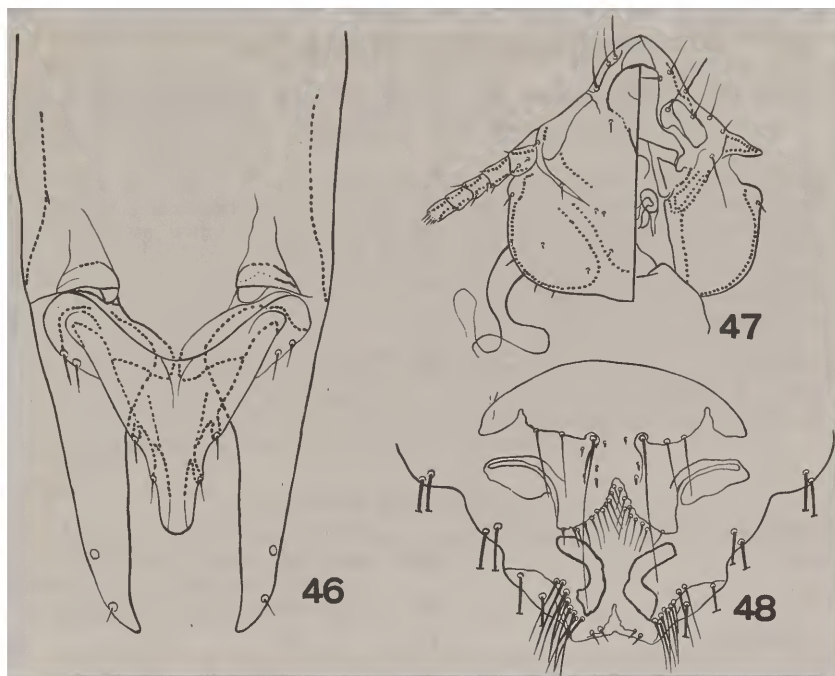
The genital plate of the male has two lateral projections on each side of the anterior half; in front of the genital plate the sternal plate is entire; the other sternal plates are variously reduced to fragments on the sides of the segments. The sternal plates of the female are reduced to small rounded spots on each side of the abdomen, and the genital plate is, sometimes, laterally fused with the sternal plates.

Besides the lectotype I have examined the following specimens in the British Museum: 22 males, 16 females and 5 immatures collected on *Poicephalus*



Figs. 44-45. *Echinophilopterus buphthalmus*. 44, male. 45, female.

rufiventris [*rufiventris*] (Rüppell), from Somaliland, February, 1949, Meinertzhagen Collection 18656; 2 males, 2 females, on the same host species, from Hergeisa, Somaliland, February, 1947, Meinertzhagen Collection 18652; 2 males, 2 females on *Poicephalus rufiventris* ssp., from Molo, Kenya, September, 1959, Meinertzhagen Collection 20626; 6 males, 6 females, on *Poicephalus gulielmi massaicus* (Fischer & Reichenow), from Kenya, February, 1936, Meinertzhagen Collection 6372, 6414, 6416; 6 males, 8 females, on *Poicephalus meyeri* [*saturatus*] (Sharpe), Mubense (=Mubende), Kampala Road, Uganda, G. H. E. Hopkins coll., March 23, number 566; 2 males, 1 female, on *Poicephalus meyeri neavei* C. H. B. Grant, from Luanshya, N. Rhodesia (=Zambia), May, 1954; 3 females on *Psittacus e. erythacus* L., from Kampala, Uganda, G. H. E. Hopkins coll. January 17, 1937, and 2 males, 2 females, on the same host form, from Ambam, French Cameroon (=Cameroons), J. Mouchet coll., 1955.



Figs. 46-48. *Echinophiloater buphthalmus*. 46, male genitalia. 47, head of male. 48, genital area of the female.

Measurements are given in Table 9.

UNRECOGNIZABLE SPECIES

Docophorus aracarae Coinde, 1859

Docophorus aracarae Coinde, 1859: 424; Giebel, 1874: 121; Kellogg 1908: 10.

Philoater aracarae; Harrison, 1916: 88.

Echinophiloater aracarae; Hopkins & Clay, 1952: 127.

I am in full agreement with Hopkins and Clay as to the impossibility of recognizing this species. Coinde's description mentions only color, and is useless. The vernacular host name, "Aracara" is obviously an incorrect rendition of "Araçari", generally applied in Brasil to toucans of the genus *Pteroglossus*.

As to the later authors, no real information was added. Giebel simply transcribed Coinde's data. Piaget added without explanation, "*Macrocerus*" to the host name. Kellogg and Harrison cited *Macrocerus* sp. as the host. Hopkins and Clay included the species in *Echinophiloater* because *Macrocerus* is a synonym of *Ara*, Psittacidae; they, however, already considered the species as unrecognizable and suggested, on account of Coinde's mention of "Aracara", that a *Pteroglossus* might be the correct host.

TABLE 9. Measurements (length and width) of *P. buphthalmus*

	lectotype		ex <i>P. rufiventris</i>				ex <i>P. g. massaicus</i>			
	female		male		female		male		female	
	l	w	l	w	l	w	l	w	l	w
total	1.80	-	1.61	-	1.78	-	1.57	-	1.84	-
head	.56	.55	.51	.53	.52	.58	.51	.54	.55	.61
prothorax	.31*	.37	.26*	.33	.26*	.34	.25*	.33	.28*	.37
pterothorax		.52		.48		.52		.48		.55
abdomen	.93	.92	.84	.86	1.00	.90	.80	.80	1.01	.86
			ex <i>P. m. neavei</i>		ex <i>Ps. e. erythacus</i>					
			male		female		male		female	
total			1.52	-	2.00	-	1.61	-	1.94	-
head			.48	.50	.56	.60	.55	.54	.57	.62
prothorax				.30		.36		.37		.41
pterothorax			.24*	.47	.30*	.56	.28*	.52	.33*	.56
abdomen			.80	.80	1.15	.94	.78	.84	1.03	.95

* prothorax + pterothorax

Docophorus arcunotatus Neumann, 1891

Docophorus arcunotatus Neumann, 1891: 85, fig. 2.

Philopterus arcunotatus; Harrison, 1916: 88.

Echinophilopterus arcunotatus; Hopkins & Clay, 1952: 127.

This species is based on one female found on *Eclectus polychlorus* (now *Eclectus roratus pectoralis*) and on one juvenile female found on *Lorius cyanau-chen* (now *Domicella lory* subsp.), both from New Guinea.

In the original description Neumann states that the species is close to the *Angusticypeati* found on Passeriformes, and likens it to *D. leontodon* (= *D. stur-ni*) and *D. continuus*, both presently placed in *Sturnidoecus*. There is no doubt that *arcunotatus* is not an *Echinophilopterus*; the drawing of the female genitalia is enough to exclude it from the genus. The only reason why Hopkins and Clay placed it there was Neumann's assertion that it occurred on parrots.

I thought it better, initially, to leave this form as *incertae sedis* or *species inquirenda*, but given the impossibility of an identification based on the published materials, and the loss of practically all *Ischnocera* studied by Neumann (Guimarães, 1974: 123), I prefer to consider it as an unrecognizable species.

Docophorus chelorhynchus Giebel, 1874

Docophorus chelorhynchus Giebel, 1874: 76; Piaget, 1880: 22, 35; Kellogg, 1908: 11.
Philoaterus chelorhynchus; Harrison, 1916: 91.
Echinophiloaterus chelorhynchus; Hopkins & Clay, 1952: 128.

Giebel described this species based on one single male, collected on *Circus aeruginosus*. His description, especially of the anterior region of the head, leads one to suppose, with some confidence, that it may belong to one of the philopterine genera found on psittaciforms. Piaget says: "Quant au *D. chelorhynchus* G. (Epiz. p. 72) provenant d'un *Circus aeruginosus*, je crois qu'il a été introduit par erreur parmi les parasites des Falconinae. Cette espèce de pince que forment les angles du clypéus est particulière aux *Docophori* des perroquets". In fact (loc. cit.: 35) he includes the species among the species of *Docophorus* from parrots. I believe Hopkins and Clay are not far from the truth when they place the species in *Echinophiloaterus*, as "unidentifiable", however. The impossibility of examining the type, that has been lost, the wrong host assignment and the insufficient description make this form obviously unrecognizable.

Docophorus gilvus Nitzsch, 1866

Docophorus gilvus Nitzsch, 1861: 305 (*nomen nudum*); Nitzsch in Giebel, 1866: 360; Giebel, 1874, 95; Piaget, 1880: 70; Kellogg, 1908: 14.
Philoaterus gilvus; Harrison, 1916: 95.
Echinophiloaterus gilvus; Hopkins & Clay, 1952: 128.

It is evident that this species cannot be included in *Echinophiloaterus*. Most probably Hopkins and Clay so placed it because the host was given as *Psittacus erythacus*.

The original description does not afford any clues, but Giebel's (1874) description cannot fit the genus, since there is no signature, there are 4 long temporal setae, and the form is very similar to *D. leontodon*.

As to the host, both Nitzsch and Giebel definitely state that it was *Psittacus erythacus*. Fortunately, Giebel adds that the collector was von Olfers, in 1818. We know that von Olfers lived in Brasil (Rio de Janeiro), at least from 1817 to 1821 (Stresemann, 1948; Papevero, 1971); the host thus was certainly not *P. erythacus*, but very probably a southwestern Brazilian *Amazona*, that somewhat resemble the exclusively African *Psittacus*. It may be that *gilvus* is a *Paragoniocoetes*, but the descriptions available do not afford grounds for a decision. As the type material is lost, I think it better to consider *Docophorus gilvus* as unrecognizable, and to apply the name *E. bupthalmus* to the true *Echinophiloaterus* of *Psittacus erythacus*.

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