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SEPTEMBER 30, 1902.

PAPERS FROM THE HOPKINS STANFORD
GALAPAGOS EXPEDITION, 1898-1899.

X.

ENTOMOLOGICAL RESULTS (8).

MALLOPHAGA FROM BIRDS.

BY

VERNON L. KELLOGG AND SHINKAI I. KUWANA.

STANFORD UNIVERSITY, CAL.

WASHINGTON, D. C.

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INTRODUCTION.

THE first collection ever made of the parasitic insects Mallophaga (biting lice) found on the birds of the Galapagos Islands is that made by Mr. Snodgrass in 1898-1899 and here reported on. The collection includes specimens from 183 birds and represents 34 out of the 79 species of birds. Parasites were taken from 26 of the 48 bird species and all of the five bird genera peculiar to the Galapagos. This enumeration of bird species is based on the work of Rothschild and Hertert.¹ To their list Snodgrass and Heller have added at least three species. The last published list of Galapagos birds, prior to Roths-

¹ Novitates Zoologica, Vol. vi, pp. 85-205, August, 1899.

child and Hertert's is one by Ridgway,¹ whose list includes 105 species. Ridgway's longer list of species results from regarding as species some forms classed by Rothschild and Hertert as varieties. The whole number of species of Mallophaga in the collection is 43, of which 25 are new to science and are here first described. Of the 18 species determined to be identical with previously known forms, three are represented by specimens which differ so considerably from the types that they must be referred to as varieties. As most of the species to which the Galapagos Island forms can be referred have been previously described by the senior author from birds of North and Central America, the types were available for comparison and no doubts as to the determinations need be entertained.

It was hoped that the character of the parasites found on the strictly Galapagos Island bird hosts might throw some light on the relationships of these birds to continental genera and species, but our knowledge of the distribution of the Mallophaga is yet far too meager to give much value to suggestions in such direction and especially as we have no data at all regarding the Mallophaga of birds from the west coast of South America, from which region the Galapagos Islands doubtless received most of their original fauna. Moreover, an extraordinary condition referred to in the next paragraph, attending the distribution of the parasites among the birds of the islands, made such an attempt even less profitable than it might otherwise have been.

When the authors first began the examination of these Mallophaga they were startled by the unusual eccentricity of the occurrence of the parasites on the various bird hosts. A species of Mallophaga, obviously normal in such a strictly land bird as *Geospiza* would be found to occur occasionally on such strictly maritime birds as terns. For example, *Nirmus vulgaris*, a typical parasite of passerine birds, and heretofore found only on them (twenty passerine hosts previously recorded by Kellogg) occurs abundantly on *Geospiza*, *Nesomimus* and *Camarhynchus* and was also found on *Sterna fuliginosa* (Clipperton Island). On the other hand a common *Nirmus* of *Sterna* and *Anous* (*Nirmus gloriosus*) and belonging to a group of *Nirmi*, the

¹ Proc. U. S. Nat. Museum, Vol. XIX, pp. 459-670, 1896.

nigropicti, abundant on terns and gulls and normally peculiar to these ocean birds was taken also on *Geospiza*, *Camarhynchus*, *Nesomimus* and *Progne*. The first cases of this kind met with in working over the collection were attributed to mistakes in the collectors' records, or to straggling after death when the birds' bodies were in occasional contact in the game bag or on the skinning table. But the repeated occurrence of these extraordinary conditions and the testimony of the collectors soon revealed the true cause of this unusual distribution. We have to do with an abnormal phase of normal straggling! On the rocks of the islands maritime and land birds sit closely huddled, actual contact of the bodies often occurring. Migration is easily effected, and thus a parasite species (*Colpocephalum unciferum* Keel) normally peculiar to pelicans finds its way to a warbler (or honeycreeper), *Certhidea*. Thus are explained the large number of unusual and startling instances in the host distribution of the Galapagos Island Mallophaga.

Certain facts of interest connected with the parasites found on the bird genera peculiar to the archipelago, should be touched on. *Geospiza fuliginosa* has a total of twenty Mallophagous species credited to it, the largest recorded list of Mallophaga from any bird species. Four or more parasitic species are recorded from each of 18 of the 34 bird species from which Mallophaga were taken; a condition unique in the records of collections of Mallophaga. This condition, of abundant parasitism, is, of course, also due to the unusual facility of migration (or normal straggling) afforded by the forced gregarious habits of the islands' birds. A fair number of the bird species peculiar to the archipelago are infested by parasitic species not hitherto known, and thus will lend a special interest to any collections of Mallophaga which may be made from birds of the west coast of South and Central America, the region from which the bird fauna of the islands has been derived. It is of interest to note the marked commonness of parasitic species to the genera *Geospiza* and *Camarhynchus*, thus lending weight to the belief in their very near relationship. However there is at present, as already said, little of real value to be got from such speculation. A considerable number of the species in this collection

are confined to hosts which are peculiar to the islands; but as so much opportunity for miscellaneous migration is offered, these forms cannot be advantageously compared with other species whose individuals may have actually recorded a wider host range but are also normally peculiar to strictly Galapagos hosts.

A second collection of Mallophaga from Galapagos Islands birds is now being made by Mr. Beck and with this additional material, and with collections from the west coast of South and Central America in hand it may be that some generalizations of importance may be arrived at.

The names of the birds used in this paper are those adopted by Ridgway¹ because these names were used by Snodgrass and Heller in determining the birds.

The papers by Kellogg on North American Mallophaga which are constantly referred to by abbreviated titles in the following pages are the following:

New Mallophaga, I; Contributions to Biology from the Hopkins Seaside Laboratory of the Leland Stanford Junior University, No. iv, 1896.

New Mallophaga, II; Contributions to Biology from the Hopkins Seaside Laboratory of the Leland Stanford Junior University, No. vii, 1896.

New Mallophaga, III; Contributions to Biology from the Hopkins Seaside Laboratory of the Leland Stanford Junior University, No. xix, 1899.

A List of the Biting Lice (Mallophaga) taken from Birds and Mammals of North America, Proc. U. S. Nat. Mus., Vol. XXII, pp. 39-100, 1899.

The authors have to express their obligations to Professor Walter Miller, of Stanford University, for assistance in composing the specific names, and to Miss Mary Wellman, artist.

SYSTEMATIC ACCOUNT.

Genus *Docophorus*.

DOCOPHORUS VALIDUS MINOR var. nov.

KELLOGG AND CHAPMAN, New Mallophaga, III, p. 56, pl. v, fig. 2, 1899.—

KELLOGG, List of Mallophaga, p. 44, 1899.

Four specimens, male and female, from *Puffinus subalaris* from

¹Proc. U. S. Nat. Museum, Vol. xix, pp. 459-670, 1896.

Narboro, and one male and one female from *Nesomimus carringtoni* from Barrington.

All these agree well in shape, marking, and other characters with the type specimens of *D. validus* from *Puffinus gavia* from Monterey Bay, California, but are uniformly smaller, being about two thirds the size of the type-specimens.

DOCOPHORUS PLATYCEPHALUS sp. nov.

(Pl. xxviii, fig. 1.)

Three specimens, two male and one female, from *Oceanites gracilis* from Albemarle, and a female from *Geospiza fuliginosa* from same island. Differs from *D. thalassidromæ* Denny from *Thalassidroma* (*Oceanites*) *pelagica* in having the clypeus emarginate, the abdominal blotches brown instead of black and the blotches with semi-pustulations along posterior margin.

Male.—Body, length 1.25 mm., width .44 mm.; brown with dark brown lateral border; head wider than abdomen. Head, length .46 mm., width .43 mm.; very large in proportion to size of body; front with deep invagination; clypeus expanded laterally, rounded with two hairs on the front of the suture, a single hair arising from the dorsal surface near the obtuse anterior angle; two short hairs in front on the trabeculæ; trabeculæ as usual; antennæ large, segment 2 longest; eyes inconspicuous, with a long hair and a prickle; temporal margin with a hair and three prickles, occipital margin sinuous; color golden brown; signature shield shape; produced acuminate posterior angle not reaching the mandibles; antennal bands pale golden brown, indistinct posterior ends turning diagonally inward; occipital bands indistinct, weakly colored, very narrow dark border on the temporal and occipital margins. Prothorax short, broad with slightly diverging sides and rounded posterior angles, with one hair; with marginal lateral bands bending inward along posterior margin. Metathorax with sides rapidly diverging, which are slightly concave; posterior margin with rounding angle on the abdomen, and a series of about ten pustulated hairs arranged along each lateral half. Legs concolorous with thorax, with dark brown margins on femora and tibiæ. Abdomen elliptical, short, narrower than head; segments 2 to 8 with two to three long hairs on posterior angles; a single transverse series of pustulated hairs along dorsal margin; ground color yellowish-brown; dark lateral bands, wide, tapering posteriorly, a transverse dark line along posterior margin of each segment; posterior margin of last segment flatly rounded, with a few longish hairs.

Female.—Body, length 1.55 mm., width .58 mm.; head, length .51 mm., width .5 mm.; abdomen, elongate ovate; segments 1 to 7 with elongate narrow, dark brown triangles, with acute apex inward; each segment with several pustulated hairs along the posterior margin of the triangle; segment 8 wholly colored, segment 9 paler than 8 but wholly colored; posterior end usually emarginated.

DOCOPHORUS MELANOCEPHALUS Burmeister.

BURMEISTER, Hand. b. d. Ent., II, p. 426, 1839.—KELLOGG, List of Mallophaga, p. 44, 1899.

Two specimens, male and female, from *Sterna fuliginosa* from Clipperton Island, a female from *Anous galapagensis* from Narboro, and a male from *Nesomimus macdonaldi* from Gardner. This is the common parasite of terns. The female specimen from *Anous* varies in having the transverse blotch of the first abdominal segment not continuous across the segment but divided into two lateral blotches.

DOCOPHORUS ICTERODES Nitzsch.

NITZSCH in Germar's Mag. f. Ent., vol. III, p. 290, 1818.—KELLOGG, List of Mallophaga, p. 45, 1899.

A single female from *Sterna fuliginosa* from Clipperton Island. This is the common parasite of ducks.

DOCOPHORUS PERISTICTUS sp. nov.

(Pl. xxviii, fig. 2.)

Numerous males and females from *Sterna fuliginosa* from Clipperton Island, one specimen from *Dendroica aureata* from Albemarle and a single specimen from *Nesomimus carringtoni* from Barrington. A well marked form with unusually short blunt head, and very heavy abdominal blotches.

Male.—Body, length 1.83 mm., width .91 mm.; dark chestnut brown, abdominal margin black. Head, length .61 mm., width .75 mm.; front slightly convex with a narrow uncolored border, and a short hair in each anterior angle; two short marginal hairs in front of the distinct suture; trabeculae small; eye inconspicuous, with two long hairs; temporal margins with three long hairs; occipital margin flatly convex, bare; signature shield-shaped, golden yellow, with acuminate posterior dark point, which does not reach the mandibles; antennae five-segmented, segment 2 longest, 3, 4 and 5 subequal; color pale brown, with a few hairs; angulated antennal bands, their continuations in front of the sutures as narrow marginal borders, the

diverging occipital bands and the narrow marginal temporal borders dark brown, and occipital margin black. Prothorax short, with slightly diverging sides, and flatly convex posterior margin; posterior angle with a single long hair; color dark brown, with dark lateral border, extending around the posterior angle, and a little way along the posterior margin. Metathorax short, broad, with widely diverging short sides, and broadly parabolic posterior margin, thickly set with a series of pustulated hairs. Sternal markings consisting of dark brown intercoxal lines, a pale median prothoracic blotch, and a small, pale, somewhat triangular metathoracic blotch. Legs short, stout, brownish, with narrow dark border. Abdomen broadly ovate; one to three long hairs in the posterior angles; whole abdomen chestnut brown, segments 1-7 with black lateral bands; segments with long, transverse, dark chestnut blotches separated medially by an uncolored line, widest on segment 5, narrowing on each successive segment; transverse blotches confluent medially on segment 1, with a small, medial, angulated, uncolored emargination on anterior margin; segments 1-6 with a series of pustulated hairs along posterior margin of each transverse blotch, and behind each series a narrow dark brown transversal line; segment 8, with transverse blotches confluent in middle; segment 9 dark brown with few short hairs in the posterior margin.

Female.—Body, length 2 mm., width .83 mm.; head, length .63 mm., width .76 mm.; last abdominal segment with usual emargination.

DOCOPHORUS LARI Denny.

DENNY, Monograph Anoplur. Brit., p. 89, pl. v, fig. 9, 1842.—KELLOGG, List of Mallophaga, p. 44, 1899.

From *Creagrus furcatus* from Culpepper. This is the common parasite of gulls, found on *Larus* and allied genera all over the world.

DOCOPHORUS BREVIFORMIS sp. nov.

(Pl. xxviii, fig. 3.)

Five specimens, male and female, from *Progne modesta* from Albemarle, 2 specimens from *Geospiza fortis* from Albemarle and one male from *Actitis macularia* from Albemarle. A member of the *excisus* group found on swallows and characterized by the emarginated clypeal front. This new form is especially broad and robust.

Male.—Body, length 1.26 mm., width .55 mm.; head and thorax golden brown, abdomen smoky golden brown. Head, length .53 mm., width .45 mm; front of clypeus deeply emarginated, a long

rather stout hair arising from the dorsal surface near the margin in each rounded latero-anterior angle of the clypeus, a short marginal hair behind it, another at the suture, two short hairs between suture and trabeculæ, and a single short marginal hair just in front of the trabeculæ; trabeculæ large; antennæ usual; eyes prominent, with a long hair; temporal margin rounded with three long hairs and one short hair behind the eye; occipital margin sinuous, with two short hairs; signature shield-shaped, anterior margin emarginated, posterior end projecting beyond the mandibles; antennal bands golden yellow, interrupted by the distinct clypeal suture; occipital bands distinct, diverging and meeting the expanded basal extremities of the antennal bands; a narrow black occipital border. Prothorax short, broad with slightly diverging sides, posterior angle with one hair; with marginal lateral bands bending inwards along posterior margin. Metathorax pentagonal, angled on abdomen, with a marginal series of eight pustulated hairs on each half of posterior margin; color golden brown, with a brown blotch in each lateral angle extending indistinctly along latero-anterior sides. Legs light brown, with narrow dark brown margins. Abdomen short, broadly ovate; segments with one to two long hairs in posterior angle; segments 1 to 4 with elongate, narrow brown triangles with acute apex inwardly; each one of segments 1 to 8 with several pustulated hairs along posterior margin of the triangle; segments 5 to 8 wholly colored; segments 5 to 7 with few pustulated hairs; segment 8 with unpustulated hairs; last segment subtransparent with rounded posterior margin. Genitalia slightly showing through segments.

Female.—Body, length 1.6 mm., width .73 mm.; head, length .55 mm., width .45 mm.; the lateral abdominal blotches much shorter, ninth segment emarginated for one half its length, the point being obtusely angled, and with a few hairs on each.

DOCOPHORUS COMMUNIS Nitzsch.

NITZSCH in Germar's Mag. f. Ent., vol. III, p. 290, 1818.—KELLOGG, List of Mallophaga, p. 50, 1899.

One female from *Geospiza fuliginosa* from Narboro, and one male from *Geospiza* species from Hood. It is surprising to find this elsewhere extremely widespread and abundant *Docophorus* of passerine birds so rare in the Galapagos Islands. The only host genus noted is one peculiar to the islands.

DOCOPHORUS GALAPAGENSIS sp. nov.

(Pl. xxviii, fig. 4.)

Numerous males from *Geospiza fuliginosa*, five specimens from

Albemarle, Chatham and Narboro; *Geospiza conirostris* from Hood, *Geospiza fortis* from Albemarle, two specimens from *Camarhynchus productus* from Albemarle; *Camarhynchus prosthernalis* from Albemarle, and *Nesomimus parvulus* (Galapagos Islands). A very small *Docophorus* with Nirmoid markings and head characters, but the usual broad Docophoroid abdomen. It is to be noticed that, so far as this collection indicates, this parasite is confined to birds peculiar to the Galapagos Islands.

Male.—Body, length 1.6 mm., width .3 mm.; head pale, golden brown, abdomen very pale brown with dark brown margin. Head, length .4 mm., width .35 mm.; triangular, with narrow anteriorly tapering clypeus, which is truncate in front; one short hair on the anterior angles, and three along the front of the rather small trabeculæ; eye indistinct, with a short prickle, temporal margin weakly convex, with a long hair and several short prickles; occipital margin straight, with two prickles along each posterior angle; ground color of head pale golden brown with narrow dark brown antennal bands, well colored signature and narrow dark brown temporal margin. Prothorax small, with slightly rounded rectangular posterior angles, and straight posterior margin, with one long hair in posterior angle; brown lateral borders, which bend inward at posterior angle. Metathorax short, broad, angulated on abdomen, with eight hairs along each latero-posterior margin; brown lateral borders which bend inward along posterior angle. Legs concolorous with body, with margin pale brown. Abdomen ovate, stout, one third wider than head, with one to two hairs on posterior angles of segments; dorsal aspect of segments 4-7 with three groups of two hairs; lateral bands translucent dark brown, the segmental portions passing the sutures and projecting inward; slight indications of median transverse bands; last segment conspicuous, caudal end round; genitalia showing through body wall.

DOCOPHORUS ALBEMARLENSIS sp. nov.

(Pl. xxviii, fig. 5.)

Two specimens, male and female, from *Camarhynchus affinis* from Albemarle.

Male.—Body, length 1.61 mm., width .57 mm.; smoky golden brown with dark margins, head wider than abdomen. Head, length .63 mm., width .58 mm.; conical, with truncate or weakly convex front, three marginal hairs, one of which is behind the anterior lateral angle, a short marginal hair on the front of the trabeculæ; trabeculæ not reaching beyond middle of segment 2 of antennæ; antennæ with

segment 1 short and stout, segment 2 longest, and segments 3 to 5 short, subequal and colored pale brown; eyes prominent with a long hair; temporal margins rounded and bearing two long hairs and, on the occipital side of posterior angle, one prickle; occipital margin nearly straight, bare; general color of head dark brown; signature distinct; anterior margin concave, posterior angle extended backward, posterior margin extending in a long, acute angle beyond the mandibles; antennal bands distinct, dark chestnut brown, posterior ends turning diagonally inwards, anterior ends where interrupted by the suture turning in toward the base of the point of the signature; occipital bands dark brown, narrow, widely diverging, and separated from the antennal bands by a pale diagonal space; region immediately contiguous to the eye, darker. Prothorax short with slightly diverging sides and flatly convex posterior margin; posterior angle with a single hair; color smoky golden brown, with a dark brown lateral border bending inward along the posterior margin. Metathorax short, broad, with widely diverging short sides, and broadly parabolic posterior margin thickly set with a series of pustulated hairs; lateral margins with dark brown borders, which extend inward around posterior margin. Legs fuliginous with dark brown to black markings. Abdomen ovate; segments 3 to 8 with one or two longish hairs in posterior angles; whole abdomen except segment 9, strongly colored; segments 2 to 7 with broad black lateral bands; segments 1 to 8 with long transverse, smoky golden blotches, barely separated medially by an uncolored line; segment 8 with a narrow, curving, transversal, continued brown band, segments 9 wholly colored, but pale; segment 1 with one dim pustulated hair near mesal end of each transverse blotch in posterior margin; segments 2 to 4 with a series of pustulated hairs along posterior margin of each transverse blotch, segments 5 to 8 with unpustulated hairs; behind each series of hairs is a narrow dark brown transversal line; posterior margin of segment 9 with a few hairs. Genitalia extending through segments 3 to 9.

Female.—Length 1.9 mm., width .7 mm.; head, length .71 mm., width .68 mm.; transverse blotches on abdomen except on segment 1, not closely approached medially, segment 9 pale, slightly emarginate, with a few hairs; segments 5 to 7 with dim pustulated hairs.

DOCOPHORUS INSULICOLA sp. nov.

(Pl. xxviii, fig. 6.)

Two specimens, male and female, from *Certhidea albamarlei* from Albamarle; four specimens, one male and three female, from *Pyro-*

cephalus intercedens from Albemarle, and one female from *Geospiza fuliginosa* from ——— Island. A well marked form of unusual markings and shape, belonging to the *communis* group.

Male.—Body, length 1.3 mm., width .53 mm.; head golden brown, with dark brown marginal marking. Head, length .48 mm., width .43 mm.; front of clypeus angularly emarginated, a short hair rising from the dorsal surface near the margin in each rounded latero-anterior angle of the clypeus, a short marginal hair behind it, and three in front of the trabeculae; the trabeculae large, acutely pointed, reaching to base of segment 3 of antennae; antennae, if projected backward, reach almost to posterior margin of the head; eye prominent, with a longish hair; temporal margin convex, with two long hairs and two prickles, occipital margin sinuous; signature indistinct, with anterior margin emarginated, posterior point projecting beyond the mandibles; antennal bands pale brown, conspicuous, widely diverging occipital bands; occipital margin narrowly edged with black. Prothorax subquadrangular; rounded posterior angles with one hair; posterior margin flatly concave; color golden brown; distinct brown lateral borders which bend inward at posterior angle. Metathorax pentagonal, with three hairs in lateral angle and four hairs ranged along each latero-posterior margin; brown lateral border which bend inward at posterior margin. Legs pale brown, with tarsi brown. Abdomen short, obovate; segments 3 to 6 with one hair on the posterior angles, segments 7–8 with two hairs; a transverse series of 12–16 hairs along caudal margin of each segment; the whole colored golden brown except tip of segment 9; lateral bands dark brown, composed of a series of slightly diagonal, narrow, marginal blotches, one on each segment, each blotch widest anteriorly; on segments 1 to 5 lateral blotches extend inward; a narrow transverse line in the posterior margin of each segment; genitalia showing through the wall.

Female.—Body, length 1.4 mm., width .53 mm.; head, length .5 mm., width, .45 mm.; elongated narrow segments 1 to 7 with several pustulated hairs along posterior margin; segment 9 with posterior margin deeply notched, no hair.

Genus **Nirmus**.

NIRMUS GLORIOSUS sp. nov.

(Pl. XXIX, fig. 1.)

Many males and females from *Sterna fuliginosa*, three specimens from Clipperton; *Anous stolidus* from Clipperton; *Geospiza fuligi-*

nosa from Albemarle and South Seymour; *Camarhynchus affinis* from Albemarle; *Progne modesta* from Albemarle and *Nesomimus caringtoni* from Barrington.

A strikingly marked form showing some relation to the *nigripicti* group common on terns.

Male.—Body, length 1.9 mm., width .45 mm.; color pale with broad dark brown margin; medial blotches of abdomen dark brown. Head large and elongate, length .61 mm., width .41 mm.; elongate conical, with narrow, rounding clypeal front slightly emarginated, and five marginal hairs, one in the rounding, anterior angle, one just behind this, one at suture, and two before the trabeculæ; trabeculæ distinct, rather stout; antennæ short, not reaching the occipital margin when projected backward, segment 2 longest, segments 3, 4 and 5 subequal; last two segments colored; eyes prominent, with a longish hair and a prickle; temporal margins flatly rounded, with two long hairs and two prickles; occipital margin nearly straight; uncolored front of clypeus very narrow; signature large, shield-shaped, anterior region dark brown, posterior end not extended to the mandibles; antennal bands distinct, blackish-brown, interrupted by suture, the part behind the suture curving, with anterior extremity expanded; temples bordered with dark brown; ground color dark brown. Prothorax quadrangular, with posterior angles nearly rectangular, with one longish hair; lateral margin with strong dark brown even border, which bends inward on the posterior angle. Metathorax pentagonal, angulated on abdomen; lateral angles with five pustulated hairs; lateral margin with dark brown border. Legs pale brown with darkish-brown marginal blotches. Abdomen elongate elliptical, with posterior angle projecting and two or three longish hairs on dorsal surface; segments 1 to 2 with triangular medial blotch, segments 3 to 6 entirely brown, segments 7 to 8 pale, segments 1 to 8 with distinct narrow lateral black bands; posterior margin of last segment rounded with several pustulated hairs. Genitalia showing through segments.

Female.—Body, length 2.28 mm., width .51 mm.; head, length .68 mm. width .45 mm.; color pale with distinct dark brown margins, and distinct medial blotches which do not cover entire surface as in the case of male; last segment angularly emarginated without terminal hair.

NIRMUS OBTUSUS sp. nov.

(Pl. xxix, fig. 2.)

A female from *Sterna fuliginosa* from Clipperton. Differs from *N. hebes* Kellogg on *Sterna maxima* from Monterey Bay, Califor-

nia, in having the head more elongate, less heavily marked, and in the absence of transverse abdominal blotches, and character of lateral markings.

Female.—Body, length 1.63 mm., width .43 mm.; slender, elongated; head and thorax with dark brown margin, and abdomen with narrow, dark brown lateral bands. Head, length .46 mm., width .31 mm.; conical, with clypeal front truncate or slightly convex; three marginal hairs, the first one near front, and the third in front of the suture, the second is midway between these; a short prickle and a marginal hair in front of trabeculæ; trabeculæ prominent, a little longer than segment 1 of antennæ; antennæ short, segment 2 longest, segments 3, 4 and 5 subequal; eye prominent, with one long hair and one prickle; temporal margin flatly convex with two long hairs and two prickles; occipital margin flatly concave with few prickles; signature distinct, shield-shaped, anterior margin convex, posterior margin produced in a narrow point; dark brown antennal bands interrupted by a distinct suture, the anterior extremities of the antennal bands bend broadly in at the suture; temporal borders narrow but well defined, broader below the eye, gradually narrowing posteriorly. Prothorax with sides slightly diverging; posterior angles rounding, with one hair; marginal borders dark brown, bending inward along posterior margin. Metathorax but little longer than prothorax, wider, and rapidly diverging lateral margins; posterior margin angulated; five pustulated hairs in posterior angles; dark brown lateral band and brown blotch projecting inward from postero-lateral margin. Legs concolorous with abdomen, with slightly colored margin. Abdomen elongate with convex sides, not parallel; segments 1 to 8 about equal length; segment 9 short, and with weak rounding emargination on posterior margin; four longish hairs on posterior margin of each segment; segments 3 to 8 with one or two longish hairs in posterior angles; a narrow lateral band in anterior part of each segment; segments 2 to 7 with small median blotches.

NIRMUS PALUDICOLA sp. nov.

(Pl. XXIX, fig. 3.)

A female from *Butorides plumbeus* from Albemarle. A member of Piaget's group *nigropicti* whose members occur commonly on gulls and terns. This form most nearly resembles *N. punctatus*, but differs in the slightly concave clypeal front, in the transverse marking across the clypeus and in the character of the lateral abdominal blotches.

Female.—Body, length 2.16 mm., width .66 mm.; white, with black marginal markings, chestnut brown, median abdominal markings. Head, length .6 mm., width .5 mm.; conical, clypeus truncate or slightly concave in front, a short hair in each anterior angle and several other short hairs in the lateral margin between it and trabeculæ; temporal margin flatly rounding, with two longish hairs and two prickles, one of the prickles being between the hairs, and the other behind the last one; occipital margin straight, bare; trabeculæ small, but distinct; antennæ uncolored, except the tip of last segment which is pale brown; eyes conspicuous, with one long hair and one prickle; anterior part of clypeus transparent; margin of forehead with narrow interrupted black line, and an irregular blotch near extremity of head; temporal margins with narrow black lines extending behind the eyes. Prothorax quadrangular, posterior angle with a single long hair, an interrupted dark brown, wide, lateral border extending inward along posterior angles. Metathorax pentagonal; media of lateral margin with a black blotch; one prickle and a group of five long hairs in posterior angles. Legs concolorous with body, except tip of tarsæ and claws which are brown. Abdomen long, with segments 4 and 5 widest, a black lateral marginal blotch on each segment; segments 3 to 7 with two weak hairs on median posterior margin of each leg; small median blotches on segments 3 to 7; segment 9 emarginated, with a few terminal hairs; segments with 1 to 2 or 3 longish hairs on the posterior angles.

NIRMUS CURVILINEATUS sp. nov.

(Pl. xxix, fig. 4.)

A male from *Nesopelia galapagoensis* from Narboro and a female from *Oceanitis gracilis* from Albemarle. This is an extraordinary instance of distribution, and when coupled with the fact that the new species is of the *fuscus* group of *Nirmi*, species found almost exclusively on raptorial birds, simply bafles explanation. The new form differs from the typical *fuscus* in having the transverse abdominal blotches continuous from side to side of abdomen, and the transverse series of pustulated hairs on each abdominal segment curving instead of straight.

Male.—Body, length 1.86 mm., width .55 mm.; pale brown, with narrow distinct brown margin, the transverse abdominal blotches continuous from side to side of abdomen; abdomen narrow, head heavy and rounding. Head, length .53 mm., width .4 mm.; forehead broad, parabolic in front, with narrow brown border; four marginal hairs on

the rounded anterior angles, and two before the small but distinct trabeculae; trabeculae small, uncolored; antennae long, segment 2 longest, segments 3, 4 and 5 slightly colored; eyes prominent, with one long hair; temporal margin flatly rounded with three long hairs and some few prickles; occipital margin slightly convex, bare; antennal bands brown, meeting in front and bending diagonally in posterior end; narrow blackish brown temporal margin, paling gradually inward from margin of head. Prothorax short, rectangular, with single long hair in posterior angles; brown lateral borders bent inward on posterior margin. Metathorax trapezoidal, posterior margin straight; four long pustulated hairs on each lateral third of the posterior margin, and a prickle in the posterior angle. Legs concolorous with thorax, with dark margin. Abdomen narrowest anteriorly, widening posteriorly to segment 5, segment 6 slightly narrow, segments 7, 8 and 9 short; posterior angles of each segment with one to two hairs and a single curving transverse series of long pustulated hairs on dorsum of each segment; each of segments 2 to 7 with a marginal dark brown blotch, widest posteriorly and projecting inward along the posterior margin of segment; golden brown, broad, transverse blotches entirely across all segments; posterior margin of last segment is rounded.

Female.—Body, length 2.2 mm., width .63 mm.; head, length .58 mm., width .43 mm.; last abdominal segment slightly emarginated with a few pustulated hairs.

NIRMUS GALAPAGENSIS sp. nov.

(Pl. xxix, fig. 5.)

Many males and females from 4 specimens of *Geospiza fuliginosa*, 3 from Albemarle and one from Chatham; *G. fortis* from Albemarle and Narboro; *G. conirostris* from Hood; *G. dubia* from Chatham; 2 specimens from *Nesomimus macdonaldi* from Hood; *N. parvulus* from Narboro; *N. carringtoni* from Barrington; *N. melanotis* from Wenman; 2 specimens from *Camarhynchus productus* from Albemarle; *C. variegatus* from Narboro; *Pyrocephalus intercedens* from Narboro; *P. dubius* from Chatham; *Certhidea albemarle* from Albemarle; *Myiarchus magnirostris* from Albemarle; *Coccyzus melanocephalus* from Chatham; *Actitis macularia* from Albemarle, and *Procellaria tethys* from Albemarle.

Most like *N. simplex*¹ from *Merula migratoria* from Kansas, but distinctly different in size, in absence of the strong transverse blotches of abdomen, and in relatively broader abdomen.

¹ Kellogg, New Mallophaga, II, p. 492, pl. LXVII, fig. 2, 1896.

Male.—Body, length 1.28 mm., width .6 mm.; very pale yellowish-brown, with dark brown margin; docophoroid in shape. Head, length .38 mm., width .36 mm.; bluntly triangular, with narrow clypeal front very slightly concave; a single hair in anterior angles, and three others on lateral margins; trabeculae small, pointed; antennae as usual; eyes inconspicuous, with one prickle in posterior edge; temporal margins flatly convex, with a single long hair, and two prickles just in front of the hair; occipital margin straight, bare; signature indistinctly colored, broad, emarginated in front and truncated behind; antennal bands distinct and narrow; temporal margins for a little distance behind eyes, narrowly bordered. Prothorax short, broad, with lateral margins strongly converging anteriorly; a single longish hair in posterior angles; posterior margin flatly convex; brown lateral borders, which extend inward along posterior margin. Metathorax broad, short, obtusely angled on the abdomen, with a series of non-pustulated hairs along posterior margin; a lateral marginal blotch extending partly inward. Legs concolorless with body. Abdomen elliptical, short and broad for *Nirmus*, with one to two or three longish hairs in posterior angles of segments, and a single transverse series of four long weak hairs along posterior margin of each segment; dark, golden-brown lateral bands, and slight indication of median blotch.

Female.—Body, length 1.55 mm., width .58 mm.; head, length .43 mm., width .41 mm.; last abdominal segment slightly emarginate, without hair.

NIRMUS SEPARATUS sp. nov.

(Pl. xxix, fig. 6.)

Two females from *Camarhynchus variegatus* from Albemarle; a female from *Progne modesta* from Albemarle; a male from *Geospiza conirostris* from Hood; two females from *G. fortis* from Albemarle; a male from *Certhidea albemarli* from Albemarle; a female from *Anous stolidus* from Clipperton Island and two females from *Sterna fuliginosa* also from Clipperton Island. A distinctly marked form not closely like any previously described *Nirmus*.

Male.—Body, length 1.66 mm., width .38 mm.; distinguishable by its general dark color and rounding, uncolored clypeus; margins dark chestnut brown; narrow-waisted. Head, length .45 mm.; width .28 mm.; elongate conical, with slightly expanded uncolored part of rounding clypeus; a marginal hair on expanded clypeal portion, one at suture and two in front of the suture, one rising from dorsal surface and one from ventral; trabeculae small, but distinct; temporal margin

flatly convex, with one long hair and one short, and two prickles; occipital margin nearly straight; eyes prominent, flat, with one hair; antennæ with segment 2 longest, segment 4 shortest, segments 4 and 5 are colored; signature shield-shaped, distinct; interrupted antenna-bands dark brown, distinct; temporal and occipital margins dark brown. Prothorax subquadrangular, sides slightly converging in front, with one short hair on the posterior angle; well defined dark brown marginal bands bent inward along posterior margin. Metal thorax with diverging sides and very flatly rounding posterior angles; five long hairs in posterior angles and two short weak hairs along posterior margin; lateral borders dark brown; a median long, spear-head-shaped sternal blotch of light brown showing through. Legs pale brown with dark brown margins. Abdomen elongate elliptical; posterior angles of segments except one with short hairs; each of segments 2 to 7 with a marginal dark band, widest anteriorly and projecting inward along the anterior margins of segment; all segments with a broad golden brown transverse blotch covering all of the segment; segments 3 to 7 with a series of pustulated hairs on posterior margin; posterior margin of segment 9 rounded, with a few long hairs.

Female.—Body, length 1.8 mm., width .38 mm.; head, length .48 mm., width .29 mm.; slightly darker than male; last abdominal segment usually emarginated, with a few weak hairs.

NIRMUS LEPIDUS sp. nov.

(Pl. XXIX, fig. 7.)

One male from *Geospiza fuliginosa* from Narboro; one female from *Nesomimus carringtoni* from Barrington and one male from *Sterna fuliginosa* from Clipperton Island. A well-marked form, resembling in general shape and head characters *Docophorus insolitus* from *Ptychoramphus aleuticus*¹ from Monterey Bay, California; but with Nirmoid, rather than Docophoroid, trabeculæ. Both of these forms are at the line between *Docophorus* and *Nirmus* and in their combination of the characters of both genera make the generic distinction very uncertain. Among the *Nirmi* it resembles such forms as *N. opacus*² from *Ægialites semipalmatus*, Monterey Bay, California.

Male.—Body, length 1.38 mm., width .41 mm.; head and thorax light brown with strong dark bands, abdomen smoky golden-brown, with strong broad dark border; abdomen swelling in middle. Head,

¹ Kellogg, New Mallophaga, I, p. 94, pl. iv, fig. 5, 1896.

² Kellogg and Chapman, New Mallophaga, III, p. 83, pl. vi, fig. 6, 1899.

Proc. Wash. Acad. Sci., Sept., 1902.

length .4 mm., width .31 mm.; elongate conical, with rounding front; one weak marginal hair near the front, three along front of suture and two behind, and one prickle in front of the trabeculae; trabeculae small but distinct, extending nearly to end of segment 1 of antennae; antennae short, segment 2 longest, segment 5 a little longer than segment 3, segments 4 and 5 colored; eyes flatly round, conspicuous, with one long hair and one prickle; temporal margins flatly convex with two long hairs and two prickles; occipital margin nearly straight, bare; signature distinct, broad, convex in front and truncate behind; antennal bands distinct, interrupted by suture; occipital bands narrow, extending to posterior rami of mandibles; temporal margins with narrow black borders, which are wider behind the eyes. Prothorax short, broad, with lateral margins slightly converging anteriorly, a single longish hair in posterior angles; posterior margin flatly convex; lateral borders extend inwards along the posterior margin. Metathorax broad, short, obtusely angled on the abdomen, with a series of pustulated hairs on lateral portions of posterior margin; a lateral marginal blotch extends inward. Legs concolorous with thorax, with dark marginal marking. Abdomen elliptical, one fifth wider than head; with one or two longish hairs in posterior angle of each segment, and a single transverse series of long hairs and a few weak hairs along posterior margin of each segment; dark lateral bands, and golden-brown transverse blotches entirely across all segments; genitalia extend beyond last abdominal segment.

Female.—Body, length 1.33 mm., width .45 mm.; head, length .41 mm., width .33 mm.; color, pale yellow with dark brown margin; last abdominal segment deeply emarginated, with a few short hairs.

NIRMUS VULGATUS Kellogg.

KELLOGG, New Mallophaga, II, p. 496, pl. LXVII, fig. 5, 1896.—KELLOGG, List of Mallophaga, p. 56, 1899.

One female from *Geospiza fuliginosa* from Albemarle. This specimen agrees well with the type specimens collected from California and Kansas birds.

NIRMUS VULGATUS GALAPAGENSIS var. nov.

Many males and females from *Geospiza fuliginosa*, 19 specimens from Albemarle, 5 from Narboro, 3 from Chatham, 1 from Hood; *G. fortis*, 3 specimens from Albemarle; *G. dubia*, 2 specimens from Chatham; *G. conirostris*, from Hood and Gardner; *G. intermedia* from Chatham; *Nesomimus macdonaldi* from Hood and Gardner; *N.*

parvulus from Narboro; *N. adamsii* from Chatham; *N. carringtoni*, 2 specimens from Barrington; *Camarhynchus productus*, 2 specimens from Narboro; *C. affinis* from Albemarle; *C. prosthemeles* from Albemarle; *Certhidea albermarli* from Albemarle; *C. beckii* from Wenman; *Dendroica aureola* from Albemarle; *Myiarchus magnirostris* from Albemarle; *Pyrocephalus intercedens* from Albemarle; *Sterna fuliginosa* from Clipperton Island.

All these specimens agree in differing from the type specimens collected from numerous passerine bird species of California and Kansas, in the more pronounced character of the markings, the color of the markings being blackish instead of brown, and their outlines being much sharper. The transverse abdominal blotches are narrower and not interrupted by a median longitudinal uncolored line as in the type specimens, and the whole body of the Galapagos specimens is a little less slender and elongate than that of the American specimens; it is a more robust form.

NIRMUS INTERPOSITUS Kellogg.

KELLOGG, New Mallophaga, III, p. 23, pl. II, fig. 7, 1899.—KELLOGG, List of Mallophaga, p. 58, 1899.

Numerous males and females from *Geospiza fuliginosa* from Albemarle and Narboro; *G. fortis*, 2 specimens from Albemarle; *Nesomimus parvulus*, 2 specimens from Albemarle; *N. carringtoni* from Barrington; *Camarhynchus variegatus* from Albemarle. The type specimens were taken from *Dendroica viellotti* from Panama. No other records yet made.

Genus *Lipeurus*.

LIPEURUS LANGUIDUS sp. nov.

(Pl. XXIX, fig. 8.)

Numerous males and females from *Oceanites gracilis*, 5 specimens from Albemarle; from *Procellaria tethys* from Albemarle; from *Sula piscator* from Culpepper; from *Actitis macularia* from Albemarle; from *Pyrocephalus intercedens* from Albemarle; from *Nesomimus parvulus* from Albemarle; from *Geospiza fuliginosa* from Albemarle; from *Camarhynchus productus* from Albemarle. This new *Lipeurus* resembles Piaget's *angusticeps* and Kellogg's *diversus* but differs in markings of head and abdomen.

Male.—Body, length 3.34 mm., width .38 mm.; slender, parallel sides; body with distinct chestnut brown marginal markings. Head,

length .71 mm., width .31 mm.; elongate conical, with narrow long parabolic front; a weakly projecting very obtuse angle at suture; five marginal hairs of which two are in front of the angle, two behind and one in front of small trabeculæ; trabeculæ small but distinct; antennæ, segment 1 a little shorter than all the others combined, segment 2 next longest, 3 with dorsal angular projection at distal extremity, segment 5 slightly longer than 4; eyes prominent; temporal margin with a few prickles; occipital margin concave, bare; signature distinct, large, anterior margin very convex; color golden brown, interrupted antennal bands and temporal bands chestnut brown, distinct. Prothorax nearly square, with posterior margin slightly concave; golden brown with chestnut brown lateral borders which extend inward along posterior margins. Metathorax longer than broad, sides diverging slightly, posterior margin straight; two short hairs on posterior margin of dorsal aspect of the segment a long hair in each posterior angle. Legs concolorous with thorax, with narrow dark margin. Abdomen slender, subparallel-sided, with one, two or three weak hairs in posterior angles; segments 1 to 4 longest; segment 5 shorter than 6 or 7, segment 9 shortest and posterior margin emarginated, two short hairs on each half; segments wholly colored with narrow chestnut brown marginal bands.

Female.—Body, length 3.9 mm., width .5 mm.; head, length .77 mm., width .46 mm.; antennæ, segment 1 shorter than segment 2, segment 3, 4 and 5 subequal; abdominal segments 1 to 7 subequal in length, segments 8 and 9 shorter, segments wholly colored except last one which is with transparent posterior margin deeply, angularly emarginated.

LIPEURUS LIMITATUS Kellogg.

KELLOGG, New Mallophaga, I, p. 124, pl. VIII, figs. 5 and 6, 1896.—
KELLOGG, List of Mallophaga, p. 60, 1899.

Three females from *Puffinus subalaris* from ———. Previously recorded from *Puffinus griseus*, *P. gavia*, *P. bulleri*, and *P. tenuirostris*, all from Monterey Bay, California.

LIPEURUS DIVERSUS Kellogg.

KELLOGG, New Mallophaga, I, p. 123, pl. VIII, figs. 3 and 4, 1896.—
KELLOGG, List of Mallophaga, III, p. 59, 1899.

A few males and females from *Puffinus subalaris* from Narboro; *Anous galapagoensis* from Narboro, and *Butorides plumbeus* from Albemarle.

LIPEURUS DIVERSUS MAJOR var. nov.

A male and a female from *Puffinus subalaris* from Albemarle are distinctly larger than the other specimens, are more strongly marked, and the fifth abdominal segment of the male instead of being very short is as long as the fourth, a noticeable difference.

LIPEURUS GRACILICORNIS MAJOR Kellogg.

KELLOGG, New Mallophaga, III, p. 30, pl. III, fig. 3, 1899.

Males and females from *Fregata aquila* from Clarion Island; from an individual of same species taken off Cape St. Lucas, and from *Sterna fuliginosa* from Clipperton Island. Previously recorded from *Fregata aquila*.

LIPEURUS POTENS sp. nov.

(Pl. xxx, fig. 1.)

Males, females and young from *Sula piscator* from Culpepper; from *Anous stolidus* from Clipperton Island; from *Procellaria tethys* from Albemarle, and from *Sterna fuliginosa* from Clipperton Island.

Male.—Body, length, 4 mm., width .7 mm.; rather robust, parallel-sided, strongly marked with brown and black in regular blotches and bands, head broadly triangular and blunt. Head, length .83 mm., width .73 mm.; color golden brown; widest behind the eyes; margins of head in front of antennæ nearly straight; temporal margin feebly rounding; occipital margin weakly concave; clypeal suture distinct; clypeus round in front, with three hairs at each angle; at suture one long hair, and behind it two long hairs, farther back a single hair; signature large, transparent with rounded posterior end, front margin parallel with margin of clypeus; antennal segments uncolored except last one; segment 3 longest, segments 3, 4, 5 subequal, with a few hairs; trabeculæ small but distinct; eyes very prominent; temporal margin with four long hairs and a few very short spines; occipital margin without hair or spine; antennal bands distinct, dark brown; margin of head dark brown. Prothorax forming a parallelogram, wider than long, the angles weakly rounded; lateral margins dark brown, extending inward along the front and hind margins toward the middle, but not reaching it, leaving the middle third of the segment uncolored. Metathorax large, parallel-sided, much wider than long; posterior margin slightly concave, angles slightly rounded; near each

angle near the posterior margin is a single pustulated hair and a little further in are five long pustulated hairs grouped in a small, elliptical, uncolored space; ground color golden brown with margins dark brown. Legs strong, with elongate coxæ, very short thick tarsi with thick strong claws; margins dark brown; a few scattered hairs. Abdomen slender, subparallel-sided, with single hairs at posterior angles, longer on posterior segments; four hairs on posterior margin of segments 1 to 7, segments subequal, 7 and 8 tapering posteriorly; color mostly yellowish-brown, consisting of very dark lateral border and large transverse lateral blotches, those of segment 6 meeting at middle line, others not meeting; anterior and posterior margins of each segment narrowly uncolored; segment 9 deeply angularly emarginated and each posterior margin bearing many short hairs.

Female.—Body, length 3.25 mm., width .66 mm.; head, length .83 mm., width .7 mm.; antennæ with segment 1 short and stout, segment 2 longest, 3, 4 and 5 subequal, segments 4 and 5 colored; black lateral borders of abdomen wider than that in male; brown transverse blotches not meeting in the middle.

LIPEURUS BACULUS Nitzsch.

NITZSCH, Germar's Mag. Ent., III, p. 293, 1818.—KELLOGG, List of Mallophaga, p. 63, 1899.

One male from *Anous stolidus* from Clipperton Island, and one female each from *Geospiza fuliginosa* from Albemarle, from *Nesomimus melanotis* from Wenman, and from *Camarhynchus productus* from Albemarle. This remarkable distribution of this characteristic *Lipeurus* of the doves is not to be explained by straggling after death of host. The Clipperton Island specimen was taken in November, 1898, a month or more before the collectors reached the Galapagos Islands. Only terns or other maritime birds were taken on this little coral island. There is no dove resident on Clipperton Island. The dove *Nesopelia* peculiar to the Galapagos was found to be abundant on Albemarle and other of the larger islands. The only parasite taken from it however is *Nirmus curvilineatus* (see p. 490). *Lipeurus baculus* has been believed to be peculiar to doves, having been recorded from a dozen or more species. Piaget records finding females "égérées" on a *Sula alba*, a *Totanus glottis* and a *Charadrius minor*. Our specimens from *Anous* and *Geospiza* are typical *baculus*, differing in no specific way from specimens found on the common domestic pigeon in the United States and agreeing entirely with the descriptions of this species by European authors.

LIPEURUS EXIGUUS sp. nov.

(Pl. xxx, fig. 2.)

One female from *Oceanites gracilis* from Albemarle and one female from *Geospiza fuliginosa* from Albemarle. This new species resembles *limitatus* Kell. more than any other *Lipeurus*, but it differs distinctly in the character of head.

Female.—Body, length 3 mm., width .36 mm.; slender, parallel-sided, pale with light yellowish-brown markings pale but well defined. Head, length .63 mm., width .3 mm.; elongate conical, with narrow almost pointed clear prolongation of clypeus in front, with lateral marginal hairs; trabeculae small; flatly rounding temporal margins with a few very small prickles; occipital margin concave, bare; eyes flat, not conspicuous; antennae with segment 2 longest, first nearly as long as segment 2, segments 3, 4 and 5 subequal, color paler than head; whole head pale yellowish-brown with dark brown marginal band on forehead; temporal margin near the eyes a feebler brown than the head color. Prothorax hexagonal with latero-anterior margins short and hardly distinct from lateral margins; lateral margin slightly darker than the last part of segment; short hair at posterior angle. Metathorax more than twice as long as prothorax; sides parallel, posterior margin straight, with four long hairs and one shorter one in posterior angles, the shorter hair being next to the outermost hair; color darker than rest of the segments. Legs concolorous with body, narrowly dark-edged. Abdomen slender elongate, subparallel-sided, widening slightly to segment 5, segments 6 to 10 tapering, segments 2 and 3 longest, segments 1, 4, 5, 6 and 7 subequal, segments 8, 9 and 10 shortest; segment 10 obtusely two-pointed, each segment with a short hair and bristle on margin just in front of posterior angle; each segment with a median pair of short hairs, a square pale brown blotch on each side of segments 1 to 8, dark-edged anteriorly and separated by a distinct median uncolored line; blotches of segment 8 meeting, and the marking of segment 9 continuous.

LIPEURUS HELLERI sp. nov.

(Pl. xxx, fig. 3.)

Males, females and young from *Sula piscator* from Culpepper, from *Anous stolidus* from Clipperton, from *Sterna fuliginosa* from Clipperton, from *Creagrurus furcatus* from Culpepper and from *Geospiza fuliginosa* from Albemarle.

Male.—Body, length 2.93 mm., width .53 mm.; everywhere brown with margins narrowly dark; abdomen swelling in middle; head

short. Head, length .7 mm., width .49 mm.; conical, with slightly expanded parabolic front, numerous marginal hairs; temporal margin flatly convex with two longish hairs and two prickles; occipital margin concave, bare; trabeculae short but distinct; antennae with segment 1 as long as all others combined, second next longest, third short with a dorsal angular projection at dorsal extremity, fourth and fifth more colored than others; eyes large and conspicuous; signature broad and short, anterior margin convex, and posterior margin rounded; whole head chestnut brown; antennal bands interrupted by suture; with narrow dark temporal borders wide just behind eyes. Prothorax short, subrectangular, slightly wider posteriorly; lateral margin with dark borders which bend inward at posterior angle, one hair at posterior angle. Metathorax subquadrangular, posterior margin concave; lateral margins irregularly bordered with black; five very long hairs and one short hair on posterior angles, the short hair being outermost. Legs pale with dark brown marking. Abdomen elongate, with sides nearly parallel; segments 4 and 5 widest; segments 2 to 8 with one, two or three longish hairs on the posterior angles; two long and two short hairs at middle of each segment on posterior margin; all segments with complete transverse dark brown bands, black at lateral margins; segment 9 very small and emarginated.

Female.—Body, length 2.8 mm., width .83 mm.; head, length .76 mm., width .6 mm.; antennae, segment 1 longest, segment 4 shortest, segment 5 shorter than 3 and brownish in color; all segments with a few hairs; abdomen elongate-elliptical; segment 9 deeply angularly emarginated.

LIPEURUS MIRICEPS sp. nov.

(Pl. xxx, fig. 4.)

One male from *Geospiza fuliginosa* from Albemarle. This *Lipeurus* is more like *L. confidens* Kellogg, from *Diomedea nigripes* from Alaska, than like any other described form, but is smaller and distinctly different in markings. The specimen is probably a normal straggler on *Geospiza* from some maritime bird, perhaps an albatross, rather than the representative of a species peculiar to *Geospiza*.

Male.—Body, length 3.5 mm., width .83 mm.; elongate, whitish with sharply defined, black markings, the lateral abdominal bands consisting of segmental elongate blotches. Head, length .85 mm., width .31 mm.; not tapering, elongate with subparallel sides; front parabolic with clypeal margin uncolored; two marginal hairs in front of the suture, one in suture and one hair and two prickles behind

it; trabeculæ apparently wanting; antennæ with segment 1 longer than all others combined, segment 2 next longest, segment 3 short with a dorsal angular projection at distal extremity, segments 4 and 5 subequal; eyes flatly convex, inconspicuous, with one prickle; temporal margins convex with two prickles; occipital margin convex, bare; blackish-brown antennal bands interrupted by suture; black brown, round blotches behind eyes; two subtriangular blotches on occipital margin. Prothorax with sides peculiarly produced; with a long hair in the posterior angles; posterior margin flatly convex; dark brown blotches on latero-posterior margins. Metathorax with lateral margins concave; four hairs in posterior angles; posterior margin flatly concave; color whitish with dark brown lateral borders, widest in front half of middle and not reaching the posterior angle. Legs uncolored except for the chestnut tibiae and claws. Abdomen elongate, segment 4 widest, segments of about equal length; posterior angles with few weak, rather short hairs; color whitish with very narrow, clear lateral margin which sends expanded processes inward in behind half of the middle; lateral blackish blotches of segment 1 round, 2 to 6 elongate, while those of segments 7 and 8 are smaller and round; segments 8 and 9 narrow; segment 9 being narrow toward extremity with angular emargination, a few short hairs on each of the flint points.

Genus *Goniocotes*.

GONIOCOTES GALAPAGENSIS sp. nov.

(Pl. xxx, fig. 5.)

One male from *Camarhynchus productus* from Albemarle; two females from *Geospiza fuliginosa* from Narboro and one female from *Oceanites gracilis* from Albemarle. The species of *Goniocotes* are normally restricted to pheasants and doves, and the distribution of this new species as recorded is another one of the puzzles presented by this lot of specimens. There are no pheasants on the islands and only one dove, *Nesopelia*. No specimens of *Goniocotes* were taken from the numerous individuals of *Nesopelia* shot.

Male.—Body, length 1.08 mm., width .6 mm.; pale yellow, with chestnut brown marginal markings on head and thorax; abdomen with curving marginal blotches. Head, length .35 mm., width .48 mm.; front broad, convex, with short prickles; antennæ in a narrow emargination with segment 2 longest, segment 5 longer than 3 or 4; eyes inconspicuous; temporal margin strongly angulated with two long

hairs and one prickle in posterior angle; occipital margin with two acuminate projections; color pale yellow with chestnut brown marginal frontal bands ending posteriorly on each side and extending inward diagonally in front of the antennæ; temporal margin with chestnut brown border; occipital margin with subsinuous chestnut brown border.

Prothorax very short and broad, trapezoidal with lateral margin flatly convex, and posterior margin nearly straight; posterior margin with a single hair, lateral border chestnut brown. Metathorax with blunt lateral angles, each with two long hairs; posterior margin nearly straight, with a series of four long hairs on posterior margin; chestnut brown marking on lateral margins. Legs concolorous with body. Abdomen broadly elliptical; posterior angles of segments bearing one to two weak hairs, posterior angles of segments 7 and 8 with two long hairs; dorsal surface with a few weak hairs; faint lateral border gradually becomes distinct toward anterior end which turns inward in anterior region of each segment; posterior margin of last segment flatly round, with several short hairs.

Female.—Body, length 1.4 mm., width .6 mm.; head, length .38 mm. width .56 mm.; elliptical with slight indication of lateral blotches.

Genus *Eurymetopus*.

EURYMETOPUS BREVIS Dufour.

DUFOUR, Am. Soc. France, IV, p. 674, pl. XXXI, fig. 3, 1835.—KELLOGG, List of Mallophaga, p. 64, 1899.

One male from *Arenaria interpres* from Narboro. This large and unmistakable species is peculiar to the albatrosses having hitherto been taken from *Diomedea exulans*, *D. albatrus*, *D. nigripes* and *D. brachyura* in various parts of the world. Specimens have also been recorded by Kellogg from *Fulmarus* and *Puffinus* from Monterey Bay, California. It is probably correct to regard as stragglers all specimens collected from any other birds than albatrosses.

Genus *Giebelia*.

GIEBELIA MIRABILIS Kellogg.

KELLOGG, New Mallophaga, I, p. 138, pl. XI, figs. 7 and 8, 1896.—KELLOGG, List of Mallophaga, p. 64, 1899.

Two females from a *Puffinus subalaris* from Albemarle. Previously recorded from *Puffinus griseus*, *P. gavia*, *P. creatopus*, *P. tenuirostris*, *P. bulleri*, and, as a straggler probably, from *Diomedea albatrus*; all the hosts from Monterey Bay, California.

Genus **Physostomum**.

PHYSOSTOMUM ANGULATUM Kellogg.

KELLOGG, New Mallophaga, II, p. 515, pl. LXX, fig. 5, 1896.—KELLOGG, List of Mallophaga, p. 69, 1899.

One female from *Myiarchus magnirostris* from Albemarle; also a young, probably this species, from *Dendroica aureola*. This *Physostomum* is unmistakably identical with the species *angulatum* described by Kellogg from *Tyrannus tyrannus* from Kansas.

Genus **Ancistrona**.

ANCISTRONA GIGAS Piaget.

PIAGET, Les Pediculines, Supplement, p. 117, pl. XII, fig. 8, 1885.—KELLOGG, List of Mallophaga, p. 71, 1899.

Two immature specimens from an undetermined host, the bird skin having been lost or thrown away before determination. Previously recorded by Kellogg from *Fulmarus glacialis glupischka* and *F. g. rodgersii*, and by Kellogg and Chapman from *Puffinus gavia* and *P. griseus*, all from Monterey Bay, California. Described by Piaget from *Procellaria glacialis*.

Genus **Colpocephalum**.

COLPOCEPHALUM MILLERI sp. nov.

(Pl. xxx, fig. 6.)

Numerous specimens, male and female, from several specimens of *Anous stolidus* from Clipperton Island; two females from *Butorides plumbeus* from Narboro; two females and a male from two specimens of *Camarhynchus affinis* from Albemarle; one male each from two specimens of *Geospiza fuliginosa* from Albemarle and a male from *Geospiza fortis* from Albemarle. A distinctly marked species like *C. maurum* N. described from terns, gulls, and other maritime birds.

Female.—Body, length 1.83 mm., width .68 mm.; elongate; golden brown with chestnut brown lateral margins, ocular blotches conspicuous. Head, length .35 mm., width .56 mm.; front broadly rounded with eleven hairs on each side between middle of front and ocular emargination; of those on the true front the first and fourth larger than the others and of those on the side one very long; ocular emargination deep, narrow; eyes undivided but with a faint medial emargination; ocular fringe prominent; of the hairs on temporal margin three are long; occipital margin flatly concave, bare; color golden brown with

chestnut brown occipital margin extending faintly over temporal margin; round yellowish-brown blotches one on each side of mandibles; small ocular black fleck continued with chestnut brown distinct ocular blotch. Prothorax hexagonal; sides with prickle and three long hairs, four long hairs on posterior margin. Metathorax with sides produced, posterior margin nearly straight or slightly convex; posterior angles with two short prickles; posterior margin with 5 or 6 long hairs on each side of median line. Legs pale yellowish-brown with several scattered hairs. Abdomen elongate, with long hairs in posterior angle of segments, and short spines along lateral margins; two more or less irregular series of hairs on dorsal surface of each segment; broad golden brown transverse blotches and narrow chestnut brown lateral bands; last abdominal segment parabolic with two hairs and a fringe of short sharp-pointed transparent hairs.

Male.—Body, length 1.68 mm., width .51 mm.; head .36 mm., width .53 mm.; golden brown; thorax and abdomen are darker than in female.

COLPOCEPHALUM SPINEUM Kellogg.

KELLOGG, New Mallophaga, III, p. 38, pl. IV, fig. 1, 1899.—KELLOGG, List of Mallophaga, p. 72, 1899.

Males and females from two specimens of *Anous stolidus* from Clipperton Island, and a female from *Geospiza fuliginosa* from Albemarle. The type specimens of this species were taken from *Fregata aquila* from Panama. The Galapagos specimens differ somewhat from the Panama specimens and probably ought to be called a variety.

COLPOCEPHALUM UNCIFERUM Kellogg.

KELLOGG, New Mallophaga, I, p. 140, pl. XII, figs. 1-3, 1896.—KELLOGG, List of Mallophaga, p. 72, 1899.

One female from *Certhidea albemarl*i from Albemarle. Identical with the type specimens, which were described from *Pelecanus erythrorhynchus* from Lawrence, Kansas, and from *P. californicus* from Monterey Bay, California. At first glance this seems an inexplicable case of distribution, *Certhidea* being not only a land bird but a genus peculiar to the Galapagos Islands. The explanation lies in the presence of *Pelecanus californicus*, abundant on the islands. The pelican is the normal host of the parasite, but the migration to *Certhidea* has been effected by the crowding together of water and land birds on the rocks. This is a conspicuous example of the ready change to a host of very different character and habits, which is one of the features of the distribution of the Galapagos Mallophaga.

Genus **Menopon.****MENOPON SINGULARIS** sp. nov.

(Pl. xxxi, fig. 1.)

One female and an immature specimen from two individuals of *Anous stolidus* from Clipperton Island.

Female.—Body, length 1.76 mm., width .76 mm.; color, golden brown; abdomen with strong, dark brown transverse bands. Head, length .36 mm., width .65 mm.; front very obtusely but distinctly angled with three hairs on each side, then two prickles, then five hairs in front of the ocular region, of which three are long; palpi projecting slightly; antennæ not projecting beyond margin of head; temporal margin with four long hairs and many prickles; occipital margin concave with four long hairs. Color golden brown, darker medially, large black ocular fleck and dark chestnut brown ocular blotches, and a linear, black occipital border. Prothorax with produced antero-lateral angle, bearing one long hair and two prickles along rounded anterior margin and two long hairs and one prickle on posterior angle; posterior margin with four long hairs on each side of middle. Metathorax with divergent sides, narrower than head, with flatly convex posterior margin bearing a series of rather weak hairs, with dark brown transverse blotches along posterior margin. Legs pale brown with dark brown margins. Abdomen broadly ovate, with broad transverse bands across all segments; in the anterior angles of each transverse band of segments 2 to 8, a small curving comma-like chitinous band; the segments with fine hairs on lateral margin and a series of long hairs in the posterior margin; segment 9 with posterior margin flatly round, with a few short hairs and two long ones.

MENOPON NARBOROUGHII sp. nov.

(Pl. xxxi, fig. 2.)

One male from *Butorides plumbeus* from Narboro and one female from *Puffinus subalaris* from same island. This species differs from *M. paululum* and *M. petulans* in shape of prothorax and other characters.

Male.—Body, length 1.58 mm., width .7 mm.: pale golden brown, with golden brown transverse abdominal bands; broad and heavy. Head, length .35 mm., width .62 mm.; semilunar with flatly rounding front, shallow ocular emarginations, and rounded posterior angles; occipital margin flatly concave; a pair of marginal hairs in middle of front and others on sides; temporal margins with three long hairs and

few prickles, and one on occipital margin of the produced temples; four long hairs in occipital margin; a small, blackish-brown ocular fleck, chestnut brown ocular blotch; the mandibles black-tipped, the other mouth parts brown. Prothorax with produced lateral angles obtuse, bearing two prickles and one long hair; a series of ten long hairs in a rounding posterior margin; a narrow transverse line in front of the middle with four short bristles along the line. Metathorax with divergent sides, one eighth narrower than head, with nearly straight posterior margin, bearing a series of long hairs; in each lateral angle several small prickles and the terminal hair of posterior series; a transverse row of six short spines in front of middle of segment. Legs concolorous with head, with scattered rather long hairs. Abdomen broadly ovate, with a narrow transverse band across all segments except last one; in the anterior angles of each transverse band a rather large curving comma-like chitinous band; the segments with fine hairs on lateral margin, with one series of long hairs in each segment; segment 9 pale, posterior margin rounded.

Female.—Body, length 1.63 mm., width .86 mm.; head, length .31 mm., width .63 mm.; color paler than male; transverse bands of abdominal segments not distinct; posterior margin of last abdominal segment with fine hair fringe.

MENOPON SNODGRASSI sp. nov.

(Pl. xxxi, fig. 3.)

One female from *Coccyzus melanocoryphus* from Chatham.

Female.—Body, length 1.55 mm., width .8 mm.; being thus broad and short; golden yellow with broad, transverse, abdominal blotches and dark brown lateral border; head with distinct dark markings. Head, length .4 mm., width .63 mm.; broad and heavy, front broad, flatly rounded, with one short hair near the middle, then four short ones and then two longish ones, the hindmost one very short, being almost in the lateral angle just in front of the ocular emargination; palpi short, not reaching the margin; temples expanded, with three long hairs and three very long hairs; occipital margin concave, straight in the middle, with two long hairs, numerous prickles; large black ocular fleck; an irregular blackish-brown ocular blotch, which connects with the occipital margin by dark brown occipital bands. Prothorax; the part of the prothorax not concealed by the head is almost of the shape of a semicircle; three long hairs in each lateral angle; posterior margin without hairs; the transverse chitin bar distinct. Metathorax larger and wider than prothorax, but narrower than

abdomen; a long hair and two spines in each lateral posterior angle; posterior margin without hair or spine; regions of latero-posterior angles dark brown, the color extending forward narrowly along the lateral margin. Legs short, stout, concolorous with body. Abdomen golden brown, very broadly elliptical, with several spines on the lateral margins of segment, some long hairs in the posterior angles; a single transverse series of hairs along posterior margin of each segment; broad, transverse bands entirely covering each segment; marginal abdominal band very distinct; last segment rounded, with fringe of short hairs.

MENOPON GALAPAGENSIS sp. nov.

(Pl. xxxi, fig. 4.)

Two females from a *Geospiza conirostris* from Hood, and a female and two young from *Nesomimus macdonaldi* from same island. A well marked form most resembling in shape and markings of head *M. eury sternum* from woodpeckers, and *M. decoratum* from a white tailed kite, *Elanus leucurus* from Palo Alto, California.

Female.—Body, length 1.5 mm., width .78 mm.; pale yellowish with dark rusty brown marking; distinct broad transverse blotches on abdominal segments, the one on segment 2 especially strong. Head, length .38 mm., width .66 mm.; robust, almost twice as wide as long; front broad and flatly round, with several short weak hairs; two long hairs in front of the ocular emargination; temporal margin roundly expanded, with three long hairs and three very long ones and several short ones; occipital margin concave, with four long hairs; small black ocular fleck; an irregular dark chestnut brown ocular blotch, the two connected with the occipital margin; chestnut brown curving transverse band; ill-defined occipital bands, the bases of the bands being dark brown; on the forehead in front of the bands being two dark brown short curving bands on each side. Prothorax with posterior margin broadly and evenly rounded with 12 long hairs in a series extending from lateral angle to lateral angle; a narrow transverse line in front of the middle. Metathorax with diverging sides, straight posterior margin; along sides several short prickles; in the posterior angle are two large hairs, then a short prickle, and then a series of about eight long hairs along posterior margin. Legs concolorous with body, with dark margin. Abdomen broadly elliptical; posterior angle of each segment with two to three long hairs; a series of long hairs on the posterior margin of each segment; broad dark brown lateral bands, which are in interior angle of each segment, subtrans-

parent; pale brown transverse blotches across the segments; the crossed transverse blotch on segment 2 is specially strongly marked; posterior margin broadly parabolic, with few long hairs on posterior margin of each segment.

MENOPON ALBEMARLEI sp. nov.

(Pl. xxxi, fig. 5.)

One female from *Camarhynchus productus* from Albemarle and a young female from *Geospiza fuliginosa* from same island.

Female.—Body, length 1.89 mm., width .95 mm.; color pale brown, with brown transverse blotches and dark brown bands, prothorax large, and metathorax small. Head, length .37 mm., width 71 mm.; semilunar obtusely angled front, shallow ocular emarginations; front with a pair of long hairs, another on side followed by two prickles, then four long hairs in front of the ocular emargination; antennæ when outstretched projecting beyond the margin of the head by length of last segment; temporal margin round with five long hairs, of which two are very long, and a few prickles; occipital margin concave with four long hairs; a small fleck, dark brown ocular blotch and dark brown occipital margin; color pale brown. Prothorax very large, with produced lateral obtuse angles, bearing one prickle and one long hair, which is the terminal one in a series of fourteen hairs ranged along the rounded posterior margin of the segment. Metathorax small, hardly wider than prothorax, with diverging sides, straight or slightly convex posterior margin; along the sides a few short prickles, in the posterior angles with a long hair, then a prickle, and then a series of sixteen hairs ranged along the posterior margin. Legs pale, with longish scattered hairs. Abdomen ovate, with one long hair and several short ones rising along posterior angles, and a series of hairs along posterior margin; color pale brown, each segment with broad transverse subtriangular brown blotches and lateral bands.

MENOPON INCERTUM Kellogg.

KELLOGG, New Mallophaga, II, p. 533, pl. LXXIII, fig. 2, 1896.—KELLOGG, List of Mallophaga, p. 79, 1899.

Many specimens, males, females and immature, from *Geospiza fuliginosa* from Albemarle and Narboro, *G. conirostris* from Hood, *G. fortis* from Albemarle, *G. sp.* from Chatham, *Nesomimus parvulus* from Narboro and Albemarle, *N. macdonaldi* from Chatham and Gardner, *N. carringtoni* from Barrington, *Certhidea albemarlei* from Albemarle, *C. becki* from Wenman, *Camarhynchus productus* from

Albemarle, *C. salvini* from Chatham, *C. variegatus* from Chatham, *Progne modesta* from Albemarle, *Pyrocephalus intercedens* from Albemarle, *Actitis macularia* from Albemarle, *Oceanites gracilis* from Albemarle, *Procellaria tethys* from Albemarle, and *Anous stolidus* from Clipperton Island. Thus a parasite of wide range and of many host species.

Previously recorded by Kellogg from *Turdus ustulatus* and *Spinus tristis* from Palo Alto, California, and by Kellogg and Chapman from *Chondestes grammacus strigatus* from Ontario, California, and from *Thryothorus bewicki spilurus* from Palo Alto, California.

LIST OF HOSTS, WITH PARASITES.

Actitis macularia.—*Docophorus breviformis*, *Lipeurus languidus*, *Menopon incertum*, *Nirmus galapagensis*.

Anous stolidus (Clipperton Island).—*Colpocephalum milleri*, *C. spineum*, *Lipeurus baculus*, *L. diversus*, *L. helleri*, *L. potens*, *Menopon incertum*, *M. singularis*, *Nirmus gloriosus*, *N. separatus*.

Anous stolidus galapagensis.—*Docophorus melanocephalus*.

Arenaria interpres.—*Eurymetopus brevis*.

Butorides virescens.—*Colpocephalum milleri*, *Lipeurus diversus*, *Menopon narboroughi*, *Nirmus paludicola*.

Camarhynchus affinis.—*Colpocephalum milleri*, *Docophorus albemarlensis*, *Nirmus gloriosus*, *N. vulgatus galapagensis*.

Camarhynchus productus.—*Docophorus galapagensis*, *Goniocotes galapagensis*, *Lipeurus baculus*, *L. languidus*, *Menopon albemarleii*, *M. incertum*, *Nirmus galapagensis*, *N. vulgatus galapagensis*.

Camarhynchus prothemelas.—*Docophorus galapagensis*, *Nirmus vulgatus galapagensis*.

Camarhynchus salvini.—*Menopon incertum*.

Camarhynchus variegatus.—*Menopon incertum*, *Nirmus galapagensis*, *N. interpositus*, *N. separatus*.

Certhidea albemarleii.—*Colpocephalum unciferum*, *Docophorus insulicola*, *Menopon incertum*, *Nirmus galapagensis*, *N. separatus*, *N. vulgatus galapagensis*.

Certhidea beeki.—*Menopon incertum*, *Nirmus vulgatus galapagensis*.

Coccyzus melanocoryphus.—*Menopon snodgrassi*, *Nirmus galapagensis*.

Creagrus furcatus.—*Docophorus lari*, *Lipeurus helleri*.

Dendroica aureola.—*Docophorus peristictus*, *Nirmus vulgatus galapagensis*, *Physostomum angulatum*.

Fregata aquila.—*Lipeurus gracilicornis major*.

Geospiza conirostris.—*Docophorus galapagensis*, *Menopon galapagensis*, *M. incertum*, *Nirmus galapagensis*, *N. separatus*, *N. vulgatus galapagensis*.

Geospiza dubia.—*Nirmus galapagensis*, *N. vulgatus galapagensis*.

Geospiza fortis.—*Colpocephalum milleri*, *Docophorus breviformis*, *D. galapagensis*, *Menopon incertum*, *Nirmus galapagensis*, *N. interpositus*, *N. separatus*, *N. vulgatus galapagensis*.

Geospiza fuliginosa.—*Colpocephalum milleri*, *C. spineum*, *Docophorus communis*, *D. galapagensis*, *D. insulicola*, *D. platycephalus*, *Goniocotes galapagensis*, *Lipeurus baculus*, *L. exiguus*, *L. helleri*, *L. languidus*, *L. miriceps*, *Menopon albemarlei*, *M. incertum*, *Nirmus galapagensis*, *N. gloriosus*, *N. interpositus*, *N. lepidus*, *N. vulgatus*, *N. vulgatus galapagensis*.

Geospiza intermedia.—*Nirmus vulgatus galapagensis*.

Myriarchus magnirostris.—*Nirmus galapagensis*, *N. vulgatus galapagensis*, *Physostomum angulatus*.

Nesomimus adamsii.—*Nirmus vulgatus galapagensis*.

Nesomimus carringtoni.—*Docophorus peristictus*, *Docophorus validus minor*, *Menopon incertum*, *Nirmus galapagensis*, *N. gloriosus*, *N. interpositus*, *N. lepidus*, *N. vulgatus galapagensis*.

Nesomimus macdonaldi.—*Docophorus melanocephalus*, *Menopon galapagensis*, *M. incertum*, *Nirmus galapagensis*, *N. vulgatus galapagensis*.

Nesomimus melanotis.—*Lipeurus baculus*, *Nirmus galapagensis*.

Nesomimus parvulus.—*Docophorus galapagensis*, *Lipeurus languidus*, *Menopon incertum*, *Nirmus galapagensis*, *N. interpositus*, *N. vulgatus galapagensis*.

Nesopelia galapagensis.—*Nirmus curvilineatus*.

Oceanites gracilis.—*Docophorus platycephalus*, *Goniocotes galapagensis*, *Lipeurus exiguus*, *L. languidus*, *Menopon incertum*, *Nirmus curvilineatus*.

Procellaria tethys.—*Lipeurus languidus*, *L. potens*, *Menopon incertum*, *Nirmus galapagensis*.

Progne modesta.—*Docophorus breviformis*, *Menopon incertum*, *Nirmus gloriosus*, *N. separatus*.

Puffinus subalaris.—*Docophorus validus minor*, *Giebelia mirabilis*, *Lipeurus diversus*, *L. diversus major*, *L. limitatus*, *Menopon narboroughi*.

Pyrocephalus dubius.—*Nirmus galapagensis*.

Pyrocephalus intercedens.—*Docophorus insulicola*, *Lipeurus languidus*, *Menopon incertum*, *Nirmus galapagensis*, *N. vulgatus galapagensis*.

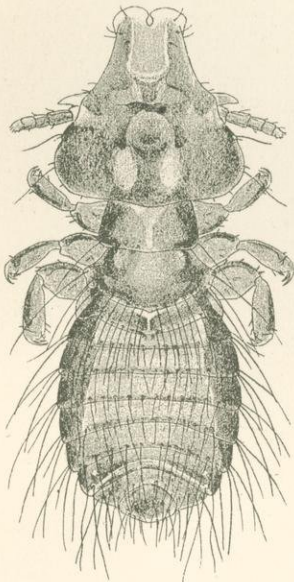
Sterna fuliginosa (Clipperton Island).—*Docophorus icterodes*, *D. melanocephalus*, *D. peristictus*, *Lipeurus gracilicornis major*, *L. helleri*, *L. potens*, *Nirmus gloriosus*, *N. lepidus*, *N. obtusus*, *N. separatus*, *N. vulgatus galapagensis*.

Sula piscator.—*Lipeurus helleri*, *L. languidus*, *L. potens*.

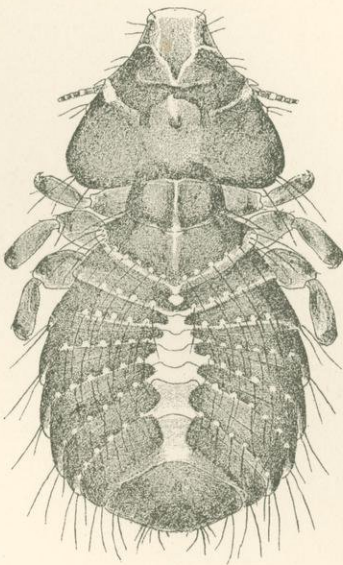
PLATE XXVIII.

FIG. 1. *Docophorus platycephalus*, male.

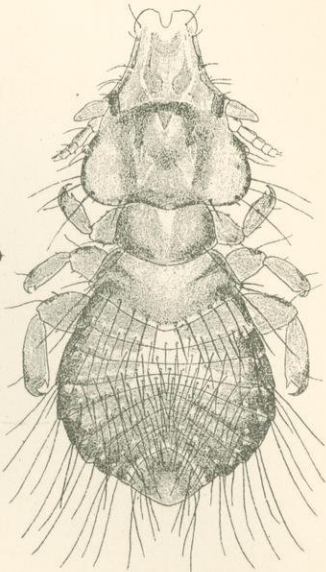
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|----|---|------------------------------|
| 2. | " | <i>peristictus</i> , male. |
| 3. | " | <i>breviformis</i> , male. |
| 4. | " | <i>galapagensis</i> , male. |
| 5. | " | <i>albemarlensis</i> , male. |
| 6. | " | <i>insulicola</i> , male. |



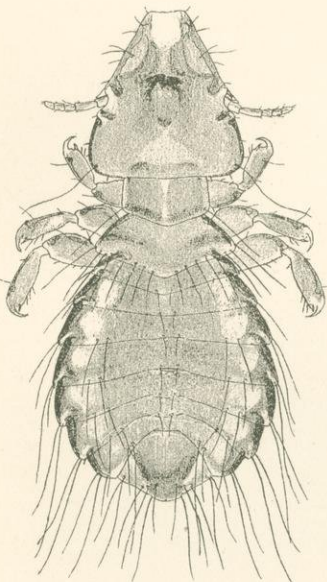
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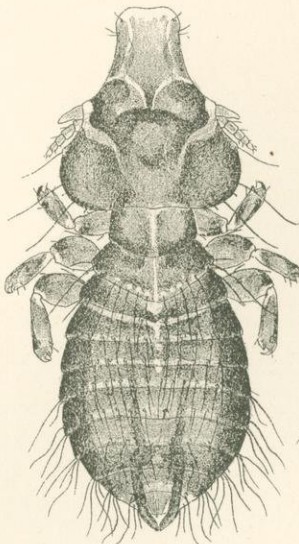
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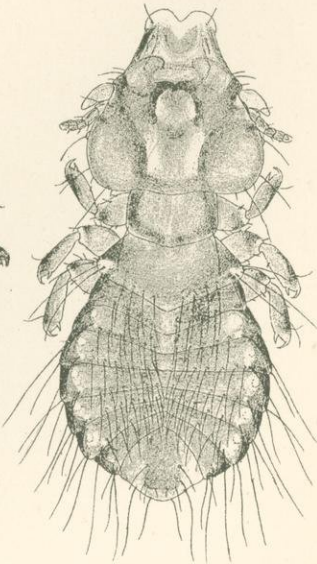
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PLATE XXIX.

- FIG. 1. *Nirmus gloriosus*, male.
2. " *obtusus*, female.
3. " *paludicola*, female.
4. " *curvilineatus*, male.
5. " *galapagensis*, male.
6. " *separatus*, male.
7. " *lepidus*, male.
8. *Lipeurus languidus*, male.

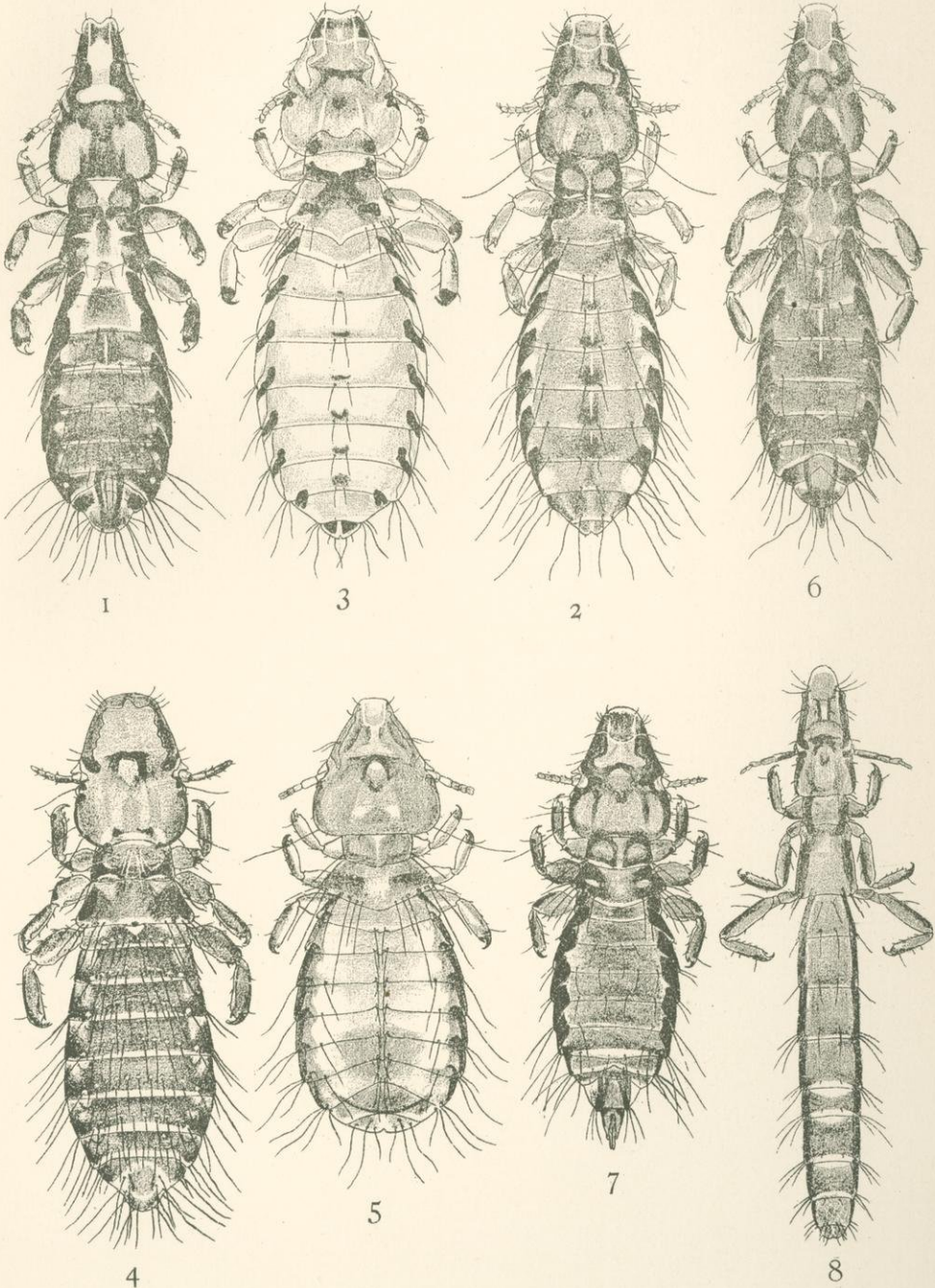
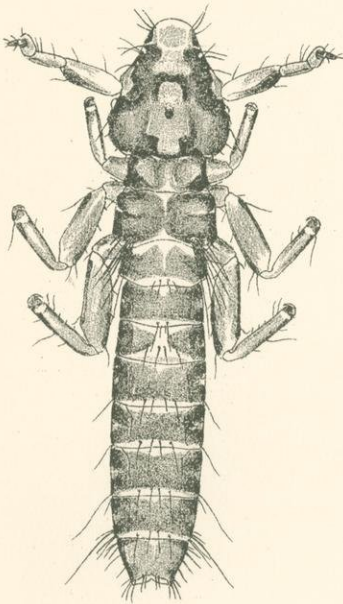
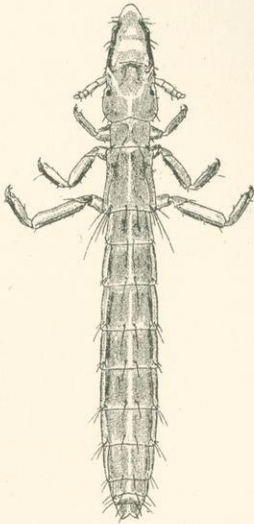


PLATE XXX.

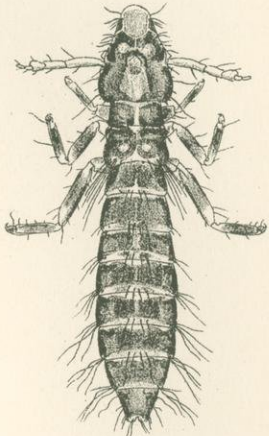
- FIG. 1. *Lipeurus potens*, male.
2. " *exiguus*, female.
3. " *helleri*, male.
4. " *miriceps*, male.
5. *Goniocotes galapagensis*, male.
6. *Colpocephalum milleri*, male.



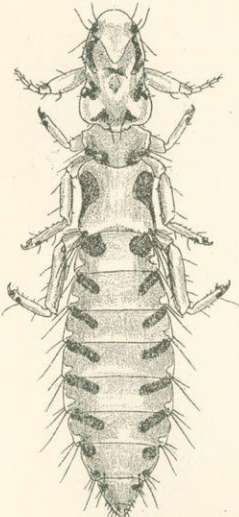
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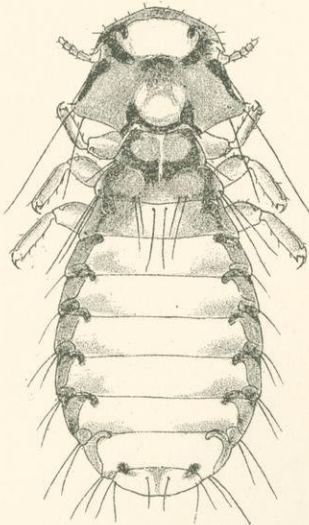
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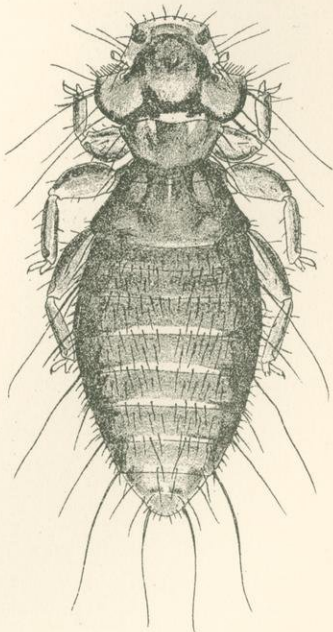
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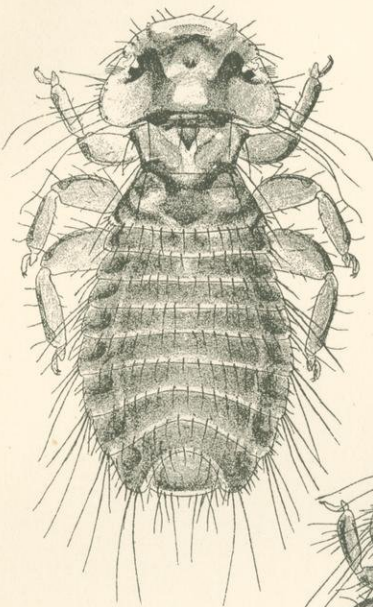
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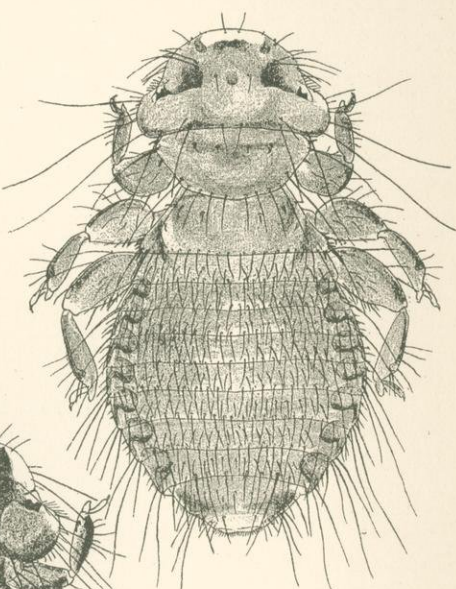
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PLATE XXXI.

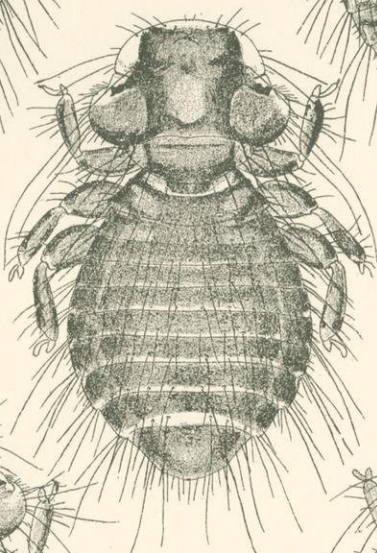
- FIG. 1. *Menopon singularis*, female.
2. " *narboroughi*, female
3. " *snodgrassi*, female.
4. " *galapagensis*, female.
5. " *albemarlei*, female.



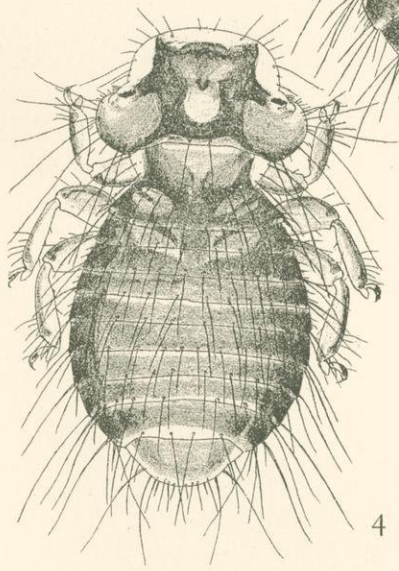
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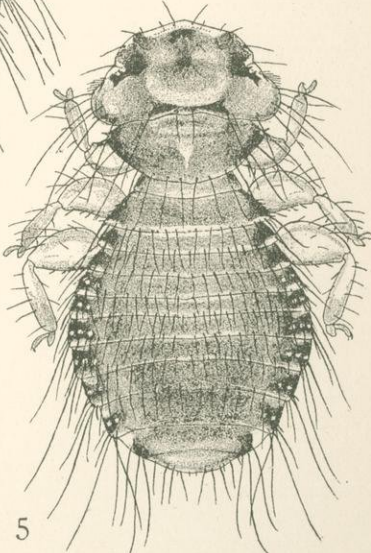
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