

ANOPLURA

By THERESA CLAY, B.Sc.

Department of Entomology, British Museum (Natural History)

THE collection of Anoplura presented to the British Museum by the British Graham Land Expedition was collected by Mr. Brian Roberts and comprises some interesting material. The collection contains two species of Siphunculata (sucking lice) and 17 species of Mallophaga (biting lice), of which two are certainly new and two others are possibly new but cannot be described until further material is available. The most interesting species in the collection are *Antarctophthirus lobodontis* Enderlein, a little known species; the species of *Tetrophthalmus*, a genus which is found in the pouch of pelicans and cormorants and which has been only rarely recorded from these latter hosts; and the two new species of *Naubates* which together with *N. annu-liventris* form a distinct and interesting group within this genus.

As is usual when working out any collection of Mallophaga it is necessary to do a considerable amount of work on the characters and synonymy of related species, and in the cases where this has been done the results have been incorporated in the paper.

Owing to the inadequacy of the descriptions and figures of the majority of species of Mallophaga it is necessary to have specimens from the type hosts for identification; also, in order to get a true conception of the genera comprising the species from a single order of birds, material from as many hosts as possible within that order is needed. The author is fortunate therefore in being able to work on Colonel Meinertzhagen's large and unique collection without which the correct identification of this material would have been difficult. The author is also indebted to Dr. Delkeskamp of the Berlin University Zoological Museum for the loan of Enderlein's types; to Professor Martin of the National Veterinary School of Toulouse for the loan of Neumann's types; to Mr. G. H. E. Hopkins for valuable advice; and to Dr. E. A. Chapin for information concerning the type of *Tetrophthalmus transitans* and for the great assistance afforded to the author while in the National Museum at Washington.

Text-figures 1, 7*b* and 10 were drawn by Miss Mackay, the remainder by the author.

Order ANOPLURA

Sub-order SIPHUNCULATA

Genus *Antarctophthirus* Enderlein

Antarctophthirus lobodontis Enderlein 1907.

1 ♂, 1 ♀, 13 immature collected from hind limbs of an immature diseased specimen of *Lobodon carcinophagus* (Jacquinot and Pucheran). Argentine Island, W. Graham Land.

These specimens have the ventral hairs on the mid-thoracic region as shown in Enderlein's original figure and are distinguished from *microchir* and *callorhini*, which also possess this character, by the absence of hairs on the mid-dorsal region of thorax and abdomen.

Antarctophthirus sp. ?

4 ♂, 31 ♀, 1 immature from young *Leptonychotes weddelli* (Lesson). Argentine Island, W. Graham Land.

These specimens are apparently conspecific with *A. ogmorhini* Enderlein, but the poor condition of the types of the latter makes an exact determination impossible.

Sub-order MALLOPHAGA

Super-family *AMBLYCERA*

Family *MENOPONIDAE*

Genus *Menopon* Nitzsch

Menopon becki Kellogg 1906.

2 ♀ from under wing of *Phaethon a. aethereus* Linné. N.E. of Cape Verde Islands.

These specimens are apparently conspecific with the species figured by Thompson (1938) as *M. becki*. However, as the original description of this species was unaccompanied by a figure it cannot be said with certainty that these specimens are *M. becki* until the type has been examined.

Genus *Tetrophthalmus* Grosse

Tetrophthalmus sp. ?

82 ♂, 61 ♀, 41 immature from 5 adults and an unspecified number of newly-hatched chicks of *Phalacrocorax a. atriceps* King, from the Bethelot, Uruguay, and Argentine Islands, and Port Lockroy, Graham Land. These specimens were collected inside the mouth and in the case of one adult and some of the newly-hatched chicks from the head skin. One immature bird had 154 specimens of this parasite inside the mouth.

2 ♂ from inside the mouth of *Phalacrocorax a. albiventer* (Lesson), from Kidney Island, E. Falkland.

Records of *Tetrophthalmus* from cormorants are rare so that these specimens from new hosts are of considerable interest. *Tetrophthalmus* on cormorants was first recorded by Kellogg and Chapman (*T. incompositus*, 1899, p. 123) from *Phalacrocorax penicillatus* (Brand), although the authors themselves expressed some doubt as to the authenticity of the host and suggested that the single specimen, on which the description was based, might have straggled from a pelican. However, the description and figure¹ show without doubt that *incompositus* is a cormorant parasite. Ewing (1930, p. 125), described *T. transitans* from a single male specimen taken from an unknown cormorant found in the stomach of a gull from Chinchá Island, Peru. Specimens of *Tetrophthalmus* recently sent to the British Museum from *Phalacrocorax bougainvilli* (Lesson), collected at Pisco, Peru, appear to be *transitans* when compared with drawings of the type made by the author while in Washington. *Phalacrocorax bougainvilli* should therefore be considered as the type host of *T. transitans* Ewing. *Tetrophthalmus* has also been recorded from *Phalacrocorax a. auritus* (Lesson) by Peters (1928, p. 222), and Lewis (1929, p. 81).

Through the kindness of Professor F. H. Wilson of the Tulane University the author has been able to examine *Tetrophthalmus* from *Phalacrocorax auritus* and, together with the material mentioned above, has now seen specimens from all the hosts from which *Tetrophthalmus* has been recorded with the exception of *Phalacrocorax penicillatus*. This is unfortunate as without material from this host, the type host of *incompositus*, identification of the other material is not possible. As soon as material from *P. penicillatus* is available it is hoped to publish descriptions of all the known cormorant *Tetrophthalmus*, but until then the identification of the *Tetrophthalmus* collected on the British Graham Land Expedition must be left uncertain.

Super-family ISCHNOCERA

Family PHILOPTERIDAE

Genus *Austrogoniodes* Harrison

? *Austrogoniodes hamiltoni* Harrison 1937.

Austrogoniodes hamiltoni Harrison, 1937, p. 18, pl. i, f. 8-9, pl. ii, f. 1-2. Type host: *Eudypetes c. cristatus* (Miller). (Corrected from *Catarrhactes pachyrhynchus* on p. 6.)

1 ♂, 1 ♀, 8 immature, from *Eudypetes c. cristatus* (Miller). Kidney Island, E. Falklands.

These specimens appear identical with paratypes of *A. hamiltoni* in the British Museum, except that in the case of the single male collected on this Expedition the genitalia are proportionally somewhat smaller.

Genus *Philopterus* (sens. lat.)

? *Philopterus bicolor* (Rudow) 1870.

1 ♂ from *Priocella antarctica* (Stephens), Clarence Island, S. Shetlands.

¹ The figure shows a female, not a male as stated in the text.

Philopterus spp. ?

1 ♂ from *Daption capensis* (Linné), Clarence Island, S. Shetlands.

1 ♀ from *Daption capensis*, Leith, S. Georgia. Apparently a different species from the male.

As it has been impossible to examine specimens of *Philopterus* from all the type hosts of the species occurring on the Procellariiformes it has been considered advisable to leave the exact determinations of these three species until more material is available.

? *Philopterus platycephalus* (Kellogg and Kuwana) 1902.

3 ♂ from *Garrodia nereis* (Gould), Kidney Island, E. Falklands.

It is not possible to say from the description and figure whether these specimens from *Garrodia nereis* are conspecific with *P. platycephalus* from *Oceanites gracilis galapagoensis* Lowe. However, it is apparent that they are closely related if not conspecific but must await the examination of material from the type host of *platycephalus* before being identified with certainty.

Docophoroides Giglioli*Docophoroides brevis* (Dufour), 1835.

11 ♂, 8 ♀, 21 immature, collected from the head and neck of 4 adult *Diomedea exulans* Linné. At sea, latitude 56° 20' S., longitude 61° 18' W.

Docophoroides harrisoni Waterston 1917.

1 immature from neck of *Diomedea m. melanophris* Temminck. At sea, latitude 60° 24' S., longitude 62° 55' W.

The specimen is somewhat immature but should probably be referred to this species.

Family ESTHIOPTERINAE

Genus *Pseudonirmus* Mjöberg*Pseudonirmis gurlti* (Taschenburg), 1882.

5 ♂, 11 ♀ collected from 4 specimens of *Daption capensis* (Linné). Deception Island, S. Shetlands, and S. Georgia.

Genus *Episbates* Harrison*Episbates pederiformis* (Dufour), 1835.

2 ♂, 2 ♀ from *Diomedea exulans* Linné. At sea, latitude 56° 20' S., longitude 61° 18' W.

? *Harrisionella ferox* (Giebel) 1867.

Lipeurus ferox Giebel, 1867, p. 195. Type host: *Diomedea m. melanophris* Temminck.

1 ♂, 1 ♀ from underside of primary wing feathers of *Diomedea exulans* Linné. At sea, latitude 56° 20' S., longitude 61° 18' W.

As is shown below it is not possible to use *diomedae* Fabricius for the species placed in *Harrisonella* by Bedford nor can *diomedae* Dufour be used, as it is merely a mis-identification of the species of Fabricius. *L. ferox* was described from *Diomedea melanophris* and as material has not been examined from this host it is impossible to determine the specimens from *D. exulans* with certainty.

Genus *Perineus* Harrison

Perineus nigrolimbatus (Giebel) 1874.

1 ♂, 6 ♀ from under wing of 2 specimens of *Priocella antarctica* (Stephens) from Clarence Island, S. Shetlands.

Specimens of this type of *Perineus* have been examined from *Fulmarus glacialis* (type host of *nigrolimbatus*), *Priocella antarctica* and *Daption capensis*. There is a certain amount of variation in the characters of these specimens especially at the point of approximation of the frontal bands in the mid-line of the head, but as any given type of variation is not restricted to the specimens from one host it cannot be considered of specific value. The head index, i.e., the proportions of breadth to length of the whole head and the breadth to length of the pre-antennal region show that on an average specimens from *Fulmarus glacialis* have a smaller and narrower head than either those from *Daption* or *Priocella*. However, a much larger number of specimens will have to be measured before any conclusions can be reached. If, on the examination of a large amount of material it is found that the specimens from the different hosts are separable, it must be remembered that the single female type specimen of *mutabilis* Piaget in the British Museum, labelled as from *Procellaria glacialis* (= *Fulmaris glacialis*) falls well within the range of the large specimens from *Priocella* and has a broader head than any of the specimens measured from *Fulmarus*. It is possible, therefore, that Piaget was mistaken as to the host, a suggestion which is borne out by the fact that amongst the old material in the Leiden Museum, which was most probably examined by Piaget, is a specimen of *Priocella antarctica* labelled *P. glacialis*.

Specimens from *Priocella antarctica* are therefore placed temporarily in *nigrolimbatus*, although eventually they may prove to be subspecifically separate.

The genus *Perineus* contains a number of rather diverse species amongst which there is a group of related species, all of which exhibit great contrast between the pigmented and non-pigmented areas. As it has been possible to examine specimens of all the known species of this group with the exception of one, and as it has been necessary to go into the characters and synonymy of them all in order to name the species collected on this Expedition, it has been thought advisable to include a short account of these species and their synonymy.

Perineus diomedae (Fabricius) 1775. (Text-figs. 1, 2, 4a, 5a and 6a.)

Pediculus diomedae Fabricius, 1775, p. 808. Original host record: "In Brasiliae diomedis". Type host (by present designation): *Diomedea m. melanophris* Temminck.

Lipeurus meridionalis Rudow, 1869, p. 32. Type host: *Phoebetria p. palpebrata* (Forster) (*Diomedea fuliginosa*).

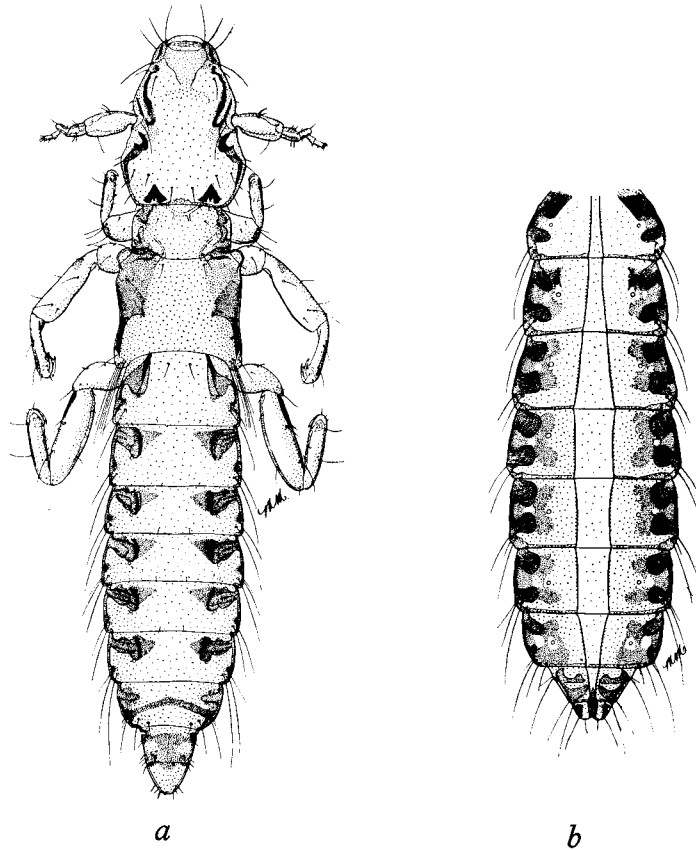
Lipeurus tricolor Piaget, 1880, p. 363, pl. XXX, f. 4. Type host: *Phoebetria p. palpebrata* (*Diomedea fuliginosa*).

Lipeurus lepturus Enderlein, 1909, p. 452, pl. LXII, f. 200-2, 209. Type host: *Phoebetria p. palpebrata* (*Diomedea fuliginosa*).

Esthiopterum ferreirai Monteiro de Barros, 1933, p. 33, 3 pls. Type host: *Diomedea m. melanophrys* Temminck (*Diomedea melanophrys*).

2 ♂, 1 ♀ collected from secondary wing feathers of *Diomedea m. melanophrys* Temminck. At sea, latitude 60° 24' S., longitude 62° 55' W.

Mr. G. H. E. Hopkins, in a private communication to the author, has pointed out that the description of *diomedea* Fabricius cannot be interpreted to represent a species of *Harrisionella*. Mr. Hopkins says: "The description is quite certainly that

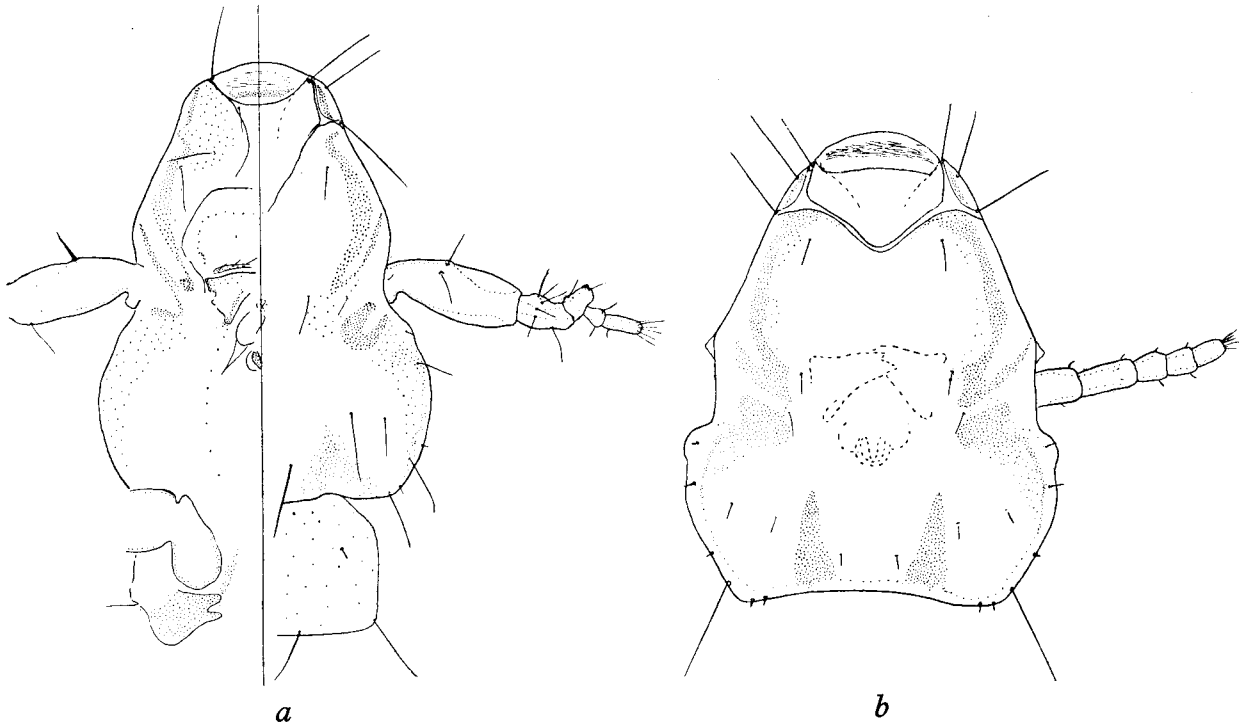


TEXT-FIG. 1.—*Perineus diomedea*. (a) ♂; (b) ♀ abdomen.

of an *Esthiopterum* s.l. and the host-record is 'Habitat in Brasiliae diomedeis'. Harrison (1916, p. 13) referred the species to *Esthiopterum*, with *Lipeurus ferox* Giebel as a synonym, presumably because Taschenberg (1882, p. 145) placed *Pediculus diomedea* Fabricius as a synonym of *L. ferox*, in which he was followed by Kellogg. But this attribution is certainly erroneous and is probably due to confusion between *Philopterus diomedea* Dufour (which is the same as *ferox*) and *Pediculus diomedae* Fabricius. Fabricius' description informs us that the species is white with broad black abdominal margins and with white legs, which is wholly at variance with *ferox*, of which the adults are very dark-coloured and even immature forms have the legs mainly dark brown. Furthermore, *ferox* is a distinctly uncommon species, so that the probabilities would be against Fabricius' species being this even if there were not such grave discrepancies in the description. On the other hand the genus *Perineus*,

which is common on albatrosses, agrees almost perfectly with the description, even to the white legs, and I have no hesitation in ascribing *Pediculus diomedae* F. to this genus." Mr. Hopkins goes on to say that on *Diomedea m. melanophris*, one of the commoner albatrosses of Brazilian waters, there is a *Perineus* which fits excellently the description given by Fabricius. The present author has therefore designated and described below a neotype from *Diomedea m. melanophris*.

Although Rudow's original description of *meridionalis* does not give much indication as to what this species represents, Taschenberg (1882, p. 194) who apparently



TEXT-FIG. 2.—*Perineus diomedae*. Heads. (a) ♂; (b) ♀.

saw an immature example of Rudow's material, considered it to be conspecific with *tricolor* Piaget. The types of *tricolor* and *lepturus* and paratypes of *ferreirai* have been examined and in addition a considerable amount of material from *Diomedea melanophris* and *Phoebetria* spp. It is apparent from this material that specimens from *Diomedea melanophris* cannot be separated from those from *Phoebetria* for, although there is considerable variation in the amount and shape of the pigmented areas, this variation is found in specimens from both hosts.

This species is distinguished from those below by the smaller size, proportions of head, characters of male genitalia, and genital region of female.

Male.—Head with characters as shown in text-fig. 2a,

Thorax as shown in text-fig. 1a, with breadth of prothorax not greater than length of occipital margin of head. Sternal plates may either be completely pigmented, partially pigmented anteriorly, or apparently absent. Dorsal chaetotaxy as in figure; ventral surface with one mesothoracic hair each side.

Abdomen as shown in text-fig. 1a, with segments VIII and IX considerably narrowed. On the dorsal surface segment I has two anterior and two posterior

central hairs and two lateral hairs each side; segments I–VI with two small central hairs and two lateral hairs each side; segment VII with four hairs. On the ventral surface segments I–V with one lateral and two minute central hairs; segment VI with one lateral and four central hairs. Chaetotaxy of posterior segments as shown in text-fig. 4a.

Genitalia are quite distinct from those of *confidens* and *miriceps* in the narrow thickened paramera and from *hyalinus* in size and shape. Total length of genital apparatus figured in text-fig. 5a is 0.80 mm.

Female.—Head as shown in text-fig. 2b.

Thorax as in male.

Abdomen as shown in text-fig. 1b, with postero-lateral angles of segment VII not drawn out posteriorly. Vulva and chaetotaxy of genital region as shown in text-fig. 6a. Chaetotaxy of segments I–VI as in male.

MATERIAL EXAMINED: *Lectotype* of *tricolor* (Piaget) designated by present author; ♂ in the Piaget collection, slide No. 451. *Paratype*: 1 ♀.

Lectotype of *lepturus* (Enderlein) designated by present author; ♂ in the Berlin University Zoological Museum, from *Phoebetria p. palpebrata* from Prince Edward Island. *Paratypes*: 3 ♀.

In the material kindly lent by the Berlin Museum are 1 ♂, 2 ♀ (presumably those mentioned by Enderlein 1909, p. 453), from *Diomedea exulans* labelled *tricolor* by Enderlein; these specimens are conspecific with *lepturus*.

Paratypes of *ferreirai* (Monteira de Barros): 1 ♂, 1 ♀ in the Meinertzhagen Collection.

22 ♂, 32 ♀ from skins and fresh specimens of *Diomedea m. melanophris* Temminck from Brazil, Valparaiso, and S. Georgia; 8 ♂, 16 ♀ from skins of *Phoebetria p. palpebrata* from the Antipodes Island and Kerguelen; 5 ♂, 7 ♀ from skins of *Phoebetria f. fusca* (Hilsenberg) from S. Atlantic.

Neotype of *diomedae* (Fabricius) designated by the present author; ♂ in the British Museum (presented by Mr. G. H. E. Hopkins), slide No. 309, from *Diomedea m. melanophris* Temminck from S. Paulo, Brazil. *Neoparatypes*: 21 ♂, 32 ♀ in the British Museum, Hopkins and Meinertzhagen Collections, from the same host from different localities.

Perineus confidens (Kellogg), 1899. (Text-figs. 3a, 4c & 5b)

Lipeurus confidens Kellogg, 1899, p. 26, pl. iii, f. 1. Type host: *Diomedea nigripes* Audubon.

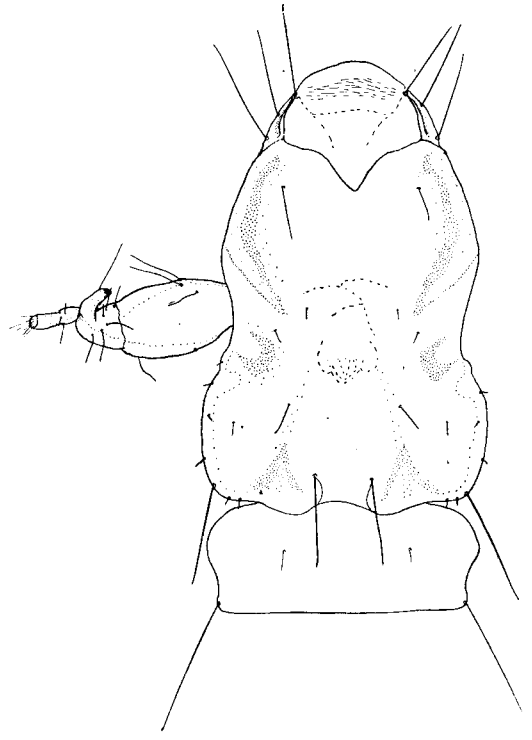
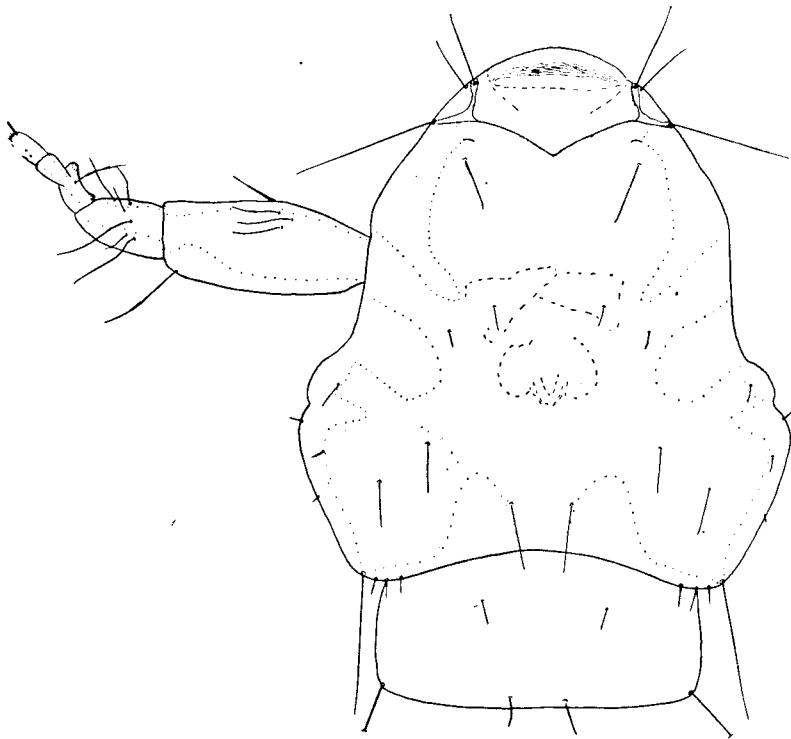
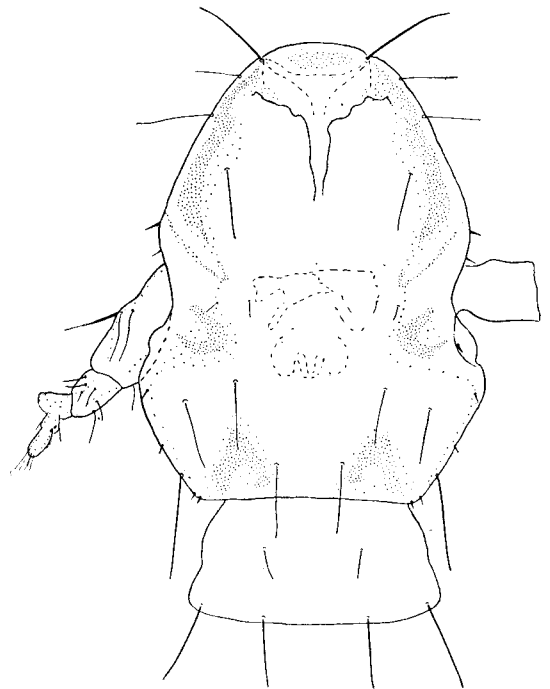
This species is distinguished from *diomedae* by its larger size and different proportions of head and from *miriceps* by the greater width of temples.

Male.—Head as shown in text-fig. 3a.

Prothorax with breadth equal to length of occipital margin of head. Pterothorax with general characters and chaetotaxy as in *diomedae*.

Abdomen with general characters as in *diomedae*, but with postero-lateral angles of segment VII produced posteriorly and posterior margin of last segment asymmetrical (text-fig. 4c). Chaetotaxy as in *diomedae*, but lateral dorsal hairs tend to be longer and stouter.

Genitalia are but slightly thickened and are therefore apt to become somewhat

*a**b**c**d*

TEXT-FIG. 3.—*Perineus* spp. ♂ heads. (a) *P. confidens*; (b) *P. miriceps*; (c) *P. hyalinus*; (d) *P. obscurus*.

distorted in mounting. Paramera differ from those of *diomedae* in being flattened and unthickened (text-fig. 5*b*). Total length of genital apparatus is 1.23 mm.

Female.—Head with characters similar to that of *diomedae* but with different measurements, and lacks lateral pigmented area running from ocular blotch to middle of temples.

Thorax as in male.

Abdomen similar in general character to *diomedae* but with postero-lateral angles of segment VII produced somewhat posteriorly. Vulva and chaetotaxy of genital region apparently identical with that of *miriceps* although the breadth of the segments is greater. Chaetotaxy as in *diomedae* except that segment I has four central hairs on the ventral surface and the lateral dorsal hairs tend to be longer and stouter in all segments.

MATERIAL EXAMINED: 5 ♂, 7 ♀ from skins of *Diomedea nigripes* Audubon from N. Pacific. 18 ♂, 18 ♀ from skins of *Diomedea irrorata* Salvin from Galapagos Islands.

Perineus miriceps (Kellogg and Kuwana) 1902. (Text-figs. 3*b*, 5*c* and 6*b*)

Lipeurus miriceps Kellogg and Kuwana, 1902, p. 480, pl. XXX, f. 4. Type host: *Geospiza fuliginosa* Gould (in error).

The host as given by Kellogg and Kuwana is a finch, and obviously not the true host of this species. This type of *Perineus* appears to be restricted to the genera, *Diomedea*, *Macronectes* and *Phoebetria*, and as the only species of these genera occurring in the Galapagos Islands (the locality of the species) is *Diomedea irrorata* Salvin, it should, as suggested by Thompson (1938¹, p. 490) be considered as the type host. Thompson, without stating his reasons, places this species as a synonym of *confidens* (Kellogg), but if the present interpretation of *miriceps* is correct the two species are quite distinct. Material examined from *D. irrorata* appears identical with the figure and description of *miriceps* except for the text measurement of the breadth of the head, this latter measurement being considerably smaller than that of any known species of *Perineus*. If the head index is calculated from the text measurements the result (i.e. C.I. = 0.36) is different from that calculated from the measurements taken from the figure (i.e. C.I. = 0.62). However, if it is assumed that the text measurement of the breadth of the head, i.e. 0.31 mm. is a mistake for 0.51 mm., the head index (i.e. 0.60) is then within the range of those taken from the figure and from specimens from *D. irrorata* (i.e. 0.62–0.66). There seems to be little doubt therefore that 0.31 mm. for the breadth of the head is an error.

This species is distinguished from *confidens* by the proportions of the head in both sexes, by the narrow temples and the male genitalia.

Male.—Head as shown in text-fig. 3*b*.

Thorax normal but with prothorax somewhat enlarged antero-laterally.

Abdomen with general characters as in *diomedae* but with postero-lateral angles of segment VII drawn out posteriorly to a greater extent and with posterior margin of last segment asymmetrical. Chaetotaxy of abdomen as in *confidens*.

Genitalia similar in general characters to those of *confidens* but differing in detail (text-fig. 5*c*). Total length of genital apparatus is 1.18 mm.

Female.—Head similar to that of *confidens* but differing in proportions.

Thorax as in male.

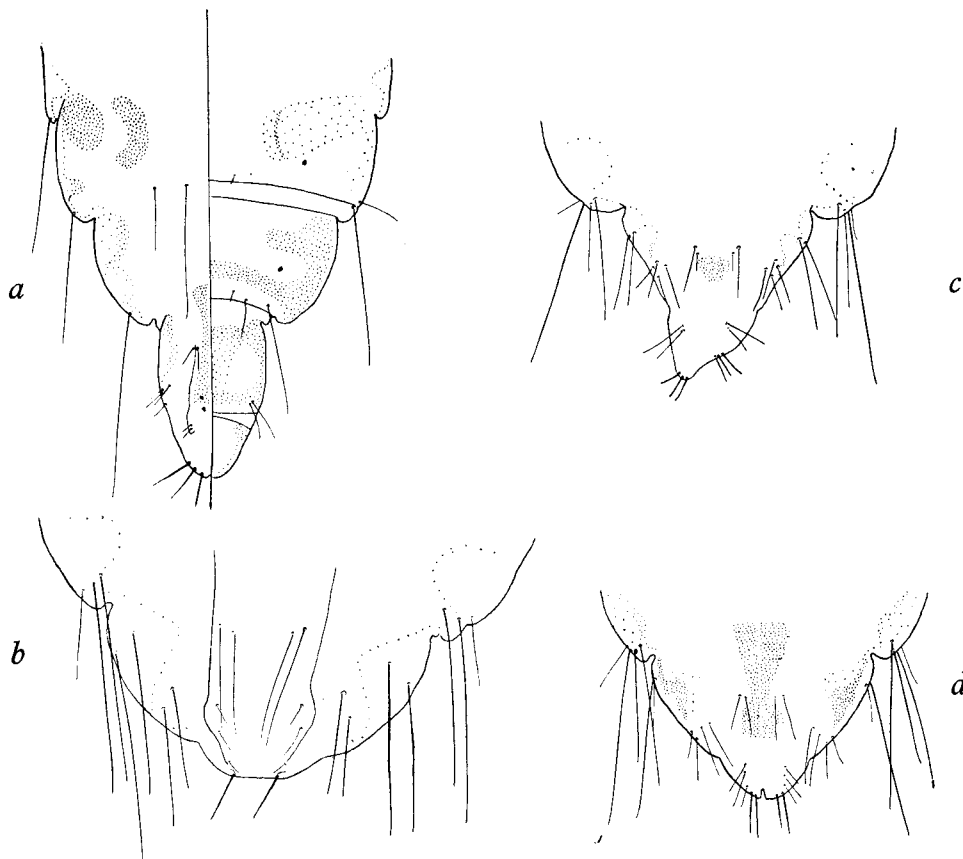
Abdomen similar in general characters to that of *confidens* but somewhat narrower. Vulva and chaetotaxy of genital region as shown in text-fig. 6b. Chaetotaxy as in *confidens*.

MATERIAL EXAMINED: 6 ♂, 15 ♀ from skins of *Diomedea irrorata* Salvin from the Galapagos Islands.

Perineus hyalinus (Neumann) 1911. (Text-figs. 3c, 4b, 5d and 6c)

Lipeurus hyalinus Neumann, 1911, p. 21, pl. ii, f. 1. Type host: *Diomedea exulans* Linné.

Lipeurus nigropunctatus Enderlein, 1917, p. 244, figs. 5-7. Type host: *Diomedea exulans* Linné.



TEXT-FIG. 4.—*Perineus* spp. Terminal segments of ♂ abdomen. (a) *P. diomedae*; (b) *P. hyalinus*; (c) *P. confidens*; (d) *P. obscurus*.

This is a characteristic species distinguished from others of this group by the lack of pigmentation, by the shape of the head, the characters of the terminal segments of the abdomen, in both sexes, and by the male genitalia.

Male.—Head as shown in text-fig. 3c.

Thorax as shown in Neumann's figure with chaetotaxy as in *diomedae*.

Abdomen with general characters as in Neumann's figure. Segments VIII and IX not greatly narrowed as in preceding species and with segment IX small (text-fig. 4b). Chaetotaxy as in *confidens*.

Genitalia distinguished from previous species by the large size, thickened

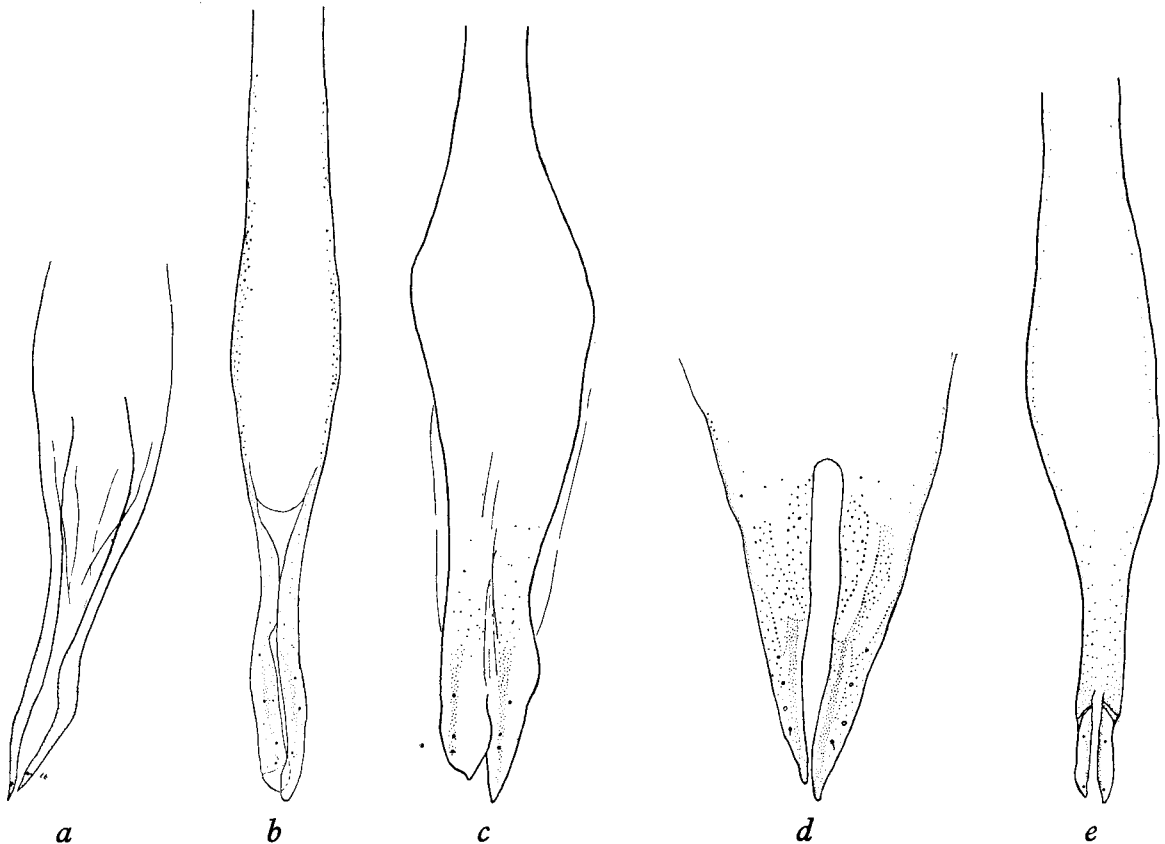
paramera and presence of sac bearing chitinized teeth (text-fig. 5*d*). Total length of genital apparatus is 1.62 mm.

Female.—Head similar to male but of somewhat different proportions and as in all these species the clypeal suture is more obvious than in the male, especially in the median area of head.

Thorax as in male.

Abdomen with general characters as shown in Neumann's figure. Vulva with shape and chaetotaxy distinctive (text-fig. 6*c*). Chaetotaxy as in *confidens*.

MATERIAL EXAMINED: 1 ♂, 1 ♀, Neumann's types from *Diomedea exulans* Linné



TEXT-FIG. 5.—*Perineus* spp. ♂ genitalia. (a) *P. diomedae*; (b) *P. confidens*; (c) *P. miriceps* (d) *P. hyalinus*; (e) *P. obscurus*.

from the S. Indian Ocean (lat. 40° S., long. 47° W.); 1 ♂, 1 ♀ Enderlein's types of *nigropunctatus* from *Diomedea exulans* collected at sea between Kapland and Tristan da Cunha (10.xi.1901); 10 ♂, 19 ♀ from skins and fresh specimens of the same host from N.W. Australia and the Cape.

Perineus giganticola (Kellogg) 1896.

Nirmus giganticola Kellogg, 1896, p. 105, pl. v, f. 6. Type host: *Diomedea albatrus* Pallas.

No material of this species has been examined, but the description and figure indicate that it resembles *hyalinus*. However, the measurements of the male head and figure of the female head show that it is not conspecific with this latter species.

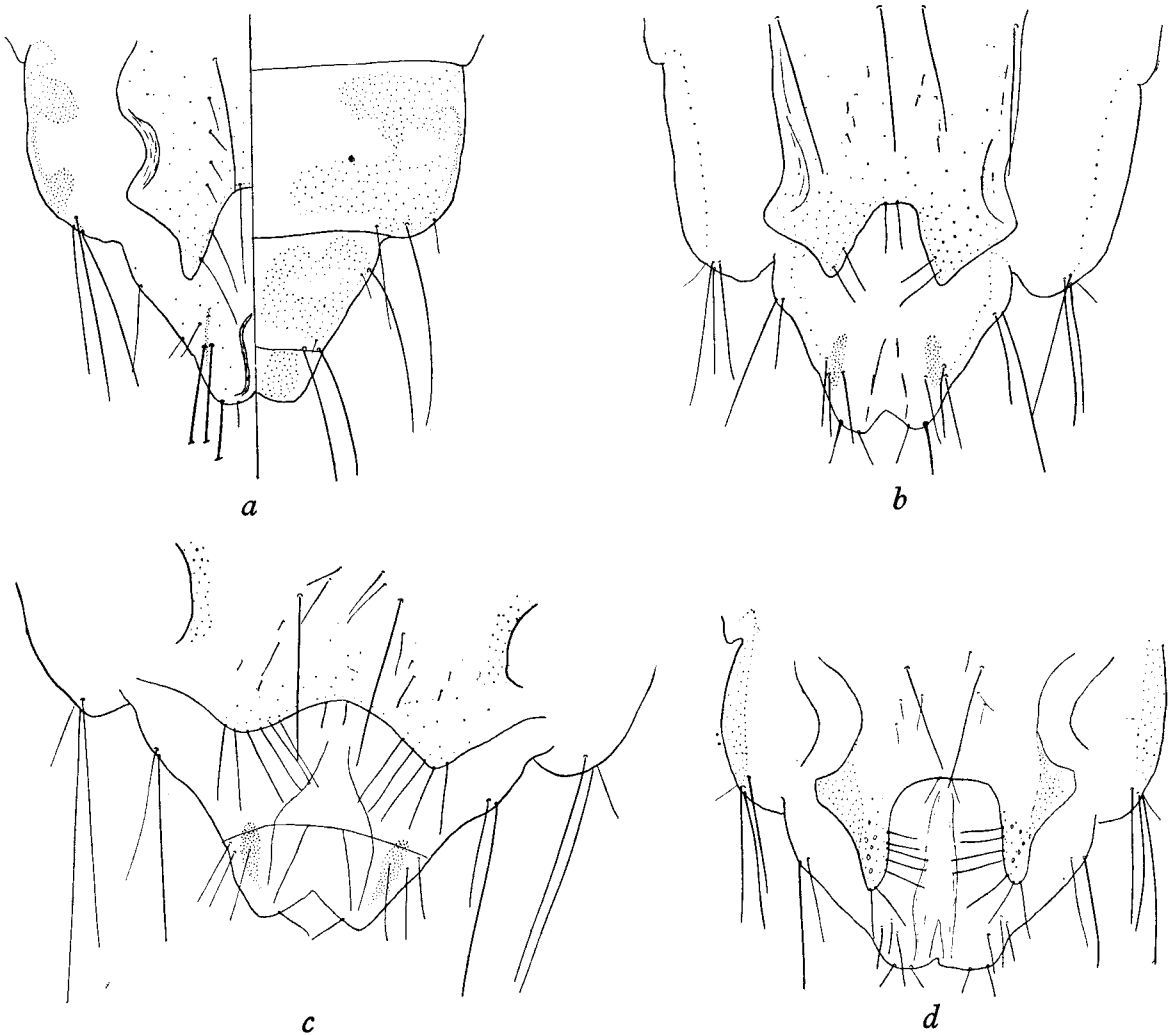
Perineus obscurus (Rudow) 1869. (Text-figs. 3*d*, 4*d*, 5*c* and 6*d*)

Lipeurus obscurus Rudow, 1869, p. 30. Type host: *Macronectes giganteus* (Gmelin). (*Procellaria gigantea*.)

?*Lipeurus melanocnemis* Giebel, 1874, p. 233. Type host: *Macronectes giganteus* (Gmelin). (*Procellaria gigantea*.)

Lipeurus gaini Neumann, 1913, p. 192, f. 4–5. Type host: *Macronectes giganteus* (Gmelin). (*Ossifraga gigantea*.)

Rudow's original description of *obscurus* has been interpreted by the present author as representing the species described below and a neotype has been designated



TEXT-FIG. 6.—*Perineus* spp. ♀ genital region. (a) *P. diomedae*; (b) *P. miriceps*; (c) *P. hyalinus*; (d) *P. obscurus*.

to fix this name definitely. It has been impossible to obtain information on Giebel's type of *melanocnemis*, but from the description it appears to be conspecific with this species. The types of *gaini* have been examined and found to be conspecific with the species described below.

This species is distinguished by the absence of a definite clypeal suture and by the characters of the terminal segments of the abdomen in both sexes.

Male.—Head as shown in text-fig. 3*d*, and characterized by the shape of the pre-antennal region and absence of definite lateral clypeal suture.

Thorax with shape as shown in Neumann's figure for *gaini* with chaetotaxy as in *diomedae*.

Abdomen with general characters as shown in Neumann's figure; segments VIII and IX not greatly narrowed as in *diomedae*, *confidens*, and *miriceps*. Chaetotaxy of dorsal surface and ventral surface of segments I–VII as in *confidens*; ventral surface of posterior segments as shown in text-fig. 4*d*.

Genitalia with small flattened paramera and lightly armed sac. Total length of the genital apparatus figured in text-fig. 5*e* is 0.95 mm.

Female.—Head similar to that of male, but differing somewhat in shape (see Neumann, f. 5).

Thorax similar to that of male.

Abdomen with general characters as shown in Neumann's figure of *gaini*. Shape and chaetotaxy of vulva characteristic (text-fig. 6*d*).

Dorsal and ventral chaetotaxy of segments I–VI as in *confidens*, but on the ventral surface segment I has apparently only 2 central hairs.

MATERIAL EXAMINED: 22 ♂, 33 ♀ from skins and fresh specimens of *Macronectes giganteus* (Gmelin) from Cape Seas, Peru, Chile, and S. Georgia.

Types of *gaini* Neumann: 1 ♂, 1 ♀, slide No. 410, from *Ossifraga gigantea* (*Macronectes giganteus*) from Petermann Island.

Neotype designated by present author: ♂ in the Meinertzhagen Collection, slide No. 12688, from *Macronectes giganteus* from Chile. *Neoparatypes*: 21 ♂, 33 ♀ in the Hopkins and Meinertzhagen Collections from the same host from various localities.

MEASUREMENTS

MALES

	<i>diomedae</i>	<i>confidens</i>	<i>miriceps</i>	<i>hyalinus</i>	<i>obscurus</i>
	mm.	mm.	mm.	mm.	mm.
<i>Length</i> :					
Head (a)*	.. 0.66–0.71	0.75–0.78	0.75–0.80	0.86–0.88	0.77–0.81
(b)	.. 0.23–0.25	0.29–0.31	0.29–0.31	0.29–0.31	0.32–0.34
Prothorax	.. 0.16–0.23	0.23–0.25	0.23–0.25	0.26–0.31	0.21–0.23
Pterothorax	.. 0.45–0.47	0.57–0.61	0.51–0.54	0.75–0.77	0.46–0.52
Abdomen	.. 1.49–1.68	1.77–1.92	2.10–2.22	2.60–2.64	1.60–1.65
Total	.. 2.80–2.85	3.22–3.50	3.60–3.65	4.40–4.45	2.98–3.12
<i>Breadth</i> :					
Head (a)*	.. 0.49–0.55	0.57–0.60	0.49–0.50	0.85	0.60–0.63
(b)	.. 0.26–0.29	0.31–0.32	0.29–0.32	0.40–0.43	0.37–0.41
Prothorax	.. 0.38–0.40	0.50–0.52	0.46–0.48	0.58	0.41–0.46
Pterothorax	.. 0.47–0.49	0.66–0.69	0.53–0.55	0.95	0.54–0.58
Abdomen	.. 0.52–0.55	0.75–0.80	0.78–0.80	1.86	0.68–0.69
C.I. (a) 0.74–0.79	0.74–0.78	0.62–0.66	0.96–0.99	0.76–0.80
(b) 1.13–1.18	1.00–1.11	0.95–1.04	1.34–1.47	1.09–1.28

		FEMALES				
		<i>diomedae</i>	<i>confidens</i>	<i>miriceps</i>	<i>hyalinus</i>	<i>obscurus</i>
Length:		mm.	mm.	mm.	mm.	mm.
Head (a)	..	0.74-0.75	0.80-0.83	0.75-0.77	0.86-0.88	0.74-0.85
(b)	..	0.24-0.25	0.34-0.35	0.32-0.34	0.40-0.41	0.35-0.37
Prothorax	..	0.17-0.22	0.23-0.25	0.23	0.26	0.20-0.22
Pterothorax	..	0.46-0.49	0.60-0.62	0.51	0.77	0.40-0.57
Abdomen	..	2.18-2.30	2.46-2.48	2.36	2.40	1.95-2.18
Total	..	3.48-3.60	3.80-4.00	3.70	4.20	3.24-3.70
<i>Breadth:</i>						
Head (a)	..	0.57-0.61	0.67-0.69	0.54-0.55	0.83-0.89	0.65-0.74
(b)	..	0.32-0.34	0.34-0.37	0.31-0.32	0.40-0.41	0.38-0.41
Prothorax	..	0.39-0.41	0.46-0.49	0.41-0.43	0.55-0.63	0.46-0.55
Pterothorax	..	0.47-0.55	0.68-0.71	0.50-0.51	0.80-0.87	0.63-0.71
Abdomen	..	0.80-0.83	0.94-1.08	0.71-0.73	1.03-1.17	0.90-0.92
C.I. (a)	0.77-0.82	0.83-0.86	0.71-0.73	0.93-1.03	0.87-0.88
(b)	1.05-1.11	1.00-1.09	0.91-1.00	1.08-1.16	1.11-1.22

* Length (a) = total length of head. Length (b) = length of lateral margin of head from postero-lateral termination of antennal band to anterior termination of clypeal band.

Breadth (a) = breadth at temples. Breadth (b) = breadth of head at hair arising immediately anterior to origin of clypeal suture.

Genus *Naubates* Bedford

The species of Esthiopterinae from the Procellariformes, as in other groups of species from single orders of birds, appear at first sight, to be divisible into a number of well-defined though related genera. However, when a large amount of material is examined a number of species arise, showing intermediate characters which necessitates either the suppression of some of the genera or the endless formation of new genera, often monotypic, to include these intermediates. This latter course does not clarify the classification and merely obscures the natural relationships between the species.

Having examined a considerable amount of material, there appears to the author to be little doubt that *Synautes* is inseparable from *Halipeurus*. Typical *Synautes* species, according to Thompson (1936, p. 43 and 1939, pp. 118 and 119) are distinguished from typical *Halipeurus* by their slender form, scaly cuticle, short internal bands and more strongly developed ventral bands. However, a new species from *Nesofregatta albigularis*, Pl. I, f. 1 (females only examined) shows the characters of typical *Synautes* in the slender form, scaly cuticle, and well-developed ventral bands, but resembles *Halipeurus* in that the internal bands reach to the level of the mandibles. A species from *Bulweria bulwerii*, Pl. I, f. 3, has the characters of typical *Halipeurus* but is more slender in form than *S. pelagicus* (Denny). In some of the species from *Pterodroma*, in which the characters are mainly those of typical *Halipeurus*, the ventral bands appear more prominent than usual, and in some of the species from *Puffinus* the cuticle may be partly scaly. A new species from *Oceandroma macrodactyla*, Pl. I, f. 2, a stout form resembling the largest of the typical *Halipeurus* in size, has the scaly

cuticle and the ventral and internal bands as in typical *Synautes* but has no lateral indication of the clypeal suture, thus resembling the new species *garrodiae* described below. When all these species are considered there does not seem to be any characters on which *Synautes* and *Halipeurus* can be satisfactorily separated.

Typical *Naubates* species appear distinct from those of *Halipeurus* mainly due to the greater development of the ventral bands, the larger size of the clypeal suture, and the form of the clypeal signature. However, species from *Haloboena* and *Pachyptila* do not have the ventral bands greatly developed, and there is a certain amount of variation in the size of the clypeal suture throughout typical *Halipeurus* species and in the form of the signature throughout *Naubates* species. The characters of the two new species described below, in which the signature and male abdomen resembles to a certain extent those of *Naubates* and the pre-antennal bands and female abdomen resemble those of typical *Synautes*, taken in conjunction with the facts discussed above, indicate that it is more satisfactory to keep all *Halipeurus* and *Synautes* species in *Naubates* instead of describing new genera to include the atypical species. It is apparent from these species that certain characters such as the presence or absence of the lateral indication of the clypeal suture are not of generic importance, and that these species have been divided into genera not so much on the absence and presence of characters but on the relative development of characters which are present in all the species.

In this discussion *Philoceanus* has not been mentioned, although it is closely related to *Naubates*, but the presence of the labral expansion and the characters of the dorsal antennal bands and lateral articulation of the mandible are distinctive. However, in the two latter characters and in the characters of the clypeal signature and absence of clypeal suture the species *annuliventris* appears to form a link between *garrodiae* and *Philoceanus*.

In considering *Naubates* it might be mentioned that the subgenus *Micronaubates* Pessoa and Guimarães with *garbei* Pessoa and Guimarães as genotype which was included in *Naubates* by Thompson (1938¹, p. 486) should be included as a synonym of *Pectinopygus*.

Naubates garrodiae, sp. n. (Text-figs. 7, 8, 9a and d, and 11a).

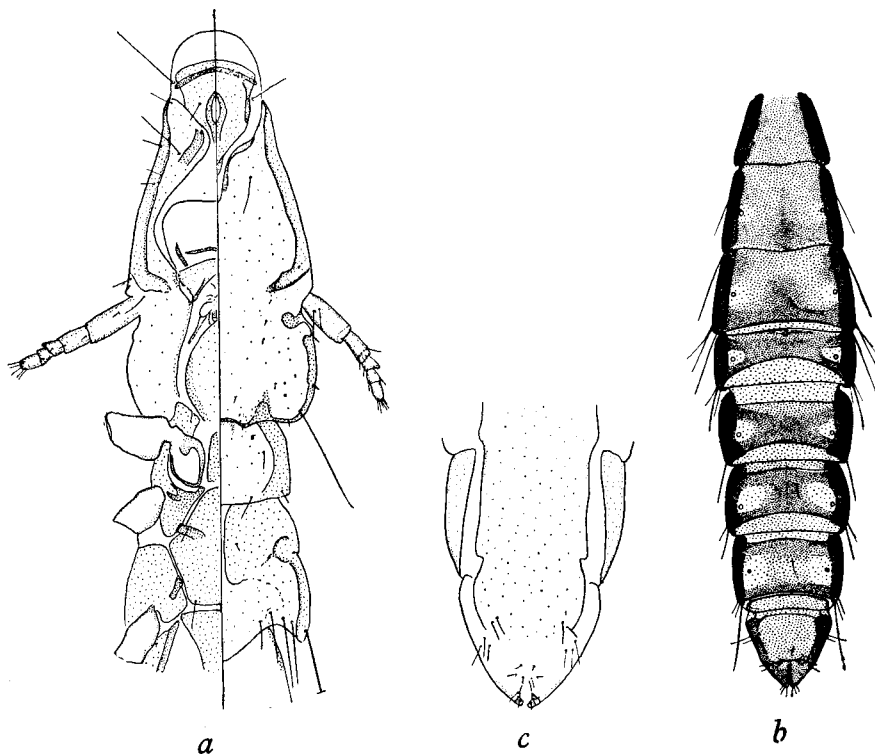
21 ♂, 22 ♀, 11 immature from *Garrodia nereis* (Gould), Kidney Island, E. Falkland.

Giebel (1874, p. 236) originally described *Lipeurus clypeatus* from *Halobaena caerulea* (Gmelin) (*Pachyptila coerulescens*); Taschenberg (1882, p. 154, Pl. V, f. 2) re-described and figured this species, presumably from Giebel's original specimens, showing a species with definite clypeal suture and internal bands; Giebel (1876, p. 389) refers to *L. clypeatus* collected from *Garrodia nereis* (Gould) (*Procellaria nereis*), and in 1878, p. 255, gives a further description and figure of these specimens. It is apparent from the figure (1878, Pl. XIV, f. 20) and from a single female in the British Museum from *Procellaria nereis* collected by the Rev. A. E. Eaton at Kerguelen Island in 1876 and presumably part of the material examined by Giebel, that these specimens are conspecific with *garrodiae* and not with *L. clypeatus*.

This species is distinguished from *robertsi*, sp. n., and *annuliventris* Uchida, by

the proportions of the head and male genitalia and from *anuliventris* also by the character of the antennal bands.

Male.—Head with broad hyaline margin; elongated somewhat pointed pre-antennal region; clypeal signature well-defined with distinct central gutta and lateral pear-shaped incassations; antennal band continuous with clypeal band, there being no suture; ventral plate with short thickened bands anteriorly; internal bands short; large thickened occipital signature present. Antennae with segment I not greatly enlarged and with distal pre-axial angle of segment III prolonged slightly (text-fig. 7*a*).



TEXT-FIG. 7.—*Naubates garrodiae* ♂. (a) Head and thorax; (b) Abdomen; (c) Terminal segments of abdomen, ventral.

Prothorax small; meso-metathorax elongated with posterior margin pointed medianly; mesonotum with median division; prosternal plate narrow and elongate; meso-metasternal plate roughly hexagonal in shape and joined to the bell-shaped first abdominal sternal plate by a narrow chitinous bar.

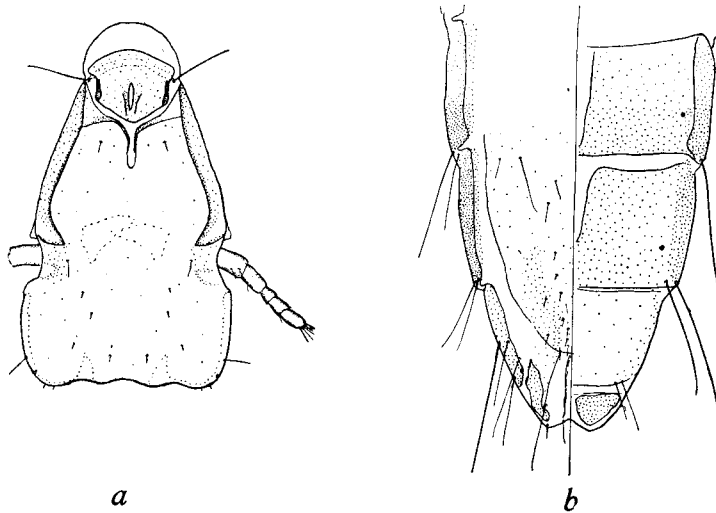
Abdomen elongated with segment V–VI modified (text-fig. 7*b*); last segment pointed posteriorly and medianly emarginate. Sternal thickening in the form of pointed median plates. Tergal plates I–IV with a minute hair each side; sternal plates I–VII with two hairs each side; segments I–VII with one lateral hair each side. Ventral chaetotaxy of posterior segments as in text-fig. 7*c*.

Genitalia with paramera flattened and unthickened (text-fig. 11*a*). Total length of genital apparatus 0.99 mm.

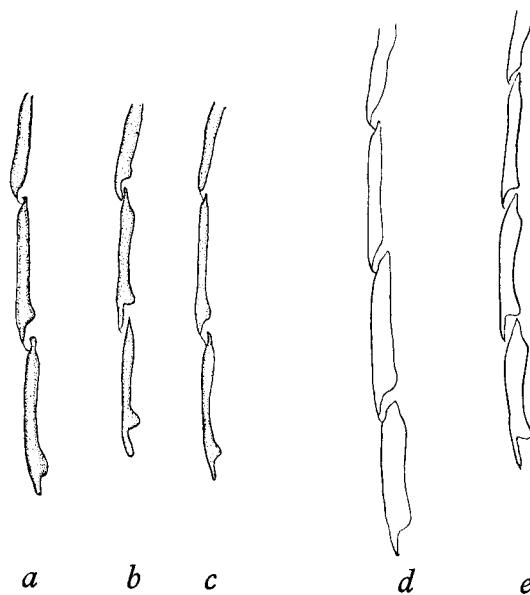
Female.—Head similar to that of male but proportions somewhat different (text-fig. 8*a*).

Thorax as in male.

Abdomen elongated, somewhat broader than that of male, and showing differences in the characters of the tergal and paratergal plates. Paratergal plates with straight internal margins without inwardly directed processes as in segments IV–VII of male abdomen (text-figs. 9*a* and *d*). Tergal plates I–VII either partially or completely



TEXT-FIG. 8.—*Naubates garrodiae* ♀. (a) Head; (b) genital region.



TEXT-FIG. 9.—Paratergal plates of *Naubates* spp. (a) ♂ *N. garrodiae*; (b) ♂ *N. annuliventris*; (c) ♂ *N. robertsi*; (d) ♀ *N. garrodiae*; (e) ♀ *N. annuliventris*.

divided medianly. Posterior margin of terminal segment emarginate; vulva simple and bearing a few scattered hairs (text-fig. 8*b*). Chaetotaxy of segments I–VI as in male.

Holotype: ♂ in the British Museum Collection, slide No. 71, from *Garrodia nereis* (Gould) from Kidney Island, E. Falklands. *Paratypes*: 20 ♂, 22 ♀ from the same host.

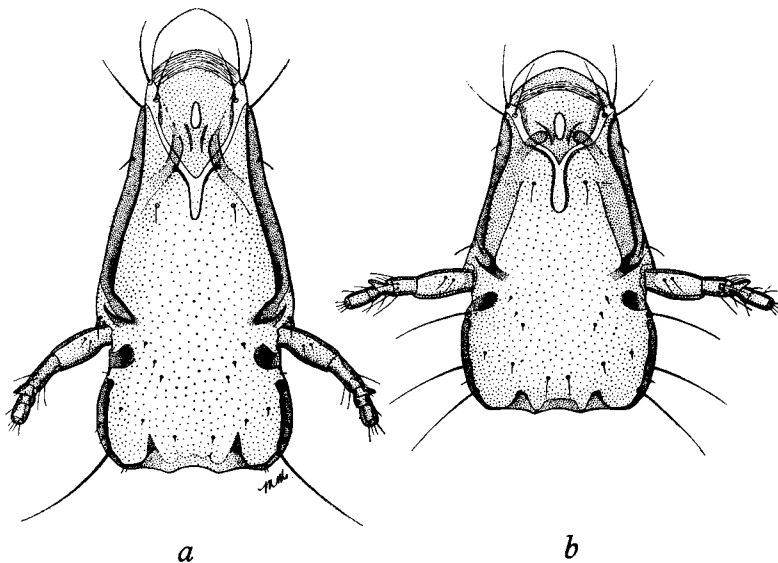
Naubates robertsi, sp. n. (Text-figs. 9c, 10a and 11b)

6 ♂, 2 ♀ collected from the underside of wings of 4 specimens of *Oceanites oceanicus exasperatus* Mathews, Argentine Islands, W. Graham Land.

This species is distinguished from *garrodiae* by the shape of the head, the pre-antennal region being proportionally longer, and by the male genitalia.

Male.—Head as shown in text-fig. 10a,¹ with general characters as in *garrodiae*. Thorax as in *garrodiae*.

Abdomen similar to that of *garrodiae* but tends to be somewhat shorter and the terminal segment less pointed posteriorly. Chaetotaxy as in *garrodiae*.



TEXT.-FIG. 10.—♂ heads. (a) *N. robertsi*; (b) *N. annuliventris*.

Genitalia similar to those of *garrodiae* but are smaller and less heavily pigmented and the sac is apparently absent (text-fig. 11b). Total length of genital apparatus is 0.71 mm.

Female.—Head similar to male, but differs somewhat in shape (compare measurements).

Thorax as in male.

Abdomen similar to that of *garrodiae* but tends to be somewhat narrower. Vulva as in *garrodiae* but is somewhat more pointed posteriorly and the two specimens of *robertsi* examined have fewer hairs. Chaetotaxy of abdomen as in *garrodiae*.

Holotype: ♂ in the British Museum Collection, slide No. 85, from *Oceanites oceanicus exasperatus* Mathews, from Argentine Island, W. Graham Land. *Paratypes*: 5 ♂, 2 ♀.

The species is named in honour of Mr. Brian Roberts, who made this collection of Mallophaga from the Antarctic.

Two other species have been recorded from *Oceanites oceanicus*, namely *languidus* Kellogg and Kuwana, and *exiguus* Kellogg and Kuwana. The former species is a typical *Synautes*, the latter probably an immature form of the same species.

¹ Figure shows dorsal view but also indicates position of ventral bands.

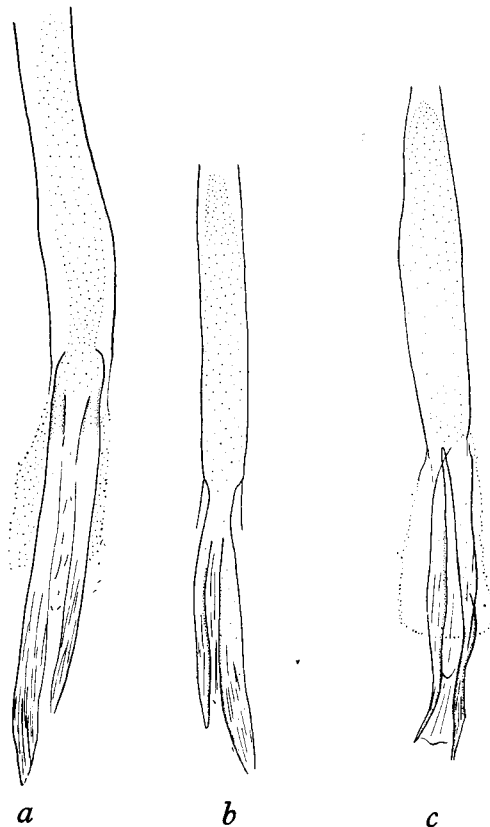
Naubates annuliventris (Uchida) 1917 (Text-figs. 9*b* and *e*, 10*b* and 11*c*)

Lipeurus annuliventris Uchida, 1917, p. 206, f. 2. Type host: *Oceanodroma furcata* (Gmelin).

This species is distinguished from both *garrodiae* and *robertsi* by the shape of the head and by the presence of a wide dorsal antennal band.

Male.—Head as shown in text-fig. 10*b*, with general characters as in the two preceding species except for the presence of a broad dorsal antennal band.

Thorax as in *garrodiae*.



TEXT-FIG. 11.—♂ genitalia. (a) *N. garrodiae*; (b) *N. robertsi*; (c) *N. annuliventris*.

Abdomen similar to that of *garrodiae* but with differences in the outline of paratergal plates I–III (text-fig. 9*b*). Terminal segment not pointed posteriorly as in *garrodiae*. Chaetotaxy as in *garrodiae*.

Genitalia similar to those of the two preceding species, but the paramera are more heavily chitinized and the sac is more heavily armed (text-fig. 11*c*). Total length of genital apparatus is 0.85 mm.

Female.—Head with general characters as in male, but differs somewhat in shape (see measurements).

Thorax as in male.

Abdomen similar to that of *garrodiae*, but with differences in the outline of paratergal plates (text-fig. 9*e*). Vulva as in *garrodiae* but more pointed posteriorly. Chaetotaxy as in *garrodiae*.

MATERIAL EXAMINED: 2 ♂, 3 ♀ from skin of *Oceanodroma furcata* from Alaska.

MEASUREMENTS

MALES

		<i>garrodiae</i>	<i>robertsi</i>	<i>annuliventris</i>
		mm.	mm.	mm.
<i>Length:</i>				
Head (a)*	0.57-0.63	0.63-0.67	0.54
(b)	0.40-0.41	0.43-0.44	0.31
Prothorax	0.10-0.12	0.14-0.15	0.14
Pterothorax	0.22-0.25	0.22-0.24	0.20
Abdomen	1.48-1.51	1.39-1.41	1.38
Total	2.34-2.36	2.48-2.50	2.24
<i>Breadth:</i>				
Head (a)*	0.29-0.31	0.28-0.29	0.31
(b)	0.29-0.31	0.28-0.29	0.28
Prothorax	0.22-0.23	0.21-0.23	0.22
Pterothorax	0.27-0.30	0.27-0.29	0.29
Abdomen	0.35-0.40	0.36-0.37	0.37
C.I. (a)	0.48-0.51	0.42-0.44	0.57
(b)	0.70-0.75	0.65	0.90

FEMALES

<i>Length:</i>				
Head (a)	0.57-0.61	0.61-0.63	0.54-0.55
(b)	0.37-0.38	0.38-0.41	0.31-0.34
Prothorax	0.12-0.15	0.15	0.12
Pterothorax	0.28-0.30	0.26	0.26
Abdomen	1.63-1.71	1.67	1.50
Total	2.52-2.78	2.60	2.30
<i>Breadth:</i>				
Head (a)	0.34-0.35	0.33-0.34	0.31-0.32
(b)	0.31-0.32	0.30-0.31	0.28
Prothorax	0.23-0.25	0.23	0.23
Pterothorax	0.30-0.32	0.29	0.28
Abdomen	0.44-0.47	0.45	0.43
C.I. (a)	0.56-0.61	0.52-0.55	0.57
(b)	0.81-0.86	0.75-0.81	0.85-0.91

* Length (a) = total length of head. Length (b) = length of pre-antennal region.

Breadth (a) = greatest breadth of post-antennal region. Breadth (b) = greatest breadth of pre-antennal region.

Naubates sp.?

Two immature ♀ from under wing of 2 specimens of *Puffinus griseus* (Gmelin), Kidney Island, E. Falkland.

These specimens belong to a species of the typical *Halipeurus* group, but are too immature to identify specifically.

LIST OF SPECIES OF ANOPLURA COLLECTED BY THE BRITISH GRAHAM
LAND EXPEDITION

SPECIES	Host
<i>Antarctophthirus lobodontis</i> Enderlein.	<i>Lobodon carcinophagus</i> (Jacquinot and Pucheran).
<i>Antarctophthirus</i> sp. ?	<i>Leptonychotes wedelli</i> (Lesson).
<i>Menopon becki</i> Kellogg.	<i>Phaethon a. aethereus</i> Linné.
<i>Tetrophthalmus</i> sp. ?	<i>Phalacrocorax a. atriceps</i> King.
	<i>Phalacrocorax a. albiventer</i> (Lesson).
? <i>Austrogoniodes hamiltoni</i> Harrison.	<i>Eudyptes c. cristatus</i> (Miller).
<i>Philopterus bicolor</i> (Rudow).	<i>Priocella antarctica</i> (Stephens).
<i>Philopterus</i> spp. ?	<i>Daption capensis</i> (Linné).
? <i>Philopterus platycephalus</i> (Kellogg & Kuwana).	<i>Garrodia nereis</i> (Gould).
<i>Docophoroides brevis</i> (Dufour).	<i>Diomedea exulans</i> Linné.
<i>Docophoroides harrisoni</i> Waterston.	<i>Diomedea m. melanophris</i> Temminck.
<i>Pseudonirmus gurlti</i> (Taschenberg).	<i>Daption capensis</i> (Linné).
<i>Episbates pederiformis</i> (Dufour).	<i>Diomedea exulans</i> Linné.
? <i>Harrisionella ferox</i> (Giebel).	<i>Diomedea exulans</i> Linné.
<i>Perineus diomedea</i> (Fabricius).	<i>Diomedea m. melanophris</i> Temminck.
<i>Perineus nigrolimbatus</i> (Giebel).	<i>Priocella antarctica</i> (Stephens).
<i>Naubates garrodiae</i> , sp. n.	<i>Garrodia nereis</i> (Gould).
<i>Naubates robertsi</i> , sp. n.	<i>Oceanites oceanicus exasperatus</i> Mathews.
<i>Naubates</i> sp. ?	<i>Puffinus griseus</i> (Gmelin).

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* The greater part of this paper was taken from Harrison's manuscript, see Harrison, 1937.

PLATE I.

FIG. 1.—*Naubates* sp. from *Nesofregatta albigularis*.

FIG. 2.—*Naubates* sp. from *Oceandroma macrodactyla*.

FIG. 3.—*Naubates* sp. from *Bulweria bulweri*.



Fig. 1

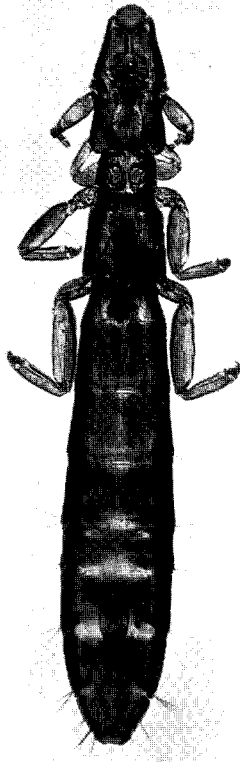


Fig. 2



Fig. 3

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By

THERESA CLAY, B.Sc.

*Department of Entomology,
British Museum (Natural History)*

WITH ONE PLATE AND ELEVEN TEXT FIGURES

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