long as the tibia, whereas in *P. gracilis* it is shorter. The Hawaiian genera *Calvoppia* and *Imparatoppia* Jacot [4] have short tarsi too, but there are no lamellæ in these genera, and other characters distinguish them from *P. gracilis*.

So far as I know, there is only a single report on mites from the Bermuda Islands [1]. It contains three species, but no Oribatids. I suspect that with modern methods it would be possible to collect many species and specimens there.

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XXIII.—THE SPECIES OF THE GENUS *QUADRACEPS* (MALLOPHAGA) FROM THE LARINAE. WITH SOME REMARKS ON THE SYSTEMATICS AND THE PHYLOGENY OF THE GULLS.

By G. Timmermann, D.Sc.

[Plate XII.]

Part I.

The following paper represents a revision of all the species of bird lice of the genus *Quadraceps* Clay & Meinertzhagen living on the gulls of the subfamily Larinae. In working out this group I have had two aims in mind which have determined the scope of my research. Above all I intend to clear up the systematic and—as far as possible—also the phylogenetical status of the parasites and on the other hand to reach, on this basis, new points of view for the judgement of the relationship and descent of their hosts. It is self-explanatory that the systematic grouping has been based only on morphological and anatomical criteria; the considerable regard that Eichler is willing to pay to the host in this connection ('Mallophagen.—Synopsis.—XVI. Genus *Saemundssonia*.' In press) would exclude the possibility of conclusions in the direction mentioned, because proofs, of which the result is already contained in the presupposition, possess in general little power of conviction.

The material upon which my investigations were based originates to a small extent from the collection of the Naturhistoriska Riksmuseum in Stockholm as well as from my own; by far the biggest part was borrowed from the Meinertzhagen Collection and the Collection of the British Museum in London. I am deeply indebted to Miss Theresa Clay of the

British Museum (Natural History), to Colonel R. Meinertzhagen (London) and Mr. Felix Bryk (Stockholm), who have met my requests in a very far-reaching and most amiable manner. Furthermore, I will not leave it unmentioned that I have had the advantage to discuss a number of systematic and nomenclatorical problems by letter with Miss Clay, which has been very useful for my investigations.

In the following paper I have considered the *Quadraceps* of all recent genera of gulls (except *Pagophila* from which no *Quadraceps* is known), altogether of 32 species and subspecies of the Larinae, besides also of *Chionis*, which harbours a gull-*Quadraceps*. The number of *Quadraceps*-specimens examined totals 639, which are distributed between the single host species as follows :—*Gabianus pacificus* 15, *scoresbii* 4, *Larus modestus* (? *fuliginosus*) 1, *heermanni* 28, *leucophthalmus* 24, *hemprichii* 36, *belcheri* 8, *audouinii* 6, *delawarensis* 29, *canus canus* 112, *canus brachyrhynchus* 23, *argentatus argentatus* 28, *californicus* 2, *occidentalis* 9, *dominicanus* 17, *marinus* 25, *hyperboreus* 36, *leucopterus* 23, *ichthyaetus* 11, *brunnicephalus* 8, *cirrocephalus* 1, *novae-hollandiae scopulinus* 26, *novae-hollandiae hartlaubii* 16, *melanocephalus* 6, *ridibundus* 47, *genei* 14, *philadelphia* 11, *minutus* 11. *Rhodostethia rosea* 3. *Rissa tridactyla* 18. *Creagrus furcatus* 22. *Xema sabini* 1. *Chionis alba* 18.

Finally I will enphasize that all designations of type hosts in this paper should be understood explicitly as being fixed in the sense of the International Rules of Zoological Nomenclature.

Key to species of the gull-*Quadraceps*.

1.	Antennæ quite uncoloured	*Qu. punctatus*.
2.	Last segment of antennæ dark coloured	3
3.	Basal plate unsclerotized (hyaline)	*Qu. ernstmayri*, sp. n.
	Basal plate laterally limited by two dark brown sclerotized bars	*Qu. ornatus*.
4.	Two last segments of antennæ dark coloured	*Qu. eugrammicus*.

I. *Quadraceps punctatus* (Burmeister), 1838.

A slender, delicate species, easy to distinguish from *Qu. ornatus*, which is much more robust though on the average a little shorter. Both species live side by side on some hosts. Furthermore *Qu. punctatus* differs from *Qu. ornatus* mainly in the following characteristics : Head always considerably longer than wide, pointed (in *ornatus* not much longer than wide, blunt), mandibles weak and small (in *ornatus* stout). Decorations of the border of the abdomen arranged more or less rectangularly to the longitudinal axis of the body (in *ornatus* slanting from the outside behind, forward and inward).

Male genitalia very delicate, hyaline and transparent, paramers broad, strongly and abruptly bent (fig. 1).

I have found this species of bird-lice on all species of gulls investigated by me with the exception of the following :—*Larus hyperboreus*, *leucopterus*, *marinus*, *minutus*. *Rissa tridactyla*, *Xema sabini*, *Creagrus furcatus* and *Rhodostethia rosea*.

Below I give the measurements (in mm.) of the neotypes of *Qu. punctatus punctatus* (Burm.) from the Black-headed Gull (further details see below) :—

	Breadth of head.	Length of head.	Cephalic Index.	Total length.
Male	0·45	0·50	0·90	2·01
Female	0·45	0·50	0·90	2·21

Male genitalia.—Total length 0·52, paramers 0·20 ; breadth of abdomen 0·57 (male) and 0·59 (female).

I distinguish within the limits of the species of *Qu. punctatus* eight different subspecies, of which three have already been described as distinct species, the five further subspecies have been introduced as new ones in this paper on basis of the material investigated. Besides variation in the extent of the decorations the species prove to be not very variable morphologically though—as expected—some differences in size are to be found between the single populations. For instance the phylogenetically old forms (*felix*, *clayi*, *ventosus*) possess a lower cephalic index than the younger ones, that is to say they are comparatively more narrow-headed. Also in the male genitalia there sometimes appear small differences between the forms, but these differences are not sufficient to establish new subspecies. Moreover, the majority of these deviations seems to be due to the influence of the different conserving media, because the male genitalia of this species are very delicate.

Quadraceps punctatus with its eight subspecies forms a beautiful example of the phylogenetic parallel development of parasite and host. On the basis of the very differently developed pattern of decoration the single populations can easily be arranged in a natural phylogenetic series beginning with the dark and strongly decorated *Qu. punct. felix* and closing with the nearly white form *Qu. punct. pallidus*. Between these two extremes the other subspecies change step by step in such a way, that each of these forms has a darker, more completely decorated forerunner and is followed by a lighter form as shown in fig. 2. Three of the eight subspecies are not figured, because I think that the rule will be more clearly shown in this way.

What conclusions can be drawn concerning the systematics and phylogeny of the gullls from this phylogenetic arrangement will be considered later in another connection. From this it will be further understood, that I will begin the discussion of the subspecies of *Q. punctatus* not with the nominate form but with the phylogenetically oldest form followed by the younger ones.

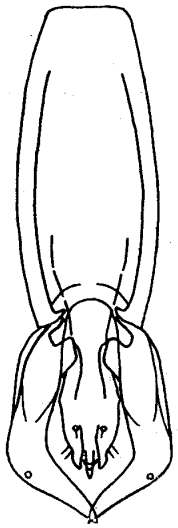
1. *Quadraceps punctatus felix* (Giebel), 1874. (Figs. 1–2*a*.)

Type-host : *Larus heermanni*.

Strongly decorated form. Forehead on both sides with three dark spots. Temples from the antennal inlet to occiput dark bordered. Dark lateral decorations of the prothorax and pterothorax nearly closed. In the anterior corners of the first visible (true 2) abdominal segment

on each side a dark spot. Lateral decorations of abdomen clothes-hook-shaped, strongly developed. In the male tergal-plates present in segments 2–6, in the female in 2–7. In segment 1 of the female there is in most cases a remainder of a tergal plate in the form of two small dark spots in the middle of the segment. Sternal plates of the male in segments 4 and 5 most strongly and completely developed, in segment 6 strongly and in segment 3 less strongly indicated, the variation in this respect, however, being considerable.

Fig. 1.



Quadraceps punct. felix (Giebel) from *Larus heermanni*. Male genitalia.

Neotype male and neallotype female from *Larus heermanni*, California, Meinertzhagen collection, slide No. 13308. Neoparatypes 5 males and 19 females from the same host, data as listed above.

To the same form I place a single male from *Larus modestus*, Galápagos, July 25, 1924, British Museum collection (mistaken for *Larus fuliginosus* ?), where the tergal plate of the first segment is represented by two small spots as in the female of the population of *L. heermanni*, which could mean that this form was still somewhat more primitive.

2. *Quadraceps punctatus clayi*, ssp. n. (Fig. 2*b*.)

Type-host : *Larus hemprichii*.

Similar to the former, but dark decorations in general more reduced. On both sides of the forehead only two dark spots (the middle spot

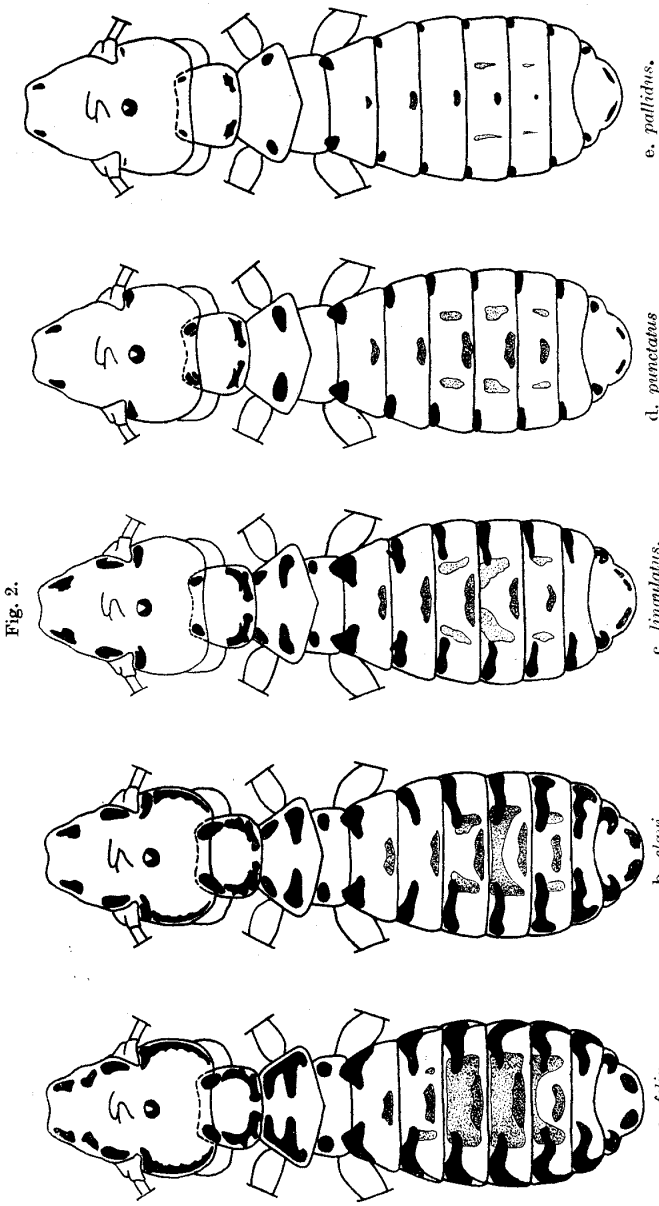


Fig. 2. Regressive development of decoration pattern in some subspecies of *Quadraceps punctatus* (males). Outlines of body somewhat schematic.

vanished). The lateral decorations of the pterothorax broken into two separate pieces. The first abdominal segment of female shows no longer any indication of a tergal plate.

Holotype male and allotype female from *Larus hemprichii*, Sudan, December 1947, Meinertzhagen collection, slide No. 16836–37. Paratypes, 8 males and 10 females from the same host, data as listed above and 9 males and 6 females from the same host, Aden, February 1937, Meinertzhagen collection, slide No. 8431. To this subspecies I place further 7 males and 8 females from *Larus leucophthalmus*, Aden, February 1937, Meinertzhagen collection, slide No. 8436 and 5 males, Red Sea, June 1936, Meinertzhagen collection, slide No. 4907, from the same host.

The new subspecies is named in honour of Miss Theresa Clay, London, the highly merited specialist in Mallophaga of the British Museum (Natural History).

3. *Quadraceps punctatus ventosus*, ssp. n.

Type-host : *Gabianus pacificus*.

In shape and decorations indistinguishable from *Qu. punct. clayi*, but in some measurements (breadth of head, male genitalia) somewhat larger.

Holotype male and allotype female from *Gabianus pacificus*, Port Jackson (New South Wales), British Museum collection. Paratypes : another female from the same host, data as listed above, and 3 males and 8 females from Tasmania, Meinertzhagen collection, slide No. 3814.

4. *Quadraceps punctatus lingulatus* (Waterston), 1914. (Fig. 2c.)

Type-host : *Larus novae-hollandiae hartlaubii*.

Similar to the former but the dark decoration in general more reduced. The dark lateral border of the temples has disappeared except for a single black spot behind the antennal inlet. In the female the anterior dark spot in the pterothorax is nearly always lacking, in the male it is always present. Some females lack the dark spot before the antennal inlet, but it is always present in the male. The anterior black dots in the first abdominal segment are regularly developed in both sexes (not in specimens from *scopulinus*). Examined 8 males and 8 females from the type host, S.W. Africa, May 1949, Meinertzhagen collection, slide No. 19112–3.

To the same subspecies I place 5 males and 19 females from *Larus novae-hollandiae scopulinus*, Auckland I., 1943, Meinertzhagen collection, though these show certain differences in their decorations (reduction more progressed). The *punctatus* on *Larus belcheri* could also be placed here, but shows, especially in the males, a very strong and extended abdominal decoration, in this respect forming a transition to *clayi*. This population proves to be more primitive than that of *lingulatus sensu stricto* and could perhaps be considered as a separate subspecies.

5. *Quadraceps punctatus sublingulatus*, ssp. n.

Type-host : *Larus delawarensis*.

This subspecies is very similar to the former, but differs from typical *lingulatus* in lacking the dark anterior spots of the pterothorax in both sexes. The dark anterior spots of the first abdominal segment are present, however, in the male, as well as in the female.

Holotype male and allotype female from *Larus delawarensis*, California, March 1939, Meinertzhagen coll., slides Nos. 12889–90. Paratypes, 10 males and 8 females from the same host, data as listed above and 2 males and 5 females, data as listed above, but slides Nos. 13072–73. To this subspecies belong also the populations on *Larus dominicanus*, *occidentalis*, *californicus*, *cirrocephalus* and *philadelphia*. A single male from *Gabianus scoresbii* stands close to *sublingulatus* too.

6. *Quadraceps punctatus regressus*, ssp. n.

Type-host : *Larus a. argentatus*.

Differs from the former by further reduction of the dark decorations. The second dark spot on the forehead before the antennal inlet is absent or appears only quite exceptionally and faintly in single males. The dark spots in the anterior corners of the first segment are always present in the male, but in the female only occasionally and then in a more or less washed-out condition.

Holotype male and allotype female from *Larus a. argentatus*, Ireland, Aug. 1937, Meinertzhagen collection, slide No. 10482. Paratypes, 7 males and 6 females from the same host, data as listed above. Very similar to *regressus* are the populations parasitic on *Larus canus*, *audouinii* and *melanocephalus*.

7. *Quadraceps punctatus punctatus* (Burmeister), 1838. (Fig. 2d.)

Type-host : *Larus ridibundus*.

The same as the former, but decorations still more reduced. The anterior dark spots in the first abdominal segment have disappeared in the male, too, or are only indicated quite exceptionally.

Neotype male and neallotype female from *Larus ridibundus*, Pembroke, England, July 1946, Meinertzhagen collection, slide No. 15867. Neoparatypes : 11 males and 1 female from the same host, data as listed above. Quite similar are the populations on *Larus ichthyaetus* and *L. brunnicephalus* (a single male of *Qu. punct. clayi* on the latter host is almost certainly a straggler).

8. *Quadraceps punctatus pallidus*, ssp. n. (Fig. 2e.)

Type-host : *Larus genei*.

The same as the nominate form, but dark decorations in general still further reduced. *Qu. punct. pallidus* ends (provisionally) the series of subspecies introduced by *Qu. punct. felix*.

Holotype male and allotype female from *Larus genei* (*gelastes*), Persian Gulf, May 1922, Meinertzhagen collection, slide No. 3744. Paratypes, 2 males and 8 females from the same host, data as listed above.

II. *Quadraceps ernstmayri*, sp. n. (Pl. XII ; fig. 3.)

Type-host : *Creagrus furcatus*.

This interesting new species is perhaps no more than a remote subspecies of *Qu. ornatus*, though it shows a number of specific morphological

Fig. 3.

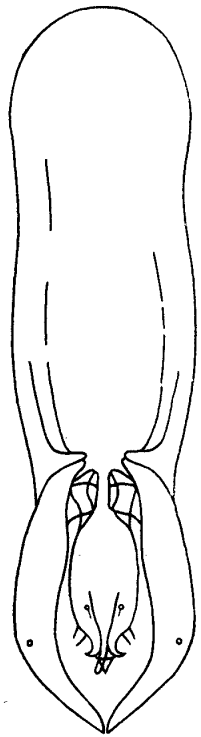


Fig. 4.

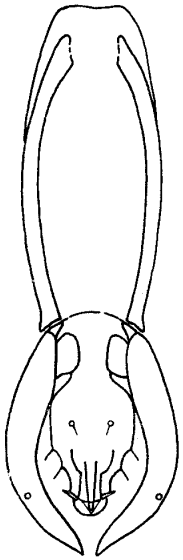


Fig. 3.—*Quadraceps ernstmayri*, sp. n., on *Creagrus furcatus*. Male genitalia.
Fig. 4.—*Quadraceps orn. paulschulzei* (Tim.) from Rissa tridactyla. Male genitalia.

details, in which it partially approaches *Qu. punctatus*. As its relations to the other species, especially its phylogenetic position, has not been sufficiently cleared up, I think it best to award *ernstmayri*, at least provisionally, the rank of an independent species.

The forehead is pointed, and more or less deeply emarginated, resembling *Qu. punctatus* and not the other *ornatus*-forms in these criteria. In the male the dark spot before the antennal inlet is rather elongated, similar to *fuscolaminulatus*, but not so thick ; in the female this spot is quite lacking. The dark spot behind the antennal inlet is contracted in the middle and obliquely pointed backward and outward. Dark temporal borders are absent.

The dark borders of the prothorax and pterothorax are nearly closed, in the male most comparable with those of *Qu. punctatus felix* ; in the female, however, the decoration of the pterothorax is restricted to a single black spot on both sides. A dark spot in the anterior corners of the first visible abdominal segment is lacking in both sexes. The median decorations of the male abdomen are confined on the dorsal side to a small dark spot in each of segments 3–5 (exceptionally in segment 2), on the ventral side there exists a broad cross bar in segment 5, and more or less distinct remainders in 4 and 6. The terminal segment of the male, which is uncoloured in all *ornatus*-populations of the northern hemisphere, bears in *ernstmayri* a strong brown half-moon-shaped spot, which is, though weaker, also to be found in *Qu. orn. fuscolaminulatus*. In the female the median abdominal ornaments are likewise very much reduced and confined to a more or less pointed or small angular figure in 3–7 (exceptionally in 2). Lateral decorations as in *ornatus*.

This distal parts of the male genitalia resemble the *ornatus*-type, but possess a dark, laterally rather strong sclerotized mesosome, which is colourless in *ornatus* (for further particulars see figs. 3 and 4). On the other hand the male genitalia of *ernstmayri* differ evidently from all *ornatus*-forms by the quite uncoloured and unsclerotized, *punctatus*-like basal plate, which moreover is comparatively longer than in all *ornatus*-subspecies.

Holotype male and allotype female from *Creagrus furcatus*, Galápagos Islands, Meinertzhagen coll., slide No. 13312. Paratypes : 6 males and 12 females from the same host, data as listed above.

The measurements (in mm.) of the holotype and the allotype are as follows :—

	Breadth of head.	Length of head.	Cephalic Index.	Total length.
Male	0·48	0·53	0·92	1·94
Female	0·50	0·55	0·89	2·23

Male genitalia.—Total length 0·50, paramers 0·19 ; breadth of abdomen 0·63 (male) and 0·66 (female).

I name this distinct new form in honour of the well-known ornithologist of the American Museum of Natural History in New York, Dr. Ernst Mayr.

III. *Quadraceps ornatus* (Grube), 1851.

Apart from the distinctive characters mentioned in the key to the species and above under *Qu. punctatus* and *ernstmayri*, this species is easily distinguished from the preceding ones by means of the male

genitalia, in which *both* basal plate *and* paramers are formed by two curved, heavily sclerotized dark brown bars (fig. 4).

I have seen this species from the following hosts : *Larus dominicanus* (one specimen), *occidentalis* (one specimen), *canus brachyrhynchus*, *canus canus*, *marinus*, *hyperboreus*, *leucopterus*, *argentatus argentatus*, *Gabianus scoresbii*, *Rissa tridactyla*, *Xema sabini* (one specimen) and *Chionis alba*.

The measurements (in mm.) of a male and a female from *L. c. canus* are as follows:—

	Breadth of head.	Length of head.	Cephalic Index.	Total length.
Male	0·49	0·51	0·96	1·91
Female	0·53	0·54	0·97	2·28

Male genitalia.—Total length 0·44, paramers 0·19 ; breadth of abdomen 0·62 (male) and 0·71 (female).

As in *Qu. punctatus* I begin the description with the phylogenetically eldest form followed by the younger.

1. *Quadraceps ornatus fuscolaminulatus* (Enderlein), 1908.

Type-host : *Larus dominicanus*.

The most primitive form of this species which I have examined. In size identical with *striolatus*, in the decorations, on the other hand, similar to *paulschulzei*, from which it is distinguishable by the following characters :—on the head there is the dark spot before the antennal inlet larger and longer (approaches the dark temples decoration nearly up to 1/10 of its own length) ; the penultimate link of the antennæ also shows a very weak brownish colouring. The dark border of the temples and the dark spots in the anterior corners of the first abdominal segment are somewhat washed out. The dark median crossbars on the ventral side of the male are not confined to segments 4–5 but exist also in 2 and 3 and in a more strongly reduced form in 6. The terminal segment shows a weak, brown colouring. I have seen only the male.

2. *Quadraceps ornatus antarcticus*, ssp. n.

Type-host : *Gabianus scoresbii*.

In general similar to the latter, but all decorations more strongly reduced and washed out. Pre-antennal spot narrower. Dark temporal borders only here and there present, mostly incomplete. Dark lateral borders of the pterothorax very faded. Anterior spots of segment 1 hardly visible or lacking. Terminal segment uncoloured.

Holotype male and allotype female from *Gabianus scoresbii*, Chile, Meinertzhagen coll., slide No. 16135. Paratype : another female from the same host, data as listed above.

Quite close to *antarcticus* is the population parasitic on *Chionis alba*. As, however, the majority of the specimens from this latter host is in a rather poor condition I must refrain from giving a detailed description of this form. It seems to be still somewhat lighter.

3. *Quadraceps ornatus paulschulzei* (Timmermann), 1949. (Fig. 4.)

Type-host : *Rissa tridactyla*.

This small form, distinguished by its dark black and sharply limited decorations has already been described and figured (Timmermann, 1949). The median decorations of the ventral side of the male resemble those of the following younger subspecies, but in *paulschulzei* there is sometimes a remainder of a cross bar also to be found in segment 3.

A single female, collected on the Vega-Expedition from *Xema sabini* (Stockholm collection) also belongs to this form. Furthermore H. S. Peters reports " *Degeeriella atrimarginata* " from the same host (*Xema*), which name almost certainly refers to *Qu. orn. paulschulzei* too (Memoirs Carnegie Mus., Vol. XII, 1934, Sect. 4, p. 36).

4. *Quadraceps ornatus ornatus* (Grube), 1851.

Type-host : *Larus canus*.

A clear intermediate form which stands, according to its decorations, as well as its size, between *paulschulzei* and *striolatus*. The decorations are developed very differently. In this respect there are realized all intermediate stages between specimens hardly to be distinguished from *paulschulzei* on one hand and resembling *striolatus* on the other. On the occiput there are the black temporal borders seldom developed as strongly as in *paulschulzei*, much more frequently incomplete, or they are quite lacking. The numerical rate of specimens with and without dark temporal borders changes in the different populations. Of 23 specimens examined from *Larus canus brachyrhynchus* from California 16 or 70 per cent had dark temporal borders, of 80 English specimens from *Larus canus canus*, however, only 11 or 14 per cent. The black lateral border of the pterothorax is reduced to a spot in the anterior corner (in the strongly coloured stage) or is, as in *striolatus*, quite lacking (in the weakly coloured phase). The spots in the anterior corners of the first abdominal segment are faded or lacking.

In 1899 a new form of *Qu. ornatus* (*Qu. ornatus* var. *atrimarginatus*) has been described from *Larus canus brachyrhynchus*, *Larus argentatus vegae* and *Rissa tridactyla pollicaris* by Kellogg & Chapman, which according to the authors is to be distinguished from the nominate form by the presence of dark temporal borders. Thus the authors have united three different groups of forms of quite different taxonomic value under the same name :—(1+2), the dark bordered phases of *Qu. orn. ornatus* and *Qu. orn. striolatus* and (3) *Qu. ornatus paulschulzei*. In order to erect a classification in this respect, which corresponds better to the real status, I hereby fix *Larus canus* as the type-host of *Qu. orn. atrimarginatus* Kellogg & Chapman and make this name simultaneously a synonym of *Qu. orn. ornatus* (Grube).

5. *Quadraceps ornatus striolatus* (Nitzsch). In Giebel, 1866.

Type-host : *Larus hyperboreus*.

Like the light, strongly reduced specimens of the nominate form, but

somewhat larger. For description and figure see my *Koeniginirmus*-paper (Timmermann, 1949), where this form is named *Koeniginirmus orn. ornatus* (Grube).

Neotype male and neallotype female from *Larus hyperboreus*, Norfolk, Nov. 1935, Meinertzhagen coll., slide No. 4475. Neoparatypes : 3 males and 8 females from the same host, dates as listed above, 3 females, Norfolk, Febr. 1934 and 10 males and 10 females, Höfn (Hornafjördur), Iceland, 3. 6. 1950, same host.

Here also fit closely the populations from *Larus leucopterus*, *Larus a. argentatus*, and *L. marinus*. A single female on *Larus occidentalis* belongs to *striolatus* too, but is possibly a straggler.

The record of "*Qu. orn. atrimarginatus*" from *Larus arg. vegae* mentioned above seems to demonstrate, that specimens with a dark temporal border may appear occasionally also among the *striolatus*-populations. I myself have, however, never observed such specimens on *L. arg. argentatus*, but it may be that the single subspecies of the Herring Gull behave differently in this respect. On *Larus hyperboreus* (*Qu. orn. striolatus*, s. str.), *Larus leucopterus* and *Larus marinus* only the light phase seems to exist, for which cause we may likely consider these populations as the phylogenetically youngest ones.

IV. *Quadraceps eugrammicus* (Burmeister), 1838.

Evidently smaller than the three former species. Outlines of temples form a rather sharp angle (in *punctatus*, *ernstmayri* and *ornatus* rounded off). Dark border of head except anterior clypeal spot laterally coherent (fig. 6). On the border of the temple is present, as in the *Quadraceps* of skuas and auks, only *one* strong seta (two in *punctatus*, *ernstmayri* and *ornatus*). Abdominal segments with transverse dark brown crossbars ; dark colouring extending to the whole proximal part of the basal plate. For further particulars of male genitalia see fig. 7.

Parasitic on *Larus minutus*, *Rhodostethia rosea* and *Xema sabini*.

Below I will state the measurements (in mm.) of 3 males and 7 females (Neotype, Neallotype and Neoparatypes) of *Qu. eugr. eugrammicus* (Burm.) :—

	Breadth of head.	Length of head.	Cephalic Index.	Total length.
Male	0·35–0·37	0·40–0·42	0·86–0·91	1·57
Female	0·36–0·41	0·41–0·45	0·87–0·91	1·74–2·06

Male genitalia of the neotype.—Total length 0·37, paramers 0·16 ; breadth of abdomen 0·42 (neotype) and 0·50 (neallotype).

1. *Quadraceps eugrammicus eugrammicus* (Burmeister, 1838).

Type-host : *Larus minutus*.

In addition to what has been said above on *Qu. eugrammicus* in general this subspecies is characterized by its narrow head (Cephalic Index low) and broad dark abdominal cross-bars, which are comparatively little narrowed at their ends especially in the first segments. In visible

abdominal segments 4 and 5 of the male (true 5 and 6) there is a light brown rectangular crossbar on the ventral side of half of the length of the segments.

Neotype male and neallotype female from *Larus minutus*, N. Russia, August 1912, Meinertzhagen collection, slide No. 3629. Neoparatypes : 1 male and 4 females from the same host, data as listed above and 1 male and 2 females from the same host, Egypt, February 1920, Meinertzhagen collection, slide No. 3742.

Fig. 5.

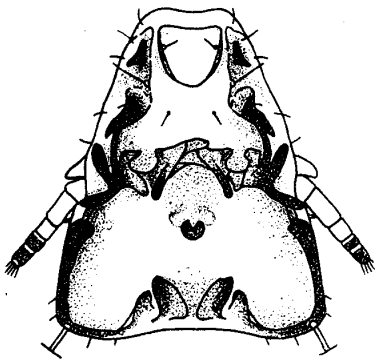


Fig. 6.

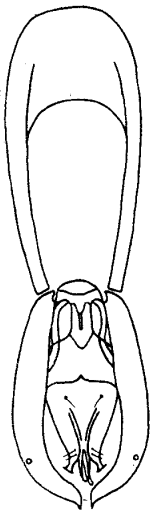


Fig. 5.—*Quadraceps eugr. eugrammicus* (Burm.) from *Larus minutus*. Head of female.
Fig. 6.—*Quadraceps eugr. eugrammicus* (Burm.) from *Larus minutus*. Male genitalia.

2. *Quadraceps eugrammicus bryki*, ssp. n.

Type-host : *Rhodostethia rosea*.

Much blunter-headed than nominate form. Head as long as wide (C.I. 1·0). Shape of clypeus approaching *ornatus*. Pterothorax laterally more rounded off, not being so prominent and pointed as in *Qu. eugr. eugrammicus*. Abdominal crossbars much narrower, especially laterally strongly narrowed, hind margin weakly convex. Between the last two crossbars there is a faded yellow spot present joining the anterior one. The male is still unknown.

Holotype female from *Rhodostethia rosea*, Vega-Expedition, 1. 7. 1879, Stuxberg, Riksmuseum Stockholm. Paratypes : 2 females from the same host, Siberia, Meinertzhagen Coll., slide No. 10973.

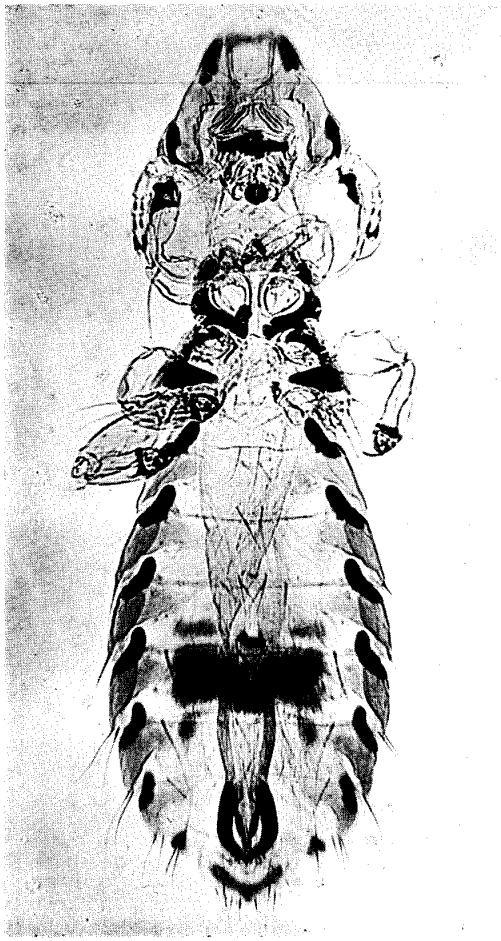
This subspecies is named in honour of the well known entomologist and Linnaeus-expert, Mr. Felix Bryk (Naturhistoriska Riksmuseum Stockholm),

3. *Quadraceps eugrammicus lineatus* (Piaget), 1880.

Type-host : ***Xema sabini***.

This " species " I have not seen myself and when I asked Miss Clay about the type, she kindly communicated, that the specimen was not to be found in the Piaget-Collection in London and must be considered as being lost. We are, therefore, confined to Paiget's description and figure, which show at least clearly enough, that " *Nirmus lineatus* " is a subspecies of *Qu. eugrammicus*. " *Degeeriella jugifera* " Müller, 1932, which has likewise been described from Sabines Gull is likely to be a synonym, the stated differences being caused by individual deviations and the inaccurate description of Piaget. At all events it is extremely unlikely, that on *Xema sabini* two different subspecies of *Qu. eugrammicus* should live side by side. Whether Müller's types have survived the disorders of the last war in Elbing (West-Prussia) is unknown to me and their present status hardly to be cleared up under the present political circumstances.

(To be continued.)



Quadraceps ernstmayri, sp. n., from Creagrus furcatus. Male (holotype).