CHAPTER V.

SUBORDER MALLOPHAGA.

Bird Lice.

This group embraces all the biting lice infesting birds and mammals. They are very distinct, indeed, from the preceding group, although frequently placed with them under such unnatural divisions as Anoplura, Pediculines, etc.

Their bodies are usually hard and horny and much flattened. They possess mandibulate mouth parts adapted to cutting and biting the hairs, feathers, epidermal scales, or excretions on the bodies of their hosts. They are said also to have a suctorial organ by means of which they may at times draw blood from the host animal. The mandibles are situated in most forms underneath the head and near the center, the clypeus projecting and forming the most anterior portion of the head. The labrum is present and the maxillary palpi are prominent in a part of the group. The eyes when visible are located back of the antennæ. The antennæ are five-jointed except in Trichodectes. The thorax is generally narrow and frequently but two divisions are apparent. The legs are adapted to claspers (Philopteridae) or to running (Liotheidae), the tarsi in the first case being short and fitted for folding against the tibiae, and in the second case being long, well adapted to running, and provided with two claws. The members of the first division occur on both mammals and birds, those of the second, except Gyropus, are limited to birds. Wings are entirely wanting, and the abdomen contains nine or ten segments and is usually oval in shape.

In life history this group agrees with the preceding. The eggs are glued to the hairs or feathers of the host animal and open with a circular cap or lid at the free end. The larvae are less flattened, shorter in proportion, and without the hardened parts common to the adults covering a part or all of the surface. The length of life and rapidity of multiplication has not been determined for any species so far as we know, and the habits of the insects make any such determination a matter of great difficulty.

While it is, of course, very desirable that a more complete knowledge of the life history of the species be secured, it may be considered as already established that all the species, with no known exception, pass their transformations on the body of the fowl, and that, unlike
the mites, they may be attacked with the assurance that eggs and newly-hatched young are not developing in some out-of-the-way corner.

Moreover, the observations made on the length of time required for the hatching of the eggs indicate that they require a number of days at least, so that in repetition of treatments intended to kill individuals hatched since a former treatment, a period of ten days to two weeks may be counted on as probably short enough.

Even were we able to keep the eggs under suitable conditions and determine its exact period of incubation for all the species, we would not know that this would hold for all times of the year, nor could we assume results as to the number of eggs laid by one female and length of life of the mature louse to be uniform under all conditions. For practical purposes, therefore, it will be best to work on the facts already known, using, where possible, measures that will destroy eggs attached to hairs or feathers as well as the lice, and to discriminate between the lice and the mites or ticks which breed away from the fowls, and must therefore be fought with a little different principle in mind, though often the same measures may be adopted for both.

It should always be borne in mind that lice must grow from eggs laid by the adult louse, and can never originate from fifth or other matter. Chickens hatched in an incubator should be absolutely free from lice and remain so until brought in contact with a lousy hen or put in a lousy house.

The effect of these lice may be less important than the suctorial lice or the sucking ticks or mites; but judging from the serious results following the efforts of the animals to rid themselves, and from the known irritation due to anything crawling among the hairs or feathers, it can not be doubted that they cause much annoyance and inconvenience to the creatures that become their involuntary supporters.

A writer in the Poultry World gives the following statement as to the symptoms of lice in fowls:

Bowel disease in summer is a sign of lice; the sleepy disease, in which the chicks are sleepy or drowsy, is a sign; refusal to eat; puny-looking body and slow growth; sudden deaths; gradual wasting away; constant crying; loss of feathers on the head, and other symptoms that appear surprising or remarkable. Even in the cleanest of houses, when not a sign of lice can be seen, look on the chick for the large lice. Not only on the chicks, but the large body lice are nearly always on the adults. A chick will never get lousy unless the old fowls are near, and that is why brooder chicks grow faster than those under hens. The large lice will kill ducks suddenly. They kill nearly all the young turkeys that die. Whenever you notice a sick fowl dusting itself look for lice. No doubt a majority of our readers fully understand how to get rid of lice, but the fact is that they will not believe that lice are present, and ascribe the results of the work of lice to some disease, thus doctoring the birds unnecessarily. First, we wish to say that while you may easily discover myriads of little red mites in the poultry house, yet the real enemy is the large gray body louse which works on the heads, necks, and vents, and which never leaves the birds. To find this louse a very close search must be made, as he lurks down on the skin, at the base of the feathers, and hides from view. A single one of these voracious fellows on the head or throat of a young chick will sometimes cause the chick to droop and die.
Mr. E. W. Parker, in Poultry World, gives a good idea of how indifferent one may be. He says:

In July and August especially (but at all times of the year) lice abound more than at any other time, and chicks will become infested with them unless great care is taken. Many persons wonder why their young chicks droop and die, mope around for a week or two, all the time getting thinner and weaker, finally become unable to stand, and die—these persons claiming all the time that "lice is not the cause of it" because they have searched under the wing for the red or yellow louse, on the head for the large head louse, and in fact have looked them from top to bottom for parasites and have found none. I wonder if they have ever looked on the throat, or at the side below the ears, for the large head louse. I wonder if it entered into the brain of such breeders that the head louse could destroy the life of chicks from two to six weeks old by sucking the lifeblood from the throat and under the head. If it has not, I can tell them that such is the case, and I say without fear of contradiction that when the chick appears weak, growing weaker and thinner, the skin seems to shrivel upon the body, and there is a slimy discharge from the body, and when the chick eats it is usually with difficulty, and as the supposed disease advances it seems almost impossible for the chick to swallow, finally refusing to eat; when any or all of these symptoms appear then examine the underpart of the head and the throat and at the sides for the head louse, and nine times out of ten he will be found snugly at home among the down or sprouting feathers; then apply two-thirds glycerin, one-third carboic acid, and five times as much water as the above mixture.

The order may readily be separated into two families upon characters a part of which have already been mentioned, namely, the structure of the mouth parts and the feet. The latter, which is the most readily observed, can be easily told from the mode of locomotion, the members of the first group being incapable of rapid movement, but well adapted to clinging to the hairs or feathers, the latter running freely and swiftly, but having less power to clasp.

Family PHILOPTERIDÆ.

Infesting horses, cattle, sheep, dogs, cats, chickens, turkeys, pigeons, ducks, etc.

The members of this family have the mouth parts on the under side of the head. Mandibles strong; maxillæ wanting; tarsi short, of one or two joints, the claw meeting a tooth at the apex of the tibia; mesothorax apparently wanting; abdomen having nine segments.

The group is a large one, the species being so numerous that there is scarcely a bird but harbors one, and sometimes several, species of this family.

The genera are, for the most part, easily separated; Docophorus, by the presence of a movable appendage (trabecula) in front of the antennæ; Nirmus, by the presence of an immovable tooth in front of the antennæ and the generally entire terminal segment of the abdomen of the female. Goniocotes and Goniodes are robust forms, usually with large heads strongly curved in front. They differ by the former having simple antennæ in both sexes, while in the latter they are modified in the male. The former are also usually much the smaller. In Lipeurus the body is generally long and slender, the antennæ of the males large
and often with a complicated structure, while the terminal segment of the female is bilobed. The species of Ornithobius are white or transparent and especially characterized by having sharp curved appendages meeting in front of the clypeus. Trichodectes is at once known by the three-jointed antenna. Other genera of the family do not contain species infesting domestic animals, and hence need not be noticed here.

**Louse of Ducks and Geese.**

*Docophorus icterodes* Nitzsch.

This species has been recorded from so many different members of the order of birds containing the ducks and geese that it may be considered as common to the order. It was described by Nitzsch in 1818, and has been mentioned by most writers on parasites since that time. It is about 1 mm. in length, and has the head and thorax of a bright reddish color with darker bands. The abdomen is white in the center, with broad, dark reddish, horny bands at the sides, with a darker spot at the margin. It occurs commonly on our native ducks.

**Little Red Swan Louse.**

*Docophorus cygni* Denny.

Notwithstanding the apparent abundance of this species, it does not appear to have been described before 1842, when it was described and figured by Denny (Monog. Anop. Brit., p. 95, pl. 1, fig. 1), but according to this author it was figured by Redi (Exper., Pl. IX, fig. inf.), which would carry its recognition back two hundred years. It is common on both the wild and domesticated swans, and Denny states that he has received it from the bean goose.

It is 1 mm. in length, of a robust form, the head decidedly rounded in front, except at the extreme tip, where it is slightly excavated. In color the head, thorax, and legs are bright reddish brown, while the abdomen is white in the center and dark brown at the sides, the brown occupying hard plate-like portions at the side of each segment.

The form and the distribution of these plates are shown in the accompanying figure.

**Lesser Chicken Louse.**

*Goniocotes hologaster* Nitzsch.

This common species which lives upon the domestic fowl was recognized by DeGeer and by Nitzsch. It has been generally confused with another form, or rather another larger and perhaps more common form
has been generally accepted by English and American writers as the *hologaster*, this being due to the description and figure given by Denny, who does not seem to have seen the true *hologaster*, but described for it, according to Piaget, an immature specimen of the larger species since described as *Goniocotes abdominalis* Piaget.

The *hologaster* is only about 1 mm. in length, whereas the *abdominalis*, or Denny's *hologaster*, is about 3 mm. In general form the species are somewhat similar, the *hologaster* being less constricted at the thorax and more regularly tapering to the end of the abdomen. The head is more nearly quadrate; the abdomen not so conspicuously marked, the incurved margins of the segments not extending so decidedly upon the disk and presenting the distinct lines seen as a border to the fasciae in *abdominalis*.

**LARGE CHICKEN LOUSE.**

(*Goniocotes abdominalis* Piaget; = *G. gigas* Taschenberg.)

This is probably fully as common as the preceding species. As already stated, it is the form which has been commonly referred to in English and American works as the *Goniocotes hologaster*, which doubtless accounts for its not having been described until quite recently.

It is a large, conspicuous species, about 3 millimeters in length, quite broad, the head nearly circular in front and constricted behind, the thorax small, the abdomen widening to near the end and terminating abruptly. The head, thorax, and legs are yellowish, with dark margins and spots; the abdominal segments bear lateral whitish fasciae bordered with black.

It appears to be much less common than some other species of chicken lice, notably *Menopon pallidum* and *Lipeurus variabilis*.

**PIGEON LOUSE.**

(*Goniocotes compar* Nitzsch.)

A species which has been familiar for a long time and generally common, along with other lice, on domestic pigeons. It is a rather
small-sized species, a little more than a millimetre in length. The head is rounded in front, narrower between the antennæ, broadest near the posterior margin. The thorax is narrower, the abdomen in the male broadest near the posterior end and squarish behind; in the female more regular and broadest near the middle. It is whitish, with a rather broad brownish margin, from which prolongations extend inward upon the sutures.

THE PEACOCK GONIOCOTES.

(*Goniocotes rectangulatus Nitzsch.*)

This species, which shares with the *Goniodes falcicornis* the hospitality of the peacock, was first described by Nitzsch (Germar's Mag., III, 294). It is a small species, about the size of the *hologaster*, which it resembles quite closely. The head is squarish, somewhat rounded in front, while the thorax and abdomen are short and oval. While less noticeable than the larger species associated with it, it is probably no less abundant.

GONIOCOTES OF THE PHEASANT.

(*Goniocotes chrysocephalus* Giebel.)

This parasite of the pheasant was first described by Giebel in 1866 under the name of *Goniocotes colchici*, which he afterwards changed to the above. It is said to resemble the *hologaster* which affects the domestic fowl. It has not been recorded from America, but will probably be found on imported birds.

BURNETT'S GONIOCOTES.

(*Goniocotes burnetii* Pack.*)

A species described by Dr. A. S. Packard (Am. Nat., Vol. IV, p. 94) is apparently much less common than some of the other species common to the sadly infested barnyard fowl. According to Dr. Packard's description, it differs from the *G. hologaster* of Europe, which lives on the same bird, in the short second joint of the antennæ, which are also stouter, and in the long head, the clypens being much longer and more acutely rounded, while the head is less hollowed out at the insertion of the antennæ. The abdomen is oval and one-half as wide as long, with transverse, broad, irregular bands along the edges of the segments. The mandibles are short and straight, two-toothed. The body is slightly yellowish and variously streaked and banded with pitchy black. This

*Probably identical with *Lipeurus heterographus* Nitzsch. (See p. 231.)*
proves to be a *Lipeurus*, or at least it agrees with *L. heterographus* in most particulars. Occurs also on ducks. (See *L. heterographus*, also technical notes.)

**THE CHICKEN GONIOIDES.**

(*Goniodes dissimilis* Nitzsch.)

Although this species has been known for a considerable time, it seems not to have been abundant enough to receive frequent notice.

Denny says:

I suspect this species of being of rare occurrence, as the only specimen which I have examined was communicated by Mr. Thompson from Belfast, and that being a female I am precluded from describing the characteristics of the male.

It is a large species, 2 to 2 1/2 mm. in length, and Denny describes it as tawny in color, smooth, shining, and pubescent, with large subquadrate head, a short transverse prothorax, and a large abdomen with the side markings confluent, and the sutures with deep chestnut bands. It has not as yet been recorded for this country that we are aware of, though in all probability it occurs here as well as in Europe.

**GUINEA FOWL GONIOIDES.**

(*Goniodes numidianus* Denny.)

We have only the record given by Denny (Monog. Anop. Brit., p. 163, Pl. XIII, fig. 7) as authority for this species. His diagnosis of the species is as follows: “Pale straw-yellow, shining and smooth, margined with black; head suborbicular; abdomen acuminate, with pitchy brown, interrupted transverse bands.” He states that “the only specimens of this species I have seen are two males, which I took from off a pintado (*Numida meleagris*).” We have not had the opportunity to search for this species and can not say whether any effort has been made in this country to obtain parasites from the guinea fowl. It is most likely that a careful examination of a number of the fowls would furnish examples of this species and possibly others not yet recognized.

**THE PIGEON GONIOIDES.**

(*Goniodes damicornis* Nitzsch.)

According to Giebel, this species was first described by Nitzsch, and his reference is “Zeitschrift f. ges. Naturwiss., 1866, XVII, 119.” It is
a rather large species, a little more than 2 mm. in length and of a bright-brown color. The head is very much rounded in front and strongly angular behind. It occurs only on pigeons, but upon these appears to be rather common, though not yet met with in our own collecting.

**The Little Pigeon Goniodes.**

(*Goniodes minor* Piaget.)

Piaget (Les Pédiculines, p. 256) has described as a distinct species, under the above name, a form quite similar to the preceding but smaller and presenting some differences of the antennæ and form of the head. According to this author, it is found on the domestic pigeons and also on *Columba tigrina*, *C. risoria*, and *C. bitorquata*. It has not to our knowledge been recorded in this country as yet, but is likely to be found along with the other forms.

**Louse of Turkey.**

(*Goniodes stylifer* Nitzsch.)

Nitzsch describes this species in German's Magazine (III, 294), and it has been frequently mentioned since that time. It was also described by Schrank under the name of *Pediculus melaleagris* (Faun. Ins. Aust., 504). It is a large species, 3 mm. or more in length, and quite readily distinguished from other common species by the hind angles of the head, which are extended backward into long styles, from the ends of which extend strong bristles. The thorax is angular, with a black margin, and the abdomen is pale, with transverse bands of dark color.

The species probably has a distribution equal to that of the turkey itself, and with the other species common to this fowl render it pretty thoroughly infested.
This large and common species appears to have been first recorded by Redi, who figured it under the name of *Pulex pavo尼斯*. Since that time it has engaged the attention of Linnaeus, Frisch, Olfers, Fabricius, Stephens, Schrank, Nitzsch, Burmeister, Stewart, Panzer, Denny, Giebel, Piaget, and numerous other writers, who have described, figured, and discussed it under one name or another, from which we would infer that it must have been one of the most common and frequently met with of any of the parasites of our domesticated fowls.

It is a large species, 3 to 4 mm. in length, of a bright reddish-yellow color, with a large head, the hind angles of which are acute and prominent. The first joint of the antenna in the male is large and bears a prominent tooth. The abdomen is broad, light yellow, with prominent transverse lateral bands extending nearly to the middle line. It has been taken repeatedly in America.

**The Pheasant Goniodes.**

(*Goniodes colchicus* Denny.)

This species is not likely to prove of any special interest in this country, except where pheasants have been introduced, and we will simply mention it and repeat the diagnostic description given by Denny:

*Bright chestnut-yellow; head subquadrate, temporal angles obtuse, thorax with a broad ferruginous margin; abdomen pale, yellow-white, nearly orbicular, each segment, excepting the first and last two, with a pitchy black aruncate fascia.*

He refers this species to the insect mentioned under the name of *Pediculus phasiani* by Fabricius, with a question as to their identity.

*Goniodes gigas* Tasch (?).

Professor Comstock, in his Introduction to Entomology, first ed., *Pt. I*, p. 86, names this as a parasite of the hen, but he states no authority for the species, and we are unable to find any other reference to it, unless it be intended for *Goniocotes gigas* Taschenberg.

**Lipeurus of the Chicken and Pheasant.**

(*Lipeurus heterographus* Nitzsch.)

This species, first recorded by Nitzsch, would appear from the writings of European naturalists to be rather common, but it has seldom
INSECTS AFFECTING DOMESTIC ANIMALS.

THE SQUALID DUCK LOUSE.

(* Lipeurus squalidus Nitzsch. *)

According to Denny, this species was referred to by Fabricius under the name of *Pediculus anatis*, and it seems extremely probable that it was referred to under other names by many of the early writers, since it is so common on many species of ducks that it is hardly possible that it should have been entirely overlooked. The first definite reference to it, however, is the description by Nitzsch in 1818; and, more fortunate than some of the related species, this has been allowed to hold in all subsequent works, and so far as we know there are no synonyms for its specific name.

It is a very abundant and common species and occurs on a great many different species of ducks, both wild and domesticated; indeed, so generally does it occur on the different species of the genus *Anas* and related genera that we may almost say that it is common to all species of the family including the ducks.

It is quite characteristic in appearance, and not likely to be confused with other species on the same birds. It is about 4 mm. (one-sixth inch) in length, elongate in form, and of a light yellowish color, with dark border to the head, thorax, and abdomen. On the latter this border is broken into a series of quadrate patches corresponding with the segments. The young lack the definite markings of the adults, but have nearly the same general outline of body. The annexed figure will doubtless enable anyone to determine with certainty as to specimens taken from ducks.

*Lipeurus anseris* Gurlt.

Under this head is recognized a species which is said to differ from the *anseris* of Linnaeus and other authors, which is referred to *jejunos* of Nitzsch. It was described from specimens taken from the domestic goose, but would appear to be rather a rare species since it has not been generally recognized. We insert it upon the authority of Piaget, who seems to consider it as unquestionably distinct from related species, though apparently in doubt as to the real form from which the descriptions were made.

THE LIPÆRUS OF THE GOOSE.

(* Lipeurus jejunos Nitzsch. *)

It is generally accepted that Redi had this species in hand as one of the different parasites which he figured, and it has certainly been
referred to by Linnaeus, Albin, Olfers, and others, but the description by Nitzsch may be taken as the first strictly technical description that would separate it certainly from related forms. Denny records it as taken from the white-fronted goose, the brent, the wild goose, and the bean goose, and Piaget adds the gray goose, Canada goose, domestic goose, and the aegypticus.

It is evident, therefore, that it is generally distributed upon members of the goose family.

We have not had specimens in hand, but it is described as slender, pale yellow-white, with a pitchy margin, the first eight segments of the abdomen with quadrangular bands, and the legs dusky above.

**THE TURKEY LOUSE.**

(*Lipeurus polytrapezius* Nitzsch.)

This, like the *variabilis*, appears to have been one of the earliest species to receive recognition, as Linnaeus cites Redi (Exper., t. II, fig. 2) with the name *Pediculus accipitris*, while he himself uses the name *Pediculus meleagridis*, and gives a brief description, which probably refers to this species. Authors have quite generally, however, followed the name given by Nitzsch, as above. It has doubtless been common wherever this fowl has been kept and is one of the familiar species.

It is of rather large size, 3 to 3½ mm. (an eighth of an inch) in length, of an elongated form, having a pale, yellowish white color, and with a black margin around the body. The abdomen is long, and all the segments but the last are marked with a grayish brown trapezoidal spot on each side. According to Denny:

Their mode of progression is rather singular, as well as rapid. They slide, as it were, side-wise extremely quick from one side of the fiber of a feather to the other, and move equally well in a forward or retrograde direction, which, together with their flat, polished bodies, renders them extremely difficult to catch or hold.

I have observed that where two or more genera infest one bird, they have each their favorite localities; for, while the *Goniodes stylifer* will be found on the breast and neck of the bird, the *Lipeurus polytrapezius* will be congregated in numbers on the webs and shafts of the primary wing feathers.

Very common on turkeys, and I have specimens from the wild turkey as well.
INSECTS AFFECTING DOMESTIC ANIMALS.

THE VARIABLE CHICKEN LOUSE.

(*Lipeurus variabilis* Nitzsch.)

This species appears to have been recorded as early as 1668 by Redi, later by Frisch, unless these both refer to *Menopon pallidum*, and to have received a brief description by Linnaeus (*Fauna Suecia*, No. 1960) under the name of *Pediculus caponis*. The name by which it is now universally known, however, was given with description by Nitzsch in 1818 (Germar’s Mag., III, 292). While no very extensive literature seems to have accumulated in reference to this particular species, it is of course included in the many articles referring to poultry lice in general. It does not seem, however, to be so abundant as some of the other species infesting the common domestic fowl.

It is about 2 mm. (one-twelfth of an inch) in length, the body elongated, of a whitish color, and smooth and shining. The margins of the body are black; the head is large, rounded on the anterior margin, and the whole appearance sufficiently distinct from any of the species infesting the chicken, so that, with the aid of the figure, there can be no difficulty in distinguishing it at a glance. Denny says: “Common on the domestic fowl, preferring the primary and secondary feathers of the wings, among the webs of which they move with great celerity.”

THE WHITE SWAN LOUSE.

(*Ornithobius cygni* Denny; *O. bucephalus* Giebel.)

This large and handsome species was quite certainly recognized by Redi and figured by him and has received frequent mention since. It is a conspicuous species, and appears to occur in great abundance on different species of swans, so that it is readily obtained. It has been recorded as occurring on the domestic and wild swan of the old world as well as the *musicus* and *bewickii*, and we have taken it in great abundance from the common swan of this country, probably the Trumpeter Swan.

The body in this species is whitish, but so transparent that all the internal organs are easily seen through the body walls. There are black points at the outer hind margins of about four of the abdominal segments, as shown in the figure, and the last segment in dusky or nearly black. It is 4 mm. long (one-sixth of an inch), and the body is
rather slender and decidedly flattened. Altogether this species seems to be almost as beautiful and as graceful in its movements as the bird which harbors it. Some of the specimens we have secured appear to contain blood, and while these parasites are not supposed to extract blood from their hosts, it is possible that they may at times burrow deep enough to secure access to the capillaries or feed upon blood that may have exuded from wounds upon the surface of the body of the bird.

THE Louse OF THE Cat.

*(Trichodectes subrostratus Nitzsch.)*

While it is possible that this parasite was referred to by Otto Fabricius about the year 1780 under the name of *Pediculus canis*, the first certain reference to it appears to have been the description by Nitzsch in 1818. Since that time it has been referred to by nearly all writers on the common parasites of animals, but so far as we know there has been no special description of the different stages, and we must assume that there is no important departure from the habits of species that are more thoroughly known.

It is a little more than a millimeter in length, and has much the appearance of the species occurring on other domestic animals, but is distinguished particularly by the form of the head, which is quite pointed, and the under part of the front of the head is hollowed out in a furrow about the size of a hair. The insect will often be found adhering by the mouth parts with a hair so closely held in this groove that it is somewhat difficult to tell where the hair begins as separate from the insect.

There is no record that we have seen that indicates its presence on any other animal than the domestic cat, and, judging by my own observation, it is only occasionally that cats become infested with it. When they do the usual remedies may be administered, especially a washing with kerosene emulsion, after which the animal should be allowed to dry in a warm place, as the fur is so fine that it dries slowly.

THE BITING Louse OF THE DOG.

*(Trichodectes latus Nitzsch.)*

Something over a century ago DeGeer mentioned a species of parasite on the dog under the name of *Ricinus canis*, which probably referred to this species, and another mention by Ollers under the name of *Pediculus setosus* probably preceded the description by Nitzsch under the name which the insect has borne since 1818.
Probably everyone who has had much to do with dogs is aware to what an extent this parasite may multiply and how troublesome it is to this friend of man. It is generally believed that the lice are more troublesome to puppies than to old dogs, and it is not at all unlikely that the insects migrate when possible from older to younger animals.

In color this species agrees pretty closely with the other species, and it is of about the same length as the cat louse, a little more than 1 mm., but it is much broader in proportion, being more than half as wide as long, and the head is short and the front but slightly curved.

**The Louse of the Bear.**

*Trichodectes pinguis* Nitzsch.

Inasmuch as the common brown bear has been to a considerable extent domesticated, and indeed furnishes a means of support to a certain class of people, it seems proper to introduce mention of its common parasite here. The species was described by Nitzsch, and apparently later authors have done little more than quote his description. To what an extent bruin suffers from the company of his guests we are not aware, but they probably multiply upon him as on other animals and cause him the same amount of annoyance.

It is described as characterized by the form of the head, which is subquadrangular. It is nearly 2 mm. in length.

**The Louse of the Llama.**

*Trichodectes breviceps* Rudow.

In some parts of South America the llama is a very important domestic animal, and consequently this parasite has a place with the other species included in this work.

This species was described by Rudow in 1866, but as we have not seen specimens we must leave it with the mere mention. It is said to be 1 mm. in length, and doubtless agrees closely with the other species of the genus in appearance.

**The Louse of the Goat.**

*Trichodectes climax* Nitzsch.

Since this species was described by Nitzsch in the early part of the present century it does not seem to have received very frequent notice, and Denny does not appear to have found it in England.

It is described as having the head wider than long, quadrangular in shape, and the body in the female nearly two-thirds as wide as long, the length being about 1½ mm.
The *Trichodectes caprae* of Gurt is considered by Piaget as identical with *climax*, while the *Tr. caprae* of Packard is not mentioned by him, but Professor Verrill has expressed the opinion that it is equivalent to *limbatis*, mention of which follows. It may be stated here, however, that the figure given by Packard agrees well with Piaget's figure of *climax*. It has been collected from goats at Baltimore by Dr. A. Hassall.
This species is referred to the Angora Goat, and is recognized as a distinct species by Giebel, Piaget, and others. It is the species to which Professor Verrill thinks Dr. Packard's caprae belongs. Dr. Packard does not state upon which species of goat he found his specimens, but it is probable that they were from the common species, and if so, and inasmuch as his figure agrees fairly well with climax, it would seem as likely to belong there.

In a recent bulletin from the Bureau of Animal Industry, Dr. Cooper Curtice describes these forms and endeavors to establish their specific identity. The principal points urged are a proportional difference in size between males and females, a difference in markings, and difference in size of eggs, but these are all variable, and the differences, as shown in the excellent figures accompanying the report, are so slight that we are the more impressed with the view that they are only varieties, and unless it be shown that they do not interbreed nor survive if changed from one host to the other we should be inclined to use the two names as synonyms.

The Louse of the Sheep.

*(Trichodectes sphaerocephalus Nitzsch.)*

Redi is credited with the recognition of this species, and following him Linnaeus described it under the name of *Pediculus ovis*, and later
still it was described in detail under the name given above. Denny's reference to it would indicate it as rare in England. It is of rather rare occurrence, which may be considered as fortunate, for, if abundant, it would be rather difficult to contend with on account of the long wool of the host.

It has been fairly plentiful at Ames on sheep which came originally from Canada, and proved quite troublesome. Pyrethrum proved most useful in the long wool in winter.

The name indicates its characteristic feature, namely, the rounded head. The color agrees closely with the related species.

Where it occurs it will be the best plan to pay close attention to destroying them at the time of clipping the sheep even if they are but few in number, as at any other time the labor of making thorough applications for them is greatly increased.

THE BITING LICE OF HORSES, MULES, ASSES, ETC.

(Trichodectes equi auct.)

The original reference by Linnaeus to the lice of horses and asses under the name of Pediculus equi most certainly refers to the common Trichodectes infesting these animals, but Piaget has reached the conclusion that this reference is to the form subsequently described by Giebel as Trichodectes pilosus, and that the form described by Denny as equi, and which has since almost universally been treated as the Linnaean species, was in reality a different insect from that described by Linnaeus under the same name. He therefore describes this form under the name of parumpilosus. It is certainly somewhat confusing to be obliged to drop the familiar designation for so common a species, and were it not that this conclusion has been reached by one who is probably the highest living authority regarding these insects we should hesitate to introduce the change. The figures given by Piaget, however, leave no question that there is a decided difference between pilosus and parumpilosus, and it is equally certain that our common species belongs to the latter form; so, if there is no question as to Linnaeus having the form pilosus in hand, we certainly have no right on technical grounds to apply the term equi to our common form. We will therefore introduce descriptions and comparisons of the two forms and adopt, for the present at least, and on the authority of Piaget, the names given in his Les Pédiculines.
This, according to Piaget, is the form originally designated by Linnaeus as equi, and which, if that is correct, was the basis for a name which has been widely used to designate the biting lice of the members of the horse family. The original reference dates back considerably more than a century, and doubtless the insect was familiar many centuries before that, as the horse and ass have been too familiar as domestic animals to allow of the parasites common to them escaping entirely the notice of man.

According to Piaget this occurs upon both the ass and the horse, while the following species he has found only on the horse.

We have not been fortunate enough to secure examples of this form, though we have the other in great abundance, so we are compelled in describing to depend upon the excellent description and figures of Piaget, the latter being reproduced here for comparison. The head in this form is shorter and less rounded in front, that of the male being still less rounded than the female, while the abdomen is more slender and tapering. The transverse bands are also represented as less conspicuous. Perhaps the most striking point, however, is the position of the antennæ, which stand well forward on the head, so that the front border of the head and base of the antennæ are nearly in line.

The habits of the species and the remedies applicable to it are naturally identical with those of the other related species.

While it does not seem possible that all the writers previous to Denny should have overlooked this form, which appears to be the more common one, at least on the horse, it may be true that Denny was the first to give it a thorough description and careful drawing. He speaks of it as common on the horse and ass, but Piaget says he has never found it on the ass, and there is of course a possibility that Denny did not distinguish between this and the preceding species.

In this species the head is decidedly rounded in front, the antennæ inserted well back, so that the head forms a full semicircle in front of the base of the antennæ. The abdomen is more slender and tapering than in scalaris, but less so than in pilosus, as shown in Piaget's figures.

The color is much the same as in the allied species, the head, thorax, and legs being a bright reddish brown, or chestnut, and the abdomen of a dusky yellowish color, with about eight transverse dusky bands occupying the central or anterior portions of the segments and extend-
ing from the middle line a little more than halfway to the margin. They are hardly as conspicuous as in scalaris, and apparently rather longer and more conspicuous than in pilosus.¹

Piaget describes two varieties of this species, one from the Burchell's zebra (Equus burchelli) which he calls var. ocellata on account of a series of eye-like uncolored spots on the abdomen, and the other from the small horses of Java, var. tarsata, which has the second joint of the tarsi particularly developed, and which he mentions as in some respects approaching pilosus.

The habits of this species are well known and have received mention for many years. They seem to accumulate more particularly upon colts or horses in pasture, but their presence becomes most manifest in the latter part of the winter, when they may become so numerous as to cause great irritation to the animals infested. They occupy more particularly the region of the neck, and also accumulate around the base of the tail and between the legs, and the animals will frequently rub bare places in these regions in their attempts to rid themselves from the irritation.

It is unnecessary to give any special notice regarding treatment, as they must be attacked on the same plan as other species.

Even if it proves that this species does not ordinarily infest the mule or donkey, it would be policy not to allow these animals, if infested, to associate with horses, as we have no assurance as yet that they can not thrive on any members of the equine family.

**Biting Lice of Cattle.**

*(Trichodectes scalaris Nitzsch.)*

This species, which is a very abundant one upon cattle and occurs the world over, appears to have been first technically described by Linneus (System. Nature, VII, p. 1017, No. 9) under the name of Pediculus bovis, and evidently the same species is referred to under the name of Pediculus tauri (Fauna Suecica, 1946). Notwithstanding these descriptions, both of which were under a different genus from that in which it is now placed, the species was again described by Nitzsch (German's Magazine, III, 296) under the name of Trichodectes scalaris, and it has been known by this name in all of the numerous writings subsequent to this description. It has been treated by all writers

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¹The hair line in the figure is about one-fifth longer than it should be.

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upon the parasites of animals and is one of the best known species of parasitic insects. The effects upon the cattle infested are often quite serious on account of their great number, but they are apparently less injurious than the sectorial species which infest cattle. This injury depends, of course, upon the numbers occurring upon the individual, and somewhat upon the irritability of the animal infested. This species much resembles the form occurring upon horses, but is somewhat shorter, and the abdomen tapers less toward the extremity; the dark bands across the abdomen are also more distinct. They are generally found in greatest abundance in the spring of the year, at which time adults and eggs are discovered in great numbers. Their development corresponds with the other species, and they are subject to the same methods of attack.

They are very distinct from the sectorial species in appearance, and this difference is recognized by practical men, who speak of them as the “little red lice,” as contrasted with the “blue lice,” and they recognize, too, the difference in the trouble caused by the two species.

The application of kerosene emulsion or of tobacco decoction at seasons when this is practicable is effective, and we have found the process of fumigation described in the chapter on remedies to be effective. This, of course, is applicable at all seasons of the year, even in cold weather, without danger to the animal.

**Family LIOTHEIDÆ.**

**LOUSE OF THE DOVE.**

*(Menopen giganteum Denny.)*

This species of louse infesting doves is described by Denny (Anop. Brit., 225, f. 2, pl. 21). It does not appear to have been commonly observed since that time. A species is described under the name of *Menopen latum* (Piaget, Les Pédic., 457), which is probably the same as *Menopen giganteum*. As the species is evidently not a very abundant one, and the habits and remedies for this species are very similar to those for the *Menopen pallidum*, it is not necessary to enter into detail as to treatment. According to Denny, it is of a yellowish-brown color, shining, the head with a small brown patch on each side, the prothorax with a cruciform depression and the lateral margin reflected.

**THE COMMON HEN LOUSE.**

*(Menopen pallidum Nitzsch.)*

This species, probably the most abundant of all the lice infesting poultry, has been a familiar creature in the writings of entomologists, and also in all the literature of poultry raising.

It was evidently recognized by Redi (Exper., tab. 16, fig. 1), who figured it under the name of *Pulex capi*. Linnaeus described it as
Pediculus gallinarum (Syst. Nat., 1020, 32), and it is also mentioned by Panzer under the same name. Offers described it under the name of Nirmus trigonocephalus, and Nitzsch, recognizing its true generic relations, gave it the name of *Menopon pallidum*. While Denny, Giebel, and Piaget all agree in referring the figure by Redi to this species, Linnaeus places it under his *Pediculus caponis*, which is equivalent to *Lipeurus variabilis* N.

The annoyance that this one species causes poultry is probably equal to that of all the other species combined, for it occurs in great abundance, and almost every fowl examined will be found infested. Then, too, it passes readily to other species of birds, and many instances are recorded where horses kept near henroosts have been very seriously troubled by them. Some of these accounts seem hardly credible, taken in connection with the habits of the insect, and we are inclined to think that the worst cases, at least, may have been due to the presence of itch mites on the poultry and the migration of them to the horses, though in such case we should expect the fowls themselves to show more serious injury. It is, at any rate, important to keep lousy chickens away from horses.

This louse is pretty easily distinguished from other common species infesting the hen by its light color and its great activity, running with great celerity among the feathers and from them upon the hands of persons holding fowls. It is from 1 to 1 ½ mm. in length, rather slender, and of a light straw-yellow color.

Remedies for this species must aim to reach the hiding places of the lice on the roosts and in the cracks of the walls of the henhouse as well as to destroy those on the fowl. Thorough fumigation and whitewashing, with careful attention to cleanliness, will do much to keep them in check. Pyrethrum, kerosene, etc., may be used direct upon the fowls, and if they are liberally supplied with ashes and road dust they will do much to protect themselves.
INSECTS AFFECTING DOMESTIC ANIMALS.

Menopon biserialum Piaget; = M. stramineum Nitzsch.

Under the above name Piaget describes a species of louse taken from the Gallophasis cuvieri, and which he speaks of as occurring also on the domestic fowl, the pheasant, and other birds. He says:

Sur un Gallophasis (Eulopocamus) cuvieri j'ai retrouvé le même parasite sur un Gallus domesticus, sur un Phasianus colchicus, sur un Pavo spiciferus mâle et femelle en assez grand nombre et dernièrement aussi sur une Meleagris gallopavo. Il se rapproche évidemment du stramineum de N., promenent d'une Meleagris gallopavo, dommage que la diagnose de Giebel (Eph., p. 291) soit trop vague pour l'identifier, mais plus encore du Pediculus meleagridis de Panzer (51, f. 20). Peut-être est-ce le parasite de Schrank No. 1019, recueilli sur le même oiseau.

It seems very probable that the description of Panzer, Nitzsch, Giebel, and Piaget all apply to the same insect, and if such is the case it would carry the recognition of the species back to 1793, when it was described by Panzer under the name of Pediculus meleagridis.

It would seem to be confined more particularly to the Phasianidae, and of these to infest particularly the peafowls and turkey, though its occurrence on the hen is frequent. It would evidently pass readily from any of these birds to others in the same family. From specimens received it would seem to be rather common on chickens in the United States.

THE PHEASANT MENOPON.

(Menopon fulco-maculatum Denny; M. productum Piaget.)

Denny, in his monograph published in 1842, describes and figures, under the name of Menopon fulco-maculatum, a species of louse occurring on the quail and pheasant. Piaget describes also a species occurring on pheasants (Phasianus pictus and P. colchicus), which he considers as probably the same as Denny's, though neither the description nor the figure enable him to determine certainly.

According to Denny, “it is fulvous yellow and pubescent; head semi-lunar, with a pitchy transverse spot on each side; abdomen clavate, with pale spots on the lateral margin.”

Piaget says it is very similar to M. pallidum, though distinct, and calls the color, “jaune ocre, fauve sur les cotés de l'abdomen.”

Piaget also describes a variety (major) taken from the Lophopharus resplendens.

THE PEACOCK LOUSE.

(Menopon phaenomum Nitzsch.)

This species is apparently confined to the peafowls, as since its description in 1818 it has been taken only from these birds. Piaget states that it occurs on three different species, Pavo spiciferus, P. cristatus, and P. javanicus. It has not been recorded from this country, but is likely to be found by searching these birds.
SUBORDER MALLOPHAGA.

LOUSE OF THE GUINEA HEN.

(Menopon numida G.)

Giebel seems to have been the first to have mentioned this species, and we may infer that it is usually not abundant. Piaget speaks of it as similar to the Menopon phaetontum N.

We have not had opportunity to make careful search for it, but it doubtless occurs on guinea fowls in this country. It would probably be difficult for an ordinary observer to distinguish between this and the common species infesting hens, and even if noticed in abundance on guinea fowls it would very likely escape mention.

LOUSE OF DUCKS.

(Trinoton luridum Nitzsch.)

Redi seems to have been the first to give mention of this very common species, it being figured in the Exper., Pl. XII, as the louse of the teal. It is also figured by Albin (pl. 46) under the same common name as quoted by Denny. Nitzsch described it in 1818 under the name given above, and the species has been fortunate enough not to have received any other designation since, although it has been mentioned in most of the works referring to the parasites of domestic fowls or the parasites of birds. It is a very common species and occurs on a great many different species of ducks, so that it is unnecessary to try to enumerate the hosts. So far as we have seen or can learn from record, however, it is not known to occur on birds outside of the duck family (Anatidae).

Its nearest ally is the goose louse, to be mentioned next, and it is easily distinguished from that by the difference in size and the more distinct markings in this species. The markings are shown in the accompanying figure, their distribution on the head, thorax, and abdomen being clearly indicated. The abdomen in the specimen figure is a trite narrower and the sides a little more parallel than in some specimens observed. It is 4 to 5 mm. in length.

LOUSE OF THE GOOSE AND SWAN.

(Trinoton conspurcatum Nitzsch.)

This species was evidently recognized at an early date, and is said to be mentioned by Sulzer under the name of Pediculus anseris. Nitzsch
described it in 1818 under the name which has been universally adopted since, and it has received frequent mention since that time. It is very similar to the *Trinoton luridum*, but may generally be easily separated by the more diffuse coloring and its larger size, being 6 mm. (3 lines according to Denny) in length. The two species are not known to infest the same kinds of birds. This louse occurs on a number of species of geese and swans, and on one gull; according to Denny, on the common domestic goose, on the *Larus canus*, and *Cygnus bewickii*; on *Cygnus olor*, according to Burmeister; on *C. m. muscius* and *olor*, according to Piaget; and on *Anser ruficollis*, according to Grube.

While the *Trinoton luridum* we have found to be rather common in America, the *conspurcatum* has not been met with, but the opportunities for examining geese have been limited.

**Louse of the Goose.**

(*Trinoton luridum* Nitzsch.)

This quite distinct species of louse has been known to entomologists since 1818, when it was described by Nitzsch. Denny, however, did not recognize the application of the description to this form and redescribed it under the name of *Trinoton squalidum*. Later writers, however, have adopted the earlier name, and there will probably be no further confusion regarding it.

It is quite easily distinguished from the other species of *Trinoton*, being considerably shorter, smaller, and of a nearly white color.

It occurs, according to Denny, on *Anser albifrons*, the domestic goose, and on *Anas clypeata*. It is also referred to the Smew, and Piaget states that it has been taken from *Dendrocygna arborea* and *Anser albifrons*.

**The Pigeon Louse.**

(*Colpocephalum longicornem* Nitzsch.)

Nitzsch described this form, which occurs on pigeons, in 1818, but it was again described by Denny in 1842, who gave it the name of *turbinatum*. Giebel retained both these names, evidently considering that they referred to distinct species, but Piaget has placed them together.

The species would not seem to be so abundant as some of the other
species of pigeon lice, and it has not been found as yet on pigeons that we have had an opportunity to examine.

It does not appear to have been found on any other birds, but has been taken from the common domestic pigeon and also the turbot.

**The Swan Louse.**

*(Colpocephalum minutum Rudow.)*

Rudow seems to have been the first to recognize this species, though its occurrence upon the swan (*Cygnus olor*) makes it rather strange that it should have escaped observation so long. It is a very small species, as would be inferred from the name, and this may account in part for its not having been earlier noticed.

It has not been recorded from this country, but may be looked for upon our species of swans, as the lice infesting these birds are generally widely distributed.

**Louse of the Guinea Pig.**

*(Gyropus gracilis Nitzsch.)*

The guinea pig is perhaps a rather unimportant factor among the domesticated animals, but it supports its due quota of parasites nevertheless, and they require a brief mention, at least. They are quite interesting in structure, differing largely from any of the species considered hitherto.

The one to first receive notice, and probably the one here given, was referred to by Schrank under the name of *Pediculus porcelli*, but Nitzsch, in 1818, described it as *Gyropus gracilis*, a name which has been used by all subsequent writers.

It is referred to generally by writers on the subject, and would seem to be a fairly common species where guinea pigs are kept. It has not been met with in this country so far as records show, but may be looked for with great probability of success in any place where guinea pigs are kept in numbers.

Denny characterizes it as "elongate, pale, fulvous-yellow, finely pubescent; head and thorax darker, segments of the abdomen with transverse striated fascia at the sutures; tarsi and unguis very short and minute." Collected at Baltimore by Dr. A. Hassall.
INSECTS AFFECTING DOMESTIC ANIMALS.

*Cyropus ovalis* Nitzsch.

This is a form closely related to the preceding species, and observed and described by Nitzsch at the same time. It differs from that species in the much shorter and broader body, and is, according to Denny, "pale yellow-white; head and thorax bright ferruginous, the former transverse; temporal lobes produced; abdomen large, nearly orbicular; legs thick, the two posterior pairs curved; ungues long, curved, and strong." Collected at Baltimore by Dr. A. Hassall.

The scanty hair of the guinea pig makes the application of washes for the destruction of the lice a very simple matter, so that wherever it is a matter of importance there need be no difficulty in ridding the animals of the parasites.

APPENDIX TO MALLOPHAGA.

List of the species of Mallophaga recognized as belonging to the fauna of the United States, with descriptions of new species.

Family PHILOPTERIDÆ.

*Docophorus platystomus* N.
Burmeister, Handbuch, Vol. II, p. 426, sp. 13; Denny, p. 108, Pl. IV, fig. 7; Giebel, Epiz., p. 69, Taf. IX, fig. 5; Piaget, p. 17, Pl. I, Fig. 1.

From sharp-shinned hawk (*Accipiter velox*), Rhode Island (H. O. Bumpus), *Buteo swainsonii*, Iowa (*H.O. collection*). *Aquila imperialis* (Burnett collection).

*Docophorus cursor* N.
Burmeister, Handbuch, Vol. II, p. 426, sp. 14; Denny, p. 101, Pl. II, Fig. I; Giebel, p. 75, Taf. X, figs. 5 and 6; Piaget, p. 24, Pl. I, fig. 5.


*Docophorus cebulebrachys* N.
Denny, p. 92, Pl. I, fig. 3; Nitzsch MSS., Vol. IV, p. 197 (cited by Denny), and Zeits. f. Natur., 1861, Vol. XVII, 523; Giebel, p. 77, Taf. XI, fig. 15; Piaget, p. 29, Pl. I, fig. 8.

From snowy owl, Iowa (H. O. collection; Cassino collection). Arctic Am. (Stejneger collection and McKay collection). Also specimens in Nat. Mus., Acc. No. 16827, and in Riley collection. It occurs very abundantly on this bird, but so far there is no record of its occurrence on any other species.

*Docophorus superciliosus* N.
Burmeister, Handbuch, Vol. II, p. 427, sp. 22; Denny, p. 68, Pl. III, fig. 9; Giebel, p. 94, Taf. X, fig. 3; Piaget, p. 39, Pl. III, fig. 1.

From hairy woodpecker (*Dryobates villosus*) (Cassino collection).

*Docophorus communis* N.
Nitzsch, German's Mag., Vol. III, p. 220 (290) (vide Giebel); Burmeister, Handbuch, Vol. II, p. 425, sp. 9; Denny, p. 70, Pl. V, fig. 10; Giebel, p. 85, Taf. XI, fig. 13; Piaget, p. 54, Pl. IV, fig. 5.

Docophorus compar Piaget.

Piaget, p. 61, Pl. VII, fig. 1.

From Loxia c. minor, Ames, Iowa.

Docophorus bassanae Denny.

Monog. Anop. Brit., p. 110, Pl. VI, fig. 3, Pl. VII, fig. 3.

Host unknown, probably the gannett (Burnett collection).

Docophorus fissiformis Denny.

Monog. Anop. Brit., p. 84, Pl. I, fig. 2.

On "black-billed sandpiper" (Burnett collection).

Docophorus testudinarius Denny. (Fig. 1, Pl. II.)

Denny, p. 96, Pl. I, fig. 6; Piaget, p. 83, Pl. VI, fig. 5.

From curlew "Numenius longirostris," Ames, Iowa. Specimens from this bird agree so closely with the figures and descriptions of the above species occurring on the related Numenius arquatus of Europe that I see no occasion to give it a separate description. On Bartramia longicauda. (Burnett collection.)

Docophorus bisignatus N.

Insecta Epiz., p. 106, Pl. IX, fig. 9; Piaget, Les Picid., p. 92.

On Ibis alba; collection of C. B. Cook.

Docophorus sphenophorus Nitzsch.

D. phatalea Denny, p. 100, Pl. IV, fig. 9.

A specimen of this well-marked species in the Cassino collection is without indication of host or locality, but it is doubtless American, probably from spoonbill.

Docophorus pertusus Nitzsch.

Recorded by Kellogg, from coot (Fulica americana) at Monterey, Cal., and Lawrence, Kans.; also from ruddy duck (Erismatura rubida) at Monterey, Cal.

Docophorus lari Fabr.


Docophorus lari Denny, p. 89, Pl. V, fig. 9; Piaget, Les Picid., p. 111, Pl. IX, fig. 7.

From herring gull (Cassino collection) and Larus philadelphia (Burnett collection). Also recorded by Kellogg from several species of gulls in California.

Docophorus colymbinus Denny.

Monog. Anop. Brit., p. 80, Pl. VIII, fig. 8.

On Urinator lumme (Burnett collection).

Docophorus icterodes Nitzsch.

Nitzsch, German's Mag., Vol. III, p. 290; Denny, p. 102, Pl. V, Fig. 11; Giebel, Vol. III, pl. 10, fig. 8; Piaget, p. 114, Pl. X, Fig. 1; Osborn, Bull. 7, Div. Ent., U. S. Dept. Agr., p. 31.

A very common species on many kinds of ducks. Specimens have been noted in the Cassino, Burnett, and Stejneger collections, and also taken at Ames, Iowa. The Burnett specimen shows the clypeus more quadrate than in other specimens, especially many specimens taken at Ames in which the clypeus is quite decidedly rounded at lateral margin. Recorded also by Kellogg.

Docophorus cygni Denny.

Denny, Monog. Anop. Brit., p. 95; Giebel, Epiz.; Piaget, Les Picid., p. 115, fig. 3, Pl. X.

From swan (Olor buccinator (?)), Ames, Iowa. Very abundant.
Docophorus rostratus Nitzsch.

*Docophorus rostratus*: Burmeister, Handbuch, Vol. II, p. 427; Denny, p. 87, Pl. II, fig. 4; Giebel, p. 76, Pl. X, fig. 4; Piaget, p. 27, Pl. I, fig. 7.

A specimen of this well-marked species from the barn owl (*Strix pratincola*) in the collection of Prof. Lawrence Bruner. There is no difference of note between this and the European form as described, though it is perhaps a little more slender and elongate than the figures would indicate. Even this is possibly due to extension of abdomen from pressure of cover glass in mounting.

*Docophorus melanocephalus* Burm.

In Burnett collection. Great Cayenne term. Recorded by Kellogg, New Mallophaga, p. 99, on royal tern (*Sternus maxima*), Monterey, Cal.

*Docophorus buteonis* Pack.


Packard's description of this species seems not to have been accessible to Piaget, or he was unable to verify it, as he passes it with a mere mention. (Les Pédic., p. 22.)

I have specimens from *Buteo lineatus*, the hawk from which Packard described the species, sent me by Dr. C. M. Weed, of Hanover, N. H., which agree entirely with Packard's description, and they appear to me to be sufficiently distinct from other species to be retained. Packard's description is as follows:

The species of *Docophorus* figured on Pl. I, fig. 3, appears to be undescribed, and may be called *D. buteonis*. It lives beneath the feathers of the red-shouldered hawk. It is honey yellow, and the abdomen is whitish with triangular chitinous plates on each segment, the two on the segment next to the last forming a continuous band. The head is longer than broad, with the trabeacula (or movable horny process just in front of the antennae) as long as the two basal joints of the antennae, and extending to the middle of the second joint. The basal joint of the antennae is rather thick, and the second joint is as long as the two terminal ones.

Both description and figure are wanting in reference to characters which would most certainly distinguish the species, and I may add that the species is separated from *platystomus* by the deeper incision of the clypeus, and the more circular outline of the clear lateral dilation. The genital patches are approximate and the proximal margins of the patches denticulated; the outer portion of the patches faint.

A specimen in the Burnett collection from *Tyrannus atra* is referred here.

*Docophorus halieti* n. sp.

Head a little wider than long, clypeus tapering but with dilated apical portion emarginate in front. The transparent dilation but little in advance of antennal bands, but curving outward so as to show as a clear part at sides; emargination shallow and reaching inner portion. Trabeacula simple, bluntly pointed, antennae slender, eye prominent, clypeus and temporal borders with few short hairs, abdomen ovate in female, round in male, sparsely hairy above and below, thickest on disk above; all hairs rather short. Genital hooks, male sharply curved, between them several prominent teeth. Genital spot male, large, distinct, the anterior lateral oval portion wide apart connected to central portion by inflated band; central portion broad, widening at middle, incised by lateral border behind, the wider part with two hair insertions on posterior half, extending to tip of last segment. Genital spot
female, curved, the inner convex margin approximate, the outer concave portion inclining near the front an oval spot. Approaches \textit{intermedius} Piaget, which is described from \textit{Haliatus vocifer}. It differs from that species in having the clypeus more emarginate for the transparent portion, the dense portion narrower at tip. The genital hooks are decidedly hooked, the genital patch of male heavier and the posterior portion broader. The genital spots of female approach closely to pattern of \textit{platystomus}.

From bald eagle (\textit{Haliatus leucocephalus}) collected by Dr. C. M. Weed, in Florida.

\textbf{Docophorus bubonis} n. sp.

General appearance of \textit{D. eblebrachys}, from which it differs distinctly in form of head and genital hooks, and in eyes being very obscure. Head oval, narrowing from eyes to occiput, broadest at base of trabecula, contracting sharply to front; eyes very obscure or wanting, scarcely any convexity indicating their position, and no trace of pigment beneath. Occiput slightly curved, temporal lobes narrow, long, contracted posteriorly; median space between occipital bands narrow behind; antennae situated slightly in front of middle. Trabeulae small and rigid, as in \textit{eblebrachys}. A very short hair at each side of transparent portion of front, a longer hair at middle of external clypeus band, and two hairs on margin of temporal lobe. Prothorax short, metathorax broader than basal segment of abdomen. Abdomen widest behind middle at fourth and fifth segment. Light yellow bands, extending more than half way to middle disk, hairy, seventh segment with dorsal margin. Male genital hooks prominent, long, heavy, sharply curved at top.

Two specimens, male and female, in Cassino collection, from \textit{Bubo virginianus}, Pennsylvania. This is a well-marked species, although showing decided affinities to \textit{eblebrachys}. The form of head in narrowness and length behind the antennae will distinguish it from almost any described species, the reduction of the eyes is very marked, and the form of the genital hooks give it well-established characters. In form of head and rigidity of trabecula it approaches \textit{Nirmus}, but the character of the clypeus and the general form of body, as well as its evident relationship to \textit{eblebrachys}, would prevent its reference to that genus.

\textbf{Docophorus syrini} Packard—cited in Piaget, p. 31—Grilt.

I have not met with this description, nor with any form which would seem to represent it.

\textbf{Docophorus quiscali} n. sp.

Clypeus broad, lateral angles rounded, with front slightly incurved, in some cases almost truncate, nearly as broad at tip as at base of trabecula, transparent for about one-fourth distance from tip to trabecula. Trabeulae large, curved, and with rather acute tip; margin of clypeus and head with scattering hairs; metathorax with a complete band posteriorly set with hairs; abdominal segments with bands extending about one-third across the posterior border of these bands, with clear spots from which arise long, rather slender hairs. The eighth segment with the brown band extended entirely across. Beneath a large brown patch occupying the
sixth, seventh, and touching the eighth segment, regularly rounded in front, roughly excised behind; brown spots located near the margin on each segment back to the eighth; those on the sixth segment form the outer portion of the genital patch. Length, 2 mm.

General appearance of *communis*, of which it might be considered a variety, but it is quite distinct and constant in form of clypeus and genital patch, and seems to occur only on Quisculus, its nearest ally being a species occurring on *Agelaius phoniceus*.

From crow blackbird, collected at Ames, Iowa.

This is a very common species on this host, and I have noted it in various collections.

**Docophorus agelaii** n. sp.

Similar to *quiscali*, but slightly narrower. The clypeus truncate or slightly rounded, the sides sloping; trabeceule curved on front margin, straight behind; the apex somewhat acuminate; bands on the abdomen broad, much incised at insertions of the hairs; band on the eighth segment contracting in the middle, almost broken. Beneath, the genital patch large, strongly curved in front, deeply and irregularly incised behind; lateral spots small, rather elongated, oblique. Quite close to *quiscali*, and both might be considered varieties of *communis*, but seem well established.

**Docophorus sialis** n. sp.

 Clypeus tapering, lateral angles rounded, front convex, or very slightly incurved at extreme apex; no transparent portion in front of the chitinous bars; trabeceule strongly curved in front, slightly curved behind, acuminat at tip.

On *Sialis sialis*, Merriam Coll. Belongs to *communis* group, but separated by head characters.

**Docophorus corvi** n. sp.

Whitish, with black and fuscous bands and stripes.

Length of body, 2.5 mm.; head, 0.75 mm.; abdomen, 1.17 mm. Width of head, 0.70 mm.; abdomen, 0.98 mm.

Head scarcely longer than wide, truncate in front; clypeus broad; clypeal signature acuminat and elongat posteriorly; posterior part black; anterior portion with a broad fuscous margin; antennal bands deep fuscous; trabeceule strong, convex in front, slightly concave behind, blackish band at base extending along posterior border; antennae rather slender, basal joint largest, with a black band extending nearly around, deepest in front; second joint slender, long, mostly black, with a deep incision of the black portion toward the tip, joints 3, 4, and 5 nearly equal, black, distal joint scarcely as dark as the others; eyes prominent; temporal lobes clear, with black border, in which are three clear spaces, from which hairs arise; occipital bands very black; occiput slightly sinuous. Prothorax narrow, with broad, black margin; metathorax nearly twice as wide as prothorax, lateral angles rounded, deeply margined, with black extending medially and nearly uniting; each side set with about eight hairs arising from round, clear pustules. Legs banded and striped with black; abdomen oval, with broad fuscous marginal bands extending well upon the disk; the posterior margin set with hairs which arise from circular pustules near the margin and from notches in the band on the disk; large, clear, circular spots marking position of spiracles; eighth segment with a broad band extending clear across; ninth segment with two triangular patches approximate anteriorly; lateral angles with

![Fig. 142. Docophorus corvi](image-url)
two or three long, slender hairs; gula with a fuscosus patch produced in front; sternum with a small fuscosus patch pointed anteriorly; genital bands rounded in front, with two circular, clear spots behind the front border extending to near the margin on the sixth segment, posteriorly produced; a rather narrow, rough-edged process on the seventh segment; a series of submarginal spots on segments 3 to 9, those on the eighth and ninth merging into a single triradiate spot.

Common on Corrus americanus, Ames, Iowa. This is probably Packard's Lupeurus corei, which was evidently described from an immature specimen.

Docophorus minuto-trabeculatus n. sp.

Head pointed, strongly tapering before antennae; clypeus narrow, slightly convex in front; anterior portion transparent; clypeal mark rounded behind, no hairs; trabeculae very small, giving appearance of a Nirmus to side of head; eye not prominent; antennae short, rather strong, joints equal, two hairs on margin; temporal lobes full; occipital bands not conspicuous; all bands on head joint, occiput straight; prothorax about half the width of head, colored at sides, central stripe light; metathorax curved behind, colored at sides, central stripes continuous, with prothorax clear; colored portion incised for insertions of hairs of posterior border; lateral bands of abdomen very short, except on first segment, where they extend inward as far as colored portion of thorax, bands less prominent on posterior segments; eighth without coloration; two faint spots on terminal; ninth segment, abdomen, oval, nearly round; a row of four hairs each on segments 3, 4, 5, and 6, marginal hairs on each segment back offifth; legs colored yellow; tibiae larger than femora; color light yellow for colored portions, mostly whitish, possibly not fully mature, but has appearance of adult.

On Fulica americana.

Differs in form of clypeus and abdomen from any species known to me as occurring on related birds. Collected from a stuffed bird in the museum of the Iowa Agricultural College. In the minuteness of the trabeculae this species might be taken for a Nirmus, but in the form of the head and abdomen, and in general appearance it is decidedly a Docophorus.

Docophorus fusco-ventralis n. sp.

Quite uniformly chestnut brown, rather slender.

Length, 1.26 mm.; head, 0.47 mm.; abdomen, 0.61 mm. Width of head, 0.40 mm.; abdomen, 0.47 mm.

Head longer than wide; clypeus, broad, truncate, thin in front, and with a ventral notch at tip; clypeal signature strong, a long, strong, dark-brown spine passing backward to a point midway between antennae; sides of clypeus a little concave; trabecula strong, forward margin curved (shape of communis); antennae slender, light brown; temporal lobes rounded; occipital bands running outward to bases of antennae; occiput nearly straight; prothorax small, sides straight, widening a little behind, posterior border slightly convex; metathorax broader, widening rapidly, distinctly angled behind, hind border with a row of hairs; abdomen above brown, lateral bands reaching nearly to center, leaving a narrow, whitish, membranous stripe from base to eighth segment; eighth segment entirely cornes and brown, margin with blackish line, a row of strong, golden hairs on posterior border of each segment to eighth; beneath uniformly dark brown, obliterating genital bands; legs small, quite uniform with body in color.

On wood pewee (Contopus virens) Cornell University collection; also in the Burnett collection.
Approaches *communis* type in some respects, but differs, I think, from any variety of *communis* in approximation of bands on abdomen and uniform brown color of ventral surface of abdomen and size of legs.

**Docophorus coccygi** n. sp.

Head large, in male nearly as large as abdomen, bright ferruginous; abdomen whitish, except in center and corneous portions, which are dark, almost blackish, and give abdomen a bluish-black cast.

Length, 2.5 mm.

Head large, triangular; clypeus broad, emarginate in front between produced chitinous rods and with transparent expansion laterally, bearing three long hairs each side, a depressed excavation above, but with signature inconspicuous; trabecule rather small, bluntly curved toward apex in front, point acutely angled; antennae slender; eyes not conspicuous; temporal lobes regularly rounded; hind border of head nearly straight, very slightly concave; prothorax quadrate, slightly widening behind; metathorax widened behind, posterior border regularly curved. A transverse band behind the middle faint in front, distinct behind, and with its hind border incised by circular spots, from which originate a series of hairs.

Abdomen short, broad, scarcely wider than head, mostly covered with dark fasciae, but the membranous portions whitish. Female beneath, with brown fasciae or circular spots forming a series around border, a pair on sixth segment extending farthest into disk, and on eighth segment nearly meeting on median line with denticulated border. Male with a broad median ventral stripe running from disk to margin of terminal segment, and with broad lateral fascia on the discal segments.

On yellow-billed cuckoo, Lincoln, Nebr., collected by Lawrence Bruner. Differs from *D. latifrons* in having narrowed clypeus and in markings of ventral surface of abdomen.

**Docophorus speotyti** n. sp.

Head longer than broad, or in female almost as wide as long, tapering with a little concavity to front, margin of clypeus in front truncate or slightly convex of medium width; signature long, acute, but not deeply colored; trabecule short, acutely pointed, very slightly swollen at base; antennae slender, joints 1 and 2 equal, each nearly twice as long as 3, 4, or 5, the latter equal in length; temporal lobes narrow.

Body rather slender; prothorax quadrate; meso-metathorax wider than basal segment of abdomen. Abdomen narrow in male, almost parallel; in female widening to fifth segment, clothed with long hairs and with dorsal fascia, rather short in female, longer in male; color, light brown.

Length, male, 1.70 mm.; female, 2 mm.
On burrowing owl (Speotyto cunicularia hypogaea) from Prof. Lawrence Bruner, Lincoln, Nebr., 1 male, 1 female, and from C. F. Baker, Fort Collins, Colo., 2 males, 2 females.

Docophorus calvus Kellogg.
New Mallophaga, p. 78, Pl. III, fig. 1.
On Uria troile californica, Monterey, Cal. (Kellogg).

Docophorus fuliginosus Kellogg.
New Mallophaga, p. 80, Pl. III, fig. 2.
On Charadrius squatarola, Lawrence, Kans. (Kellogg).

Docophorus graviceps Kellogg.
New Mallophaga, p. 82, Pl. III, fig. 3.
On Fulica americana, Monterey, Cal. (Kellogg).

Docophorus acutipectus Kellogg.
New Mallophaga, p. 84, Pl. III, fig. 4.
On Cerorhinca monocerata, Monterey, Cal. (Kellogg).

Docophorus quadraticeps Kellogg.
New Mallophaga, p. 85, Pl. III, fig. 5.
On Fulica americana, Monterey, Cal. (Kellogg).

Docophorus montereyi Kellogg.
New Mallophaga, p. 87, Pl. III, fig. 6.
On Synthilborhamphus antiquus, Brachyborhamphus marmoratus, and Ptychorhamphus aleuticus, Monterey, Cal. (Kellogg).

Docophorus occidentalis Kellogg.
New Mallophaga, p. 89, Pl. III, fig. 7.
On fulmars, Fulmarus, Monterey, Cal. (Kellogg).

Docophorus kansensis Kellogg.
New Mallophaga, p. 91, Pl. III, fig. 8.
On eared grebe, Colymbus nigricolis Californicus, Lawrence, Kans. (Kellogg).

Docophorus atricolor Kellogg.
New Mallophaga, p. 93, Pl. III, fig. 9.
On murrelets, Monterey, Cal. (Kellogg).

Docophorus insolitus Kellogg.
New Mallophaga, p. 94, Pl. IV, fig. 5.
On Aleutian murrelet, Ptychoramphus aleuticus, Monterey, Cal. (Kellogg).

Nirmus discocephalus N.
On Haliatus leuccephalus (Burnett collection).

Nirmus euzonius Nitzsch.
On Gyaŭtus barbatus (Burnett collection).

Nirmus fuscus Nitzsch.
Nirmus fuscus Nitzsch MSS., Denny, p. 118, Pl. IX, fig. 8; Giebel, p. 123, Pl. VIII, fig. 2.
From Buteo swainsoni, Ames, Iowa, Accipiter velox (Merriam).

Nirmus brachythorax Giebel.
Giebel, p. 134; Piaget, p. 150, Pl. XII, fig. 8.
From Ampelis cedrorum, Ames, Iowa.

Nirmus submarginellus N.
Nirmus fenestratus N.
On Coceyzus erythrophthalmus (Burnett collection).

Nirmus cyclothetaorax Nitzsch.
Burmeister, Handbuch, Vol. II, p. 429, fig. 10; Denny, p. 150, Pl. XI, fig. 6; Giebel, p. 137, Pl. VI, fig. 9; Piaget, p. 162.
From English sparrow, Passer domesticus (Laurent collection), and Acanthis linaria (?) (C. B. Cook collection).

Nirmus candidus Nitzsch.
On Melaneopse carolinus (Burnett collection).

Nirmus ornatiissimus Giebel.
Giebel, p. 144; Piaget, p. 163.
From Agelaius phoeniceus (Cassino collection).
This handsome species can quite certainly be referred to Giebel's species, though his description is not very full.

Nirmus ornatiissimus, var. xanthocephali, n. var.
In the male the ventral median patch is extended to the tip from the sixth segment, there being clear lateral spaces on segment 6, and a large, clear, median space on segments 7 and 8, and lines of dusky running from this patch to margin of segments posteriorly on 6 and 7 and a small spot on 8 at sides.
On yellow-headed blackbird (Xanthocephalus xanthocephalus), collected at Fairfax, Iowa (II. O. collection).

Nirmus plicus, N.
Nitzsch, German’s Mag., Vol. III, p. 291; Zeitschr. f. g. Naturwissenschaft., 1866, Vol. XXVIII, p. 373; Giebel, p. 162; Piaget, p. 182, Pl. XV, fig. 6.
From stuffed specimens of avocet, in museum of Iowa Agricultural College. A well-marked species, our specimen agreeing perfectly with description in European works.

Nirmus citrinus Nitzsch.
Nirmus alce Denny, p. 137, Pl. IX, Fig. I.
Nirmus citrinus Giebel, p. 177; Piaget, p. 190, Pl. XVI, fig. 8.
From Alleus alle (Cassino collection), Simorhynchus pygmaeus, S. cristatellus, S. pusillus, and Synthliboramphus (Stejneger collection).

Nirmus lineolatus Nitzsch.
(1856) Nirmus lineolatus Nitzsch. Zeit. f. ges. Naturwiss., Vol. XXYIII, p. 376; Giebel, 177, Vol. IV, pp. 5, 6, 7, 8; Piaget, 199, Pl. XVI, fig. 3.
From herring gull, in collection of S. E. Cassino; Baker collection, Elkhart, Ind.; also recorded by Kellogg, New Mallophaga. So far as I can discover, there is no description of this species prior to that of Grube's in 1851, the name alone appearing in Burmeister.

Nirmus signatus Piaget.
Les Pédic. p. 186, Pl. XV, fig. 8.
From avocet, collected from stuffed bird in museum of Iowa Agricultural College.
This species has so much the aspect of a Lippeurus that I fail to see on what basis Piaget places it in Nirmus. It is readily characterized by the prolonged point to clypeal signature.
SUBORDER MALLOPHAGA.

Nirmus gracilis N.
Nirmus gracilis Nitzsch.
Nirmus elongatus Denny, p. 140, Pl. VII, fig. 4.
Nirmus gracilis Piaget, p. 157, Pl. XIII, fig. 10.

Small, light brown.
The head and body both lanceolate in shape. Head abruptly lanceolate, the tip narrow and forcipate; clypeal suture fairly distinct, a transparent anterior border projecting slightly in front of the forcepts like side pieces and involute, furrowed beneath, and a narrow slit passing backward from this furrow to the mandibles; trabeculae inconspicuous; antennae short, first joint but little larger than the others; temporal lobes curved on the lateral margin; posterior angles abruptly rounded with a single hair; occipital very slightly concave; prothorax constricted behind; metastoma much wider behind than the base of abdomen, with a fringe of long hairs; abdominal segments about equal in length, light brown, with a central lighter stripe and sutural margins and a lighter submarginal space, giving a series of four quadrates round margins to each segment; posterior margins of the segments without hairs except a single one at the lateral angles of segments 2 to 5, two on segments 6 to 7, and several scattering hairs on terminal segment.

Described from one specimen taken from the purple martin (Progne subis), Ames, Iowa, in company with numerous specimens of Menopon and Docophorus.
The lanceolate form of the head and the body and narrow forcipate tip of the clypeus are the most distinctive characters of the species. While evidently to be referred to the above species, the description will indicate the details of character in our form.

Nirmus furvus Nitzsch.
Nirmus furvus Nitzsch.
Nirmus obscurus Denny, p. 147, Pl. X, f. 6.
Nirmus furvus Giebel, p. 163, Pl. V, f. 2, 3.
Nirmus obscurus Giebel, p. 16.
Nirmus Furvus Piaget, Lez Pédiac., p. 169, Pl. XIV, f. 3.

Brown, with a distinct dark border. Head elongate; clypeus tapering, with a distinct suture, circular in front and with a wide clear margin, a short hair on each side; antennal band heavy, internal band narrower, approaching the antennal band in front of trabeculae, a median light line reaching the mandibles from the clypeal suture; trabeculae sharp, conic, transparent; antennae with second joint as long as the third and fourth; temporal lobes slightly widening behind, posterior angles regularly curved; occipital slightly incurved; prothorax margined with dark brown, widening behind; metathorax twice as long as prothorax, broadly margined with brown, widening to behind the middle, where there appears to be a pretty distinct suture, as if the mesothora and metathorax were not fused, with two prominent hairs on each lateral angle; legs brown; femora thick, paler on under side; abdomen with a broad, dark-brown or blackish margin, light brown in the disk, with a light line on each segment from 2 to 6; the posterior end of this line merging into a dark circular spot open in front; segments 1 and 2 with two hairs each arising from clear dots each side of the central dark spot; segments 3, 4, 5, and 6 with hairs arising from light dots on posterior margin, two bordering the black central spot, the others midway from these spots to the margin; seventh segment with hairs near the posterior angle; eighth with two lateral hairs each side; segments 2 to 7 with short hairs on the outer angle.

Described from one female specimen, taken from Phalaropus tricolor, in the museum of the Iowa Agricultural College.

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The species is specially marked by the presence of the central line on the abdominal segments 2 to 6, which, merging into the dark spots, resemble a series of locks. The general agreement with descriptions of *furvus* is very close and it is referred to this species.

**Nirmus rotundatus** n. sp.

Very broad and conspicuously marked with black and dark brown; type of *latifasciati*. Head cordate, regularly curved in front, very slightly conic, the tip barely truncate, the antennae and internal bands broad and prominent and including a broad lateral clear space; also a broad, clear furrow from tip to mandibles, broadening in front of mandibles to form a wide, clear area; trabeculae inconspicuous, antennae short, first two joints thicker than others, all but first annulate with black, last three nearly equal; occiput slightly incurved, a long hair at posterior angle of temporal lobe; prothorax widening behind, dusky at sides; metathorax widening much behind, a blackish band running across a little behind the center of posterior margin, obtusely angled, set with bristles; legs large, femora at base above and tibiae on dorsal side heavily marked with black and dark brown; abdomen ovate, very wide, widest slightly in front of middle, with broad transverse bands above and below, those above broken on disk except on eighth segment; large, clear spaces surrounding spiracles; genital band arched on eighth segment and with slender, dusky stripes running forward and slightly outward on seventh segment; ninth segment with short band or double spot.

This species is of the general type of *variatus*, but much broader. In this respect it is similar to *latifasciatus* Piaget, described from *Xilla mantola*, but the clear spaces of the anterior part of the head are broader, the abdomen wider, the lateral bands extending farther toward the center, and circles around the spiracles larger, the head much more decidedly rounded in front, the clear spaces of clypeus and margin larger, and other characters indicating it to be a well-established form.

Described from one specimen collected from crow (*Corvus americanus*), at Ames, Iowa.

**Nirmus picturatus** n. sp.

Head elongate cordate, one hair visible each side, margined with black, apex clear, margin widening to base of antennae, and from this point directed inward one-third width of head and then back to side of head; temporal lobes narrowly margined, occipital bands not blackened, occiput not margined; antennae with joints subequal, annulate; prothorax or humeri in front and margin behind black; metathorax with broad, black band widened at sides to form submargin; legs strong, femora at base and tip and tibiae at tip broadly annulate with black or dark brown; abdomen with broad, black margin on segments 1 to 7, broad ventral median bands on segments 1 to 5, faint on 1 and 2, not separated by median clear space, but with a transverse light band a little behind the middle of each dusky band; on segments 6 and 7 a continuous black patch, narrowing to posterior part of seventh, and continued as a narrow stripe to join the arc on the eighth segment in female and extended to tip of body in male; a few scattering hairs at the tip of the body, with some light portions laterally on seventh segment; seventh and eighth segments dusky on tip; open in front, and eighth with a medial dusky spot and a marginal dark dusky spot; ninth unmarked, but indented at tip. The dorsal and ventral spots are not easily distinguished on account of thinness and transparency of body.

Taken from *Sturnella magna*, Ames, Iowa. Very closely related to *ornatissimus*, but differs distinctly from species on *Agelaius* and
Xanthocephalus in being a little larger, the clypeus more rounded internally, and in the absence of occipital bands, and in the median bands of abdomen not sharply defined.

*Nirmus pallidus* n. sp.

Almost white throughout. Head bluntly conic in front of antennae, as long as wide; clypeus concave, a rather deep ventral furrow running from tip to mandibles; mandibles chestnut, a single hair at posterior angle of temporal lobes, widening behind; occiput convex, slightly emarginate in center; antennae with basal joint larger than others, but short; second joint longest, fifth joint almost as long as second, third and fourth equal; prothorax rather narrow; metathorax broadened with lateral angles but little behind center and bearing several stiff hairs; posterior border subangulate, a few hairs toward the outer margin; legs uncolored, claws tinged with brown; abdomen elliptic, uncolored, sparsely hairy at sides posteriorly.

Taken from rose-breasted grosbeak (*Habia ludoviciana*), Ames, Iowa. All specimens, four in number, show the pallid character of immature individuals, but as the largest shows no more coloring than smallest, and all appear to have chitinous framework thoroughly developed, it seems proper to consider them fairly mature, at least. I can not connect them with any described species, and believe the above diagnosis will serve to distinguish them even if additional material should bring to light more mature specimens.

*Nirmus secondarius* n. sp.

Type *circumfasciati*. Head longer than wide, rounded in front and slightly conic; antennal band strong, thickened at margin; trabeculae conic; antennae rather long, first joint strong, second joint slender as long as third and fourth together; eyes prominent; temporal lobes narrowing behind, two hairs, one at middle of lateral margin the other at posterior angle; occiput slightly sinuous; thorax narrow; prothorax slightly widened behind, a strong bristle at posterior margin; metathorax contracted for one-third its length, widening behind; posterior margin regularly curved with stiff hairs set in pairs; legs strong, anterior femora with a prominent callosity at tip above; abdomen widest behind the middle, marginal bands strong, projecting deeply into preceding segment, and recurved in segments 1 to 5 and very slightly in segment 6; genital spot running from sixth segment to the tip and widening posteriorly. Color uniformly light brown, more prominent on margin of head; thorax and abdomen separated by clear lines on the sutures and by a median light line longitudinally in the front portion of the disk.


*Nirmus orpheus* n. sp.

Head large, rounded in front, with continuous marginal band; antennae slightly darker toward apex, eyes distinct; temporal lobes with blackish margin shading gradually toward the disk, with two hairs; occiput slightly concave; prothorax short, transverse; metathorax more than twice as long as prothorax, enlarging posteriorly; a hair at lateral angles; legs fuscous, somewhat more dusky on the dorsal border of femur and tibia; tip of femora subannulate; abdomen enlarging posteriorly, margin without deeper bands, median bands broad separated by wide, clear space on the sutures, those on the sixth, seventh, and eighth segments merging into a median stripe.

Length, 1.60 mm.; head, 0.5 mm.; abdomen, 0.9 mm. Width, head, 0.37 mm.; abdomen, 0.5 mm.

Described from two male specimens, both of which appear to be scarcely mature.
On Galeocoptes carolinensis. Burnett collection.

Approaches the Nirmus annulatus, occurring on Ceophlebus pileatus, but lacks the annulations of the antennæ. The black margin to the abdomen and the median bands are differently arranged.

Nirmus tyranus n. sp.
Yellowish brown, with darker margin to metathorax and abdomen.
Head conic, tapering sharply in front, but with rather broad truncate clypeus; antennæ inserted midway, second joint about as long as third, fourth, and fifth together; eyes prominent; occiput emarginate; thorax short; metathorax but little longer than prothorax; legs long, middle and posterior coxae elongate; abdomen narrow, enlarging posteriorly, quite uniformly yellowish brown, with four hairs arising from minute, clear spots near the posterior margin of segments 3, 4, 5, 6, and 7. Also on the same segments are hairs arising just within the marginal band and one or two hairs at the lateral angles; spiracles located in clear spots just within the marginal band; eighth segment a transverse band, including two clear spots from which hairs arise; ninth segment very small.
Length, 2.6 mm. to 2.8 mm.; head, 0.7 mm.; abdomen, 1.68 mm. Width, head, 0.54 mm.; abdomen, 0.63 mm.
Described from two specimens (on Tyrrnus) from the Burnett collection, both females.

Nirmus cordatus (Pl. II, fig. a).
Head cordate; abdomen ovate, tapering pretty sharply caudally. Color fulvous. Head regularly rounded in front; clypeal signature faint; antennæ inserted in front of the middle, rather thick; eyes large, prominent; occiput emarginate, with blackish border; temporal lobes with two hairs; prothorax short, a short hair on the angle; metathorax obtusely angled on the abdomen, two hairs at the lateral angle; legs strong, bright fulvous without bands; abdomen ovate, with transverse brown bands separated by clear spaces at the sutures, most distinct on the disk, a few short hairs at the angles of the posterior segments.
Length, 2.44 mm.; head, 0.66 mm.; abdomen, 1.41 mm. Width, head, 0.73 mm.; abdomen, 0.94 mm.

On Limosa hamastica, Burnett-collection.
Described from a single female specimen and an immature individual. The species, however, seems to be a well-marked one, and it seems proper to give it a description.

Nirmus marginatus n. sp. (Pl. II, fig. b).
Head and body with a blackish margin, gula with an inverted shield-shaped fuscous spot.
Head longer than wide; clypeus broad, rounded with a wide continuous band; antennæ with rather deep insertions; second joint about twice as long as the others, joints 3 to 5 with dusky annulations; occiput transverse, straight; prothorax short, rather deeply inserted in the head; metathorax twice the length of prothorax; posterior margin straight; lateral margin with blackish spots anteriorly and a larger fuscous patch posteriorly, with a prolongation inward to near the center; femora with a blackish dorsal spot extending into a partial annula; tibiae with apical external spot and an internal black stripe; abdominal segments 1 to 7 with a black border and more or less distinct median transverse fuscous bands; eighth segment with a narrow fuscous band produced in front and with two clear pustules from which arise long slender hairs.
Length, 2 mm.; head, 0.36 mm. Width, head, 0.40 mm.; abdomen, 0.48 mm.

On Ceophlebus pileatus, Burnett collection.
Nirmus abruptus n. sp. (Pl. II, fig. c.)
Head parabaloid, almost conical in front, with a distinct ventral furrow in front of mandibles, outer margin deeply infuscated, becoming darker to the base of the antenna; antennal pits surrounded by a broad, dark border, curved in front, straight behind, merging into a somewhat acute angle inwardly; antenna obscurely annulate with fuscos, deepest on fourth and fifth joints, fifth joint nearly as long as third and fourth together; temporal lobes margined with a narrow black stripe, a single hair at the outer angle; occiput straight; prothorax small; metathorax about as broad as head, with deep stripes set into margin and merging into a transverse stripe; posterior margin set with a row of stiff hairs; legs robust; femur and tibiae annulate at distal ends with fuscos and showing dorsally and ventrally deeper blackish spots; abdomen, with segments 1 to 7 with rather broad blackish margin within which the disk is light, clear, slightly yellowish and with a central row of transverse bands on ventral surface, those of the sixth and seventh segments merged together and connecting with the transverse stripe on the eighth segment, the lateral portions of which are curved forward; terminal segment slightly notched, a single series of hairs on the posterior margin of segments 5 to 8 and single hairs at the lateral angles on segments 3 to 7.
Length, 1.69 mm.; head 0.39 mm.; abdomen, 1.08 mm. Width, head 0.35 mm.; abdomen, 0.51 mm.

On CoUinus virginianus, Burnett collection. Described from one immature individual, the slide also containing an immature one, which presents the same characteristics except in the intensity of the dark markings. This species is of the general aspect of ornatissimus, differing in the intensity of the abdominal margin and some of the head markings, and as it occurs on so distinct a group of birds it seems worthy of separate description.

Nirmus parallelus n. sp. (Pl. II, fig. d.)
Long and slender, recalling the form of Lipeurus baculus. Head long, slightly conic; clypeus wide, slightly convex; antennae dusky at tip; forehead with a clear space in front of mandibles and a subquadrate clear space between the internal bands, but the anterior portion of clypeus dusky; orbital and temporal lobes strongly margined with black; prothorax quadrate, slightly narrowed in front; metathorax lobed at the sides; mesosternum, with central fuscos patch, marginate in front, truncate behind, connected at sides with patches extending in from border; abdomen elongate, sides parallel, margins black; disk, with median brown patches, marginate laterally, and separated at the sutures by transverse clear band; middle and posterior tibiae, with a dark spot nearly encircling the tip, male similar to the female; terminal segment of abdomen rounded and dusky; genital hooks heavy, incurved.
♀ Length, 2 mm.; head, 0.42 mm.; width, head, 0.25 mm.; abdomen, 0.37 mm.
♂ Length, 1.74 mm.; width, abdomen, 1.74 mm.

On Equitulris vocifera, Burnett collection. (Description written in May, 1894.)
This species is remarkably like the Lipeuri in appearance in the slender body and parallel-sided abdomen and the character of the legs, but there is no trace of a process upon the third joint of the antennæ or of the notch in terminal segment of male.
Kellogg's description of Nirmus boephilus from a female specimen from same host agrees quite closely in most respects, but differs in proportions of head. The types for my description being now in the Boston
Society of Natural History, a detailed comparison is impossible. Comparisons of a greater series of specimens will very likely prove their identity, in which case Kellogg's name will have priority. Kellogg's suggestion that this represents Packard's *Lipeurus gracilis* seems quite well founded.

**Nirmus praestans** Kellogg.
New Mallophaga, p. 99, Pl. V, figs. 1 and 2.
On royal tern, *Stern a maxima*, Monterey, Cal. (Kellogg).

**Nirmus hebes** Kellogg.
New Mallophaga, p. 101, Pl. V, fig. 3.
On royal tern, *Stern a maxima*, Monterey, Cal. (Kellogg).

**Nirmus farallonii** Kellogg.
New Mallophaga, p. 103, Pl. V, fig. 4.
On *Phalacrocorax dilophus albociliatus*, Monterey, Cal. (Kellogg).

**Nirmus orarius** Kellogg.
New Mallophaga, p. 104, Pl. V, fig. 5.
On *Charadrius dominicus*, Lawrence, Kans. (Kellogg).

**Nirmus giganticaul** Kellogg.
New Mallophaga, p. 105, Pl. V, fig. 6.
On *Diomedea albatrus*, Monterey, Cal. (Kellogg).

**Nirmus boophilus** Kellogg.
New Mallophaga, p. 107, Pl. V, fig. 7.
On *Aegialitis vocifer a*, Lawrence, Kans. (Kellogg).

**Oncophorus minutus** Nitzsch.
*Nirmus minutus* Giebel, p. 170, Pl. V, fig. 7.
*Oncophorus minutus* Piaget, p. 215, Pl. XVIII, fig. 2.
On *Fulica americana* Ames, Iowa.

**Goniocotes rectangulatus** Nitzsch.
*Goniocotes rectangulatus* Nitzsch, German's Mag., Vol. III, p. 294; Giebel, Epiz., p. 185.
I have not seen specimens of this species, but mention it here since it is so certain to occur here as well as in Europe.

**Goniocotes hologaster** Nitzsch.
This is not the *G. hologaster* of Denny and of English and American writers generally, and I know of no positive record for America.

**Goniocotes abdominalis** Piaget.
*Goniocotes hologaster* Denny, p. 153, Pl. XII, fig. 4.
*Goniocotes abdominalis* Piaget, p. 298, Pl. XX, fig. 2; Osborn, Bull. 7, Div. Ent., Dept. Agr., p. 32.
The species is usually known as *hologaster* in English and American writings.

**Goniocotes compar** Nitzsch.
German's Mag., Vol. III, p. 294; Denny, p. 152, Pl. XIII, fig. 2; Gurlt, Vol. VIII, p. 117, Pl. IV, fig. 2; Giebel, p. 181, Pl. XII, figs. 10 and 11, Pl. XX, fig. 8; Piaget, p. 294, Pl. XIX, fig. 10; Osborn, Bull. 7, Div. Ent., Dept. Agr., p. 33, fig. 19.
From *Columba livia*, specimens in Burnett collection.

**Goniodes dispar** Nitzsch.
German's Mag., Vol. III, p. 294; Denny, p. 159, Pl. XII, fig. 5; Giebel, Epiz., p. 193, Pl. XII, figs. 12, 13.
A specimen from the quail in the Cassino collection is referred to this species. I have not been able to critically compare it with *G. ortygis* of Piaget.

**Goniodes cupido** Giebel.


From *Typanummachus americanus*, C. B. Cook collection.

**Goniodes merriamani** Packard.


I know of no record of this species later than the original description.

**Goniodes damicornis** Nitzsch.


Specimens from the pigeon in the Cassino collection.

**Goniodes stylifer** Nitzsch.

*Pediculus meleagris* Schrank, p. 504; *Goniodes stylifer* Nitzsch, Germar’s Mag., Vol. III, p. 294; Denny, p. 156, Pl. XII, fig. 2; Giebel, Epiz., p. 200, Pl. XIII, fig. 1; Gurlt, Vol. VIII, p. 421, Pl. IV, figs. 7, 8; Piaget, p. 264, Pl. XXII, fig. 1; Osborn, Bull. 7, Div. Ent., Dept. Agr., p. 36, fig. 24.

Specimens from the turkey (*Meleagris gallopavo*), collected by Dr. A. Hassall, Baltimore, Md.

**Goniodes ortygis** Piaget.

Les Pédic., p. 282, Pl. XXIII, fig. 6.

On *Colinus virginianus*, (vide Piaget.)

**Goniodes falcicornis** Nitzsch.


*Nemurus tetragonecephalus* Oilser, p. 9.

**Goniodes falcicornis** Nitzsch, Germar’s Mag., Vol. III, p. 293.

*Ricinus porcina* Kirby & Spence, Int. Ent., Vol. II, Pl. V, fig. 3.


Common on the pea fowl.

**Goniodes mephitidís** Packard.


Not seen. It seems quite unlikely that a Goniodes should occur on a mammal except as a straggler, and I should incline to believe that the species is one of the forms occurring on the gallinaceous birds, and has possibly migrated to the skunk from its normal host when the latter was devoured.

**Lipeurus heterographus** Nitzsch.


In Burnett collection I find a species which agrees with Packard’s description and figure, and which must, I think, be his *burnetti*, but it is not a Goniocetes, as I have specimens of both sexes, of what is evidently the same species, which prove it to be a Lipeurus.
INSECTS AFFECTING DOMESTIC ANIMALS.

Body margined distinctly with black. Head elongate, cordate; antennæ set in rather deeply; eyes conspicuous; antennal cavity and temporal lobes with black border extending inward to mandibles, also a prominent orbital band; occiput sinuous; prothorax subangular, lateral angles a little behind middle, with a single prominent hair; metathorax short, posterior border straight, lateral angles with three hairs, margin very black; legs rather slender; abdomen with black margin, and more or less distinct median bands, which are separated in median line and most distinct at the anterior and posterior borders.

On domestic fowl. Burnett collection, and Ames, Iowa. Specimens from Professor Bruner are from a young duck, and it seems probable that the species may occur on different domestic fowls where opportunity offers for its transfer from one to another.

Packard's figure (fig. 116, ante) is fairly good, though it lacks in detail for the certain recognition of the species.

**Lipeurus baculus Nitzsch.**

*Pulex columbae majoris* Redl. Exp. pl. 2 (vide Denny); Louse of Pigeon, Albin. Aran. pl. 43.


*Nymphus filiformis*, Olfers 90.

*Lipeurus baculus*, Nitzsch, German's Mag. Vol. III, p. 293; Lyoneet, p. 273, Pl. XIII, fig. 10; Burmeister, Handbuch, Vol. II, p. 434, 8; Denny, p. 172, Pl. XIV, fig. 3; Grüt, Vol. VIII, p. 424, Pl. VIII, fig. 9; Giebel, Epiz., p. 235, Taf. XVI, fig. 8, st. 9, Taf. XX, fig. 3; Giraud, Bulletin de la Soc. Ent., 1859; Piaget, Les Pédic., 303, Pl. XXV, fig. 2; Osborn, Bull. 7, Div. Ent., Dept. Agr., p. 38.


**Lipeurus luridus Nitzsch (?)**.

Elongate, nearly parallel, general color dusky brown.

Head tapering in front of antennæ; clypeal suture indistinct, sides of head broadly margined; a large brown spot extending forward from the occiput, pointed anteriorly; antennæ of male with a very large basal joint, a much-curved third joint with the fourth joint set upon the outside of the curve; thorax quadrate, broadly margined with brown; metathorax trapezoidal, with four hairs near the posterior margin; legs large and strong; coxae of second and third pair enlarged; abdomen widest about the middle, in the male light dusky bands running from side to side, occupying full length of the segments at margins; segments 4, 5, 6, and 7 with long hairs at lateral angles, spiracles surrounded by a small, clear circle.

I find it impossible to satisfy myself of the identity of my specime from the American coot with the *luridus* of European authors. The description given by Piaget and the figure (by Nitzsch) in Gieb. are neither of them in accord with my specimens, and while Denny's fig. might be made to fit, his description indicates blacker margin than in my specimens, and moreover, he does not seem to have been certain of his species, assuming it to be *luridus* from occurrence on the same bird. Therefore, while retaining the name with some doubt, I think it well to state the diagnostic features, and if additional material or comparison with European specimens prove it to be distinct, it will be time enough to give it a separate description and name.
SUBORDER MALLOPHAGA.

Eurymetopus brevis Dufour.

(1835) *Philopterus brevis* Dufour, Annales de la Soc. Ent., Vol. IV, p. 674, Pl. XXXI, fig. 3. (vide Piaget, Les Pédic.)


*Lipeurus taurus* Piaget, Les Pédic., p. 332, Pl. XXXI, fig. 3.

*Eurymetopus taurus* Nitzsch, Taschenberg, Die Mallophagen (1882), p. 183, Pl. V, figs. 8, 8a.


It seems to me necessary to restore the name of Dufour for this species, as his description was published four years before any by Nitzsch, and in the first indication of the Nitzsch description (Burmeister, Handbuch II, p. 433) Dufour's name is given, and it is simply stated in parenthesis that it is the *taurus* of Nitzsch's MSS. On what ground Giebel should have resurrected the name *taurus*, or why Piaget should follow him in it, I fail to see, as both were familiar with Dufour's description.

Piaget considers the *L. pederiformis* of Dufour an example of *taurus* not fully developed (in way of development).

*Lipeurus bifasciatus* Piaget.

Les Pédiculinae, p. 342, Pl. XXVIII, fig. 1.

From *Pelecanus erythrorynchos*, Davenport, Nebr.; collection of Prof. Lawrence Bruner.

*Lipeurus forficulatus* N.


From pelican, Ames, Iowa. Recorded by Kellogg from *Pelecanus californicus* (Monterey, Cal.), and *Pelecanus erythrorynchos* (Lawrence, Kans.).

*Lipeurus temporalis* Nitzsch.

Recorded by Kellogg, from *Merganser serrator* (Monterey, Cal.).

*Lipeurus testaceus* Tschb.

Recorded by Kellogg, from *Puffinus opisthomelas* (Monterey, Cal.).

*Lipeurus toxoceros* Nitzsch.

Recorded by Kellogg from *Phalacrocorax dilophus albociliatus* (Monterey, Cal.).

*Lipeurus longicornis* Piaget.

Albin, pl. 49 (1) (vide Piaget).

(1) *Lipeurus brevicornis* Denny, p. 181, Tab. XIII, fig. 2.

*Lipeurus longicornis* Piaget, Les Pédic., p. 334, Pl. XXVII, fig. 3.

This species occurred in great numbers upon a cormorant (*Phalacrocorax dilophus*), taken at Ames, Iowa.

*Lipeurus squalidus* Nitzsch.

Pediculus anatis Fab., Syst. Ent., p. 345.

*L. squalidus* Nitzsch, Germar's Mag., Vol. III, p. 292; Denny, p. 176, Pl. XVI, fig. 5; Grube Vol. II, p. 486; Giebel, p. 241, Pl. XVI, fig. 1; Piaget, p. 344, Pl. XXX, fig. 5; Osborn, Bull. 7, Dir. Ent., Dept. Agr., p. 39, fig. 27.

Common to many kinds of ducks, specimens in Cassino collection from *Merganser serrator*. Stejneger Collection from *Eniconetta stelleri*. (H. O. collection, N. M. collection.)
INSECTS AFFECTING DOMESTIC ANIMALS.

Lipeurus variabilis Nitzsch.


_Lipeurus variabilis_ Nitzsch, German's Mag., Vol. III, p. 292; Denny, p. 164, Pl. XV, fig. 6; Giebel, Epiz., p. 219, Pl. XVI, fig. 3; Gurtl, Vol. VII, p. 422, Pl. VIII, fig. 10; Piaget, Les Pélic., p. 364, Pl. XXI, fig. 4; Osborn, Bull. 7, Div. Ent., Dept. Agr., p. 41, fig. 29.

A common species on domestic fowls.

Lipeurus polytrapezius Nitzsch.


_Lipeurus polytrapezius_ Nitzsch, German's Mag., Vol. III, p. 293, Denny, p. 165, Pl. XV, fig. 5; Giebel, p. 218, Pl. XVII, figs. 1 and 2; Gurtl, Vol. VIII, p. 423 Pl. IV, fig. 11; Piaget, p. 367, Pl. XXI, fig. 6; Osborn, Bull. 7, Div. Ent., Dept. Agr., p. 41 fig. 28.

The common Lipeurus of the turkey (_Meleagris gallopavo_). I have specimens collected from the wild turkey by Prof. H. W. Parker.

Lipeurus jejunus Nitzsch.

On _Anser albiçrons gambeli_ (Cook collection).

Lipeurus leucopygus, var. _fasciatus._

On _Botaurus_ sp. (Burnett collection).

Lipeurus pastulatus.

On "_Haliatus leucocephalus_" (Burnett collection).

Lipeurus botauri, _n._ _sp._

Slender, slightly marked with brownish, clypeus rugose. Head tapering; clypeus circular in front, with surface distinctly roughened with papillose rugosities, two hairs at the clypeal margin and two or three others on the margin of head in front of antennae and two on temporal lobe; occiput slightly concave; prothorax slightly wider behind, tinged with brown at sides; metathorax quadrato, wider behind; posterior margin concave; legs large, anterior femora incrassate; abdomen with faint brownish markings on each segment, most conspicuous on segments 4, 5, and 6; angles of segments 3, 4, 5, 6, and 7 with short hairs.

On bittern or stake driver, _Botaurus leutiginosus._

Lipeurus pullatus Nitzsch.

(1845) (1) _Lipeurus staphylinoides_ Denny, Monog., p. 180, Pl. XV, fig. 2.


(1873) _Lipeurus pullatus_ Giebel, Epiz., p. 236.

(1880) _Lipeurus pullatus_ Piaget, Les Pélic., p. 399, Pl. XXVII, fig. 9.

On _Sula bassana_ and _Sula alba_, Burnett collection (Nos. 91 and 92). Specimens labeled from _Sula alba_ lighter colored than those from _Sula bassana_, but the latter agree perfectly with Piaget's excellent figure. It would seem that Denny's _staphylinoides_ must come here, but the specimens do not agree with his description or figure.

Lipeurus infuscatus _n._ _sp._ (Pl. II, figs. e. and f.)

Light fuscos, a transverse clear space just behind the clypeus.

Female.—Head quite uniformly fuscos and elongate cordate, the anterior portion rounded, with a transverse clear space about one-third distance between the tip and antennae extending to margin; antennae rather long, second joint rather slightly longer than the others, all slightly fuscos; temporal lobes oval, narrowing posteriorly; occiput slightly concave; prothorax enlarging slightly behind, slightly darker at the margins, the usual bands not very distinctly marked; metathorax a little longer than prothorax, widening behind; legs unicolorous, the anterior ones with more distinctly marked apical ring to the femur and external marginal stripe on tibia; abdomen enlarging posteriorly, marginal bands rather broad, median bands extending to the clear spiracular spaces separated from each other by distinct satal bands, a single row of hairs near the posterior margin and one or two hairs at the lateral angles of segments 4 to 8.
Male.—Head rounded in front, slightly conic, transverse clear space behind clypeus; antenna strong, third joint produced on anterior margin, forming small but rather sharp process; abdomen nirmoid; legs strong.

Head elongate, slightly conic, widest behind antennæ, front rounded, nearly parabolic, the margins dense, a clear transverse band very distinct behind clypeus, one-third distance from tip to base of antennæ, mandibles conspicuous between bases of antennæ; antenna strong, proximal joint enlarged, third joint slender, produced on anterior margin forming narrow rather acute process, distal joint longer than fourth, cylindric, 4 and 5 directed backward, being attached on caudad surface of third joint; eyes black, temporal lobes rounded narrowing caudad; occipit slightly emarginate; prothorax quadrate and widening slightly posteriorly; metathorax widening from prothorax to base of abdomen; anterior legs only about half as large as median pair, middle and hind legs large, coxae not specially elongate but fairly elongate in hind pair; abdomen elongate ovate, widest segment behind the middle, with transverse brown bands, terminal segment scarcely notched, genital hooks slender.

♀ Length, 1.68 mm.; head, 0.48 mm.; abdomen, 0.98 mm. Width, head, 0.36 mm.; abdomen, 0.47 mm.

♂ Length, 1.64 mm.; head, 0.47 mm.; abdomen, 0.92 mm. Width, head, 0.34 mm.; abdomen, 0.43 mm.

This species, which is quite readily distinguished by the transverse clear space in the forehead, is represented by two females, one from Philohela minor and one from Bartramia longicauda and two males from Bartramia longicauda and one from Philohela minor, in the Burnett collection.

_Lipeurus subangusticeps_ Piaget. (Pl. II, fig. g.)

Les Pédiculés, p. 208, Pl. XXV, fig. 5.  

Male closely resembles the female in shape, but is somewhat smaller. The clypeus is slightly more pointed; the antennæ have the first joint very long, about as long as all the rest together, second joint as long as the remaining joints; third joint very short but with a distinct process on the anterior margin; fourth and fifth joints equal; terminal segment very slightly notched; genital hooks very long and slender.

♂ Length, 3.26 mm.; head, 0.70 mm.; thorax, 0.56 mm.; abdomen, 2 mm. Width, head, 0.30 mm.; abdomen, 0.33 mm.

♀ Length, 4 mm.

Described from one specimen in the Burnett collection, from Thallas-sidroma wilsoni, which contains also several fine specimens of the female. Heretofore only the female seems to have been discovered, and the above description is given to complete the description of the species. Some slight differences seem to exist when compared with the descriptions of Denny and Piaget, but these are only varietal at most.

_Lipeurus densus_ Kellogg.

New Mallophaga, p. 114, Pl. VII, figs. 1 and 2.

On _Diomedea albatrus_, Monterey, Cal. (Kellogg).

_Lipeurus varius_ Kellogg.

New Mallophaga, p. 116, Pl. VII, figs. 3 and 4.

On _Fulmarus glacialis glupischa_ and _rodersii_, Monterey, Cal. (Kellogg).

_Lipeurus celer_ Kellogg.

New Mallophaga, p. 117, Pl. VII, figs. 5 and 6.

On _Fulmarus glacialis glupischa_ and _rodersii_, Monterey, Cal. (Kellogg).
Lipeurus longipilus Kellogg.
   New Mallophaga, p. 129, Pl. VIII, fig. 7.
   On *Fulica americana*, Monterey, Cal. (Kellogg).

Lipeurus picturatus Kellogg.
   New Mallophaga, p. 121, Pl. VIII, figs. 1 and 2.
   On *Fulica americana*, Monterey, Cal. (Kellogg).

Lipeurus diversus Kellogg.
   New Mallophaga, p. 123, Pl. VIII, figs. 3 and 4.
   On *Puffinus opisthomelas*, Monterey, Cal. (Kellogg).

Lipeurus limitatus Kellogg.
   New Mallophaga, p. 124, Pl. VIII, figs. 5 and 6.
   On *Puffinus griseus*, Monterey, Cal. (Kellogg).

Lipeurus constrictus Kellogg.
   New Mallophaga, p. 125, Pl. VIII, figs. 7 and 8.
   On *Oidemia perspicillata* and *O. deglandi*, Monterey, Cal. (Kellogg).

Giebelia mirabilis Kellogg.
   New Mallophaga, p. 138, Pl. XI, figs. 7 and 8.
   On *Puffinus opisthomelas*, Monterey, Cal. (Kellogg).

Onchophorus advena Kellogg.
   New Mallophaga, p. 133, Pl. XI, figs. 1 and 2.
   On *Fulica americana*, Monterey, Cal. (Kellogg).

Ornithobius cygni Linn.
   *Pulex cygni* Redi, Exp., tab. 8, Oper., tab. 29.
   Louse of the swan, Albin, Aran., p. 76, tab. 48.
   *Pediculus cygni* Fab., Syst. Ent., p. 807, fig. 18.
   *Ornithobius cygni* Denny, p. 183, Pl. XXIII, fig. 1.
   *Lipeurus buechphalus* Giebel, Epiz., p. 239.
   *Ornithobius buechphalus* Piaget, Les Pédic., p. 377, Pl. XXXI, fig. 4.

   Collected in abundance from a swan, probably *Olor buccinator*, at Ames, Iowa.

   It seems to me necessary, on the ground of priority, to retain the name given by Linnaeus, and while in my previous papers I have followed Piaget in accepting Giebel's name, it was simply to avoid confusion and in deference to his authority. In the present paper, and with the synonymy stated in full, it seems best to restore the early name. While certainly recognized by Redi and Albin, Linnaeus was the first to properly describe it.

Ornithobius gonioleurus.
   On *Branta canadensis*, Burnett collection.

Trichodectes latus Nitzsch.
   *Pediculus solitus* Ofers, p. 64.

   A common species upon the domestic dog. It has had frequent mention in general works upon parasites. Specimens in the Hassall collection, labeled 1884, may have been taken in England.
Trichodectes subrostratus Nitzsch.


The common louse affecting domestic cats, often abundant. I have specimens from the Fitch and various other American collections.

Trichodectes retusus Nitzsch.

Pediculus musculus Schrank.

Trichodectes retusus Nitzsch, German's Mag., Vol. III, p. 296.


Trichodectes dubius Denny, p. 190. Pl. XVII, fig. 2.

Trichodectes retusus Giebel, p. 55. Pl. III, fig. 4.

Trichodectes pusillus Giebel, p. 55. Pl. III, fig. 4.

Trichodectes retusus Piaget, p. 387. Pl. XXXI, fig. 8.

Collected from a weasel at Ames, Iowa, July, 1883.

Specimens evidently belonging here and taken from the mink have been examined in collections from Professor Bruner and Professor Comstock. In the Bruner collection there is a very fine series of females which agree closely with descriptions and figures by Piaget, but, unfortunately, there appear to be no mature males. A single mature male in the Cornell collection, however, agrees with the male from the weasel, and I therefore feel little hesitancy in referring all to retusus.

Trichodectes crassus Nitzsch.

I have referred here, with some hesitation, a specimen from the raccoon (Procyon lotor) (Burnett collection.) The specimen was not in condition for absolute identification.

Trichodectes climax Nitzsch.

Trichodectes climax Nitzsch, German's Mag., Vol. III, p. 296; Gervais, Vol. III, p. 313. pl. 48, fig. 3; Giebel, Zeitschr., Vol. XVII, p. 81. pl. 1, figs. 1 and 2; Giebel, Epiz., p. 58. pl. XX, fig. 2.


Infests the common goat. Specimens in Hassall collection, collected at Baltimore 1891. This and the following one are very similar.

Trichodectes limbatus Gervais.


Trichodectes climax var. major Piaget, Les Pedic. Suppl. p 86 Pl. IX, fig. 5.


This form so closely resembles the climax that it has been a question whether it is entitled to specific rank. Specimens in Hassall collection taken at Baltimore in 1891. (See figure, ante.)

Trichodectes sphærocephalus Nitzsch.

Figured Rodi, Pl. 22.


A rather common parasite on sheep, though seldom in great numbers. Specimens in H. O. collection from Canada and Iowa. Has been quite common on sheep at Ames, winter of 1895–6.
Trichodectes scalaris Nitzsch.


_Trichodectes scalaris_ Nitzsch, German’s Mag., Vol. III, p. 296; Denny, p. 191, Pl. XVII, fig. 9; Giebel, p. 61, Pl. III, figs. 7 and 9; Pignat, p. 396, Pl. XXXIII, fig. 2.

A very common parasite on domestic cattle, and I have seen specimens in a number of collections. Although there can be little doubt that Linneaus referred to this form in his descriptions of _P. bovis_ and _P. tauri_, the mistaken generic reference and the indefiniteness of his description may be reason to give Nitzsch’s name the precedence, and I have followed all modern authors in so referring it.

![Trichodectes scalaris diagram](image)

Fig. 145.—*Trichodectes scalaris*: _a_, terminal segments of male; _b_, female—enlarged (original).

Trichodectes parumpilosus Pignat.

_Trichodectes equi_ Denny, p. 191, Pl. XVIII, fig. 7.
_Trichodectes parumpilosus_ Pignat, p. 397, Pl. XXXII, fig. 5.

This species is the common one of horses in this country, and is the one which in English and American works generally, since Denny’s monograph, has been known as *Trichodectes equi*.

Specimens collected abundantly at Ames, Iowa, and I have determined it in a number of collections.
Trichodectes pilosus Giebel.


Piaget holds that this is the form originally described as *Pediculus equi* by Linnaeus, but retains the name proposed by Giebel. He records it as occurring on both *Equus caballus* and *Equus asinus*. I am not aware of any record of actual occurrence of this form in this country, but it should be found on donkeys and horses, and it seems proper to include it with such statement.

**Trichodectes setosus** Giebel.

Collected from porcupine (*Erethizon dorsatum*) by Prof. Lawrence Bruner, Lincoln, Nebr.

**Trichodectes geomydis** Osborn.

Bull. 7, Div. Ent., Dept. Agr., p. 54, fig. 42.

A very common and abundant species on the pocket gopher (*Geomys bursarius*), and I have examined specimens in the Cassino collection from Thomomys. Also from *T. bottae* from California, in Johnson collection.

The original notice and description are as follows:

Related to the Trichodectes infesting the larger mammals is a species which has been taken in immense numbers from the pocket gopher (*Geomys bursarius*), at Ames, Iowa. It was first taken in 1883, and since then has been collected from a great number of individuals, and I have also seen specimens taken from the western gopher, *Thomomys*, in a collection of parasites kindly loaned me by Mr. S. E. Cassino.

Body robust and rather hairy. Antennae very long, the basal segment enlarged, the head with a deep semi-circular incision in front.

The head is rather wider than long and the antennae are situated somewhat posterior to the middle and usually directed backward, very large and long, the joints nearly equal in length, but the basal are much enlarged in the male. Head with a deep semi-circular incision on the otherwise semi-circular anterior border, the posterior border slightly trilobed. Thorax short and broad; suture distinct; abdomen ovate, tapering regularly and rapidly to the anal segment. Genital apparatus of male distinct. The hairs are distributed evenly over border of head and sides of body; four central segments of abdomen with transverse rows of stronger hairs or weak spines, and the lateral posterior angles of all segments but the first with long bristles. Length, 1 mm.

The antennae in male and the deep frontal incision separate this from any species known to me, and I think there is no question as to its being a distinct species.
Trichodectes tibialis Piaget.
Les Péliculines, p. 339, Pl. XXXII, fig. 5.

I have referred to this species some specimens from the black-tailed deer (Baker collection).

They do not agree absolutely with Piaget's description or figure, but until a more critical study can be made or additional material collected it may rest here.

Trichodectes parallelus n. sp.

Head large, abdomen rather narrow, hind border mesothorax and metathorax straight.

Head large, clypeus slightly concave, a few short hairs on front border, antennal angles very prominent; antennae long, reaching beyond hind border of head, first joint slightly enlarged, second and third about equal, third slightly curved; temporal lobes quadrate; lateral angles rounded; occiput straight; occipital bands parallel.

Prothorax and metathorax equal in length, metathorax a little wider, prothorax with sides curved; metathorax with sides straight; in both, posterior border straight.

Legs slender, claws long, slender.

Abdomen narrow, entirely corneous, segments straight and equal, no dusky transverse bands, spiracles conspicuous on 2 to 7, bordered especially in front with dark brown or blackish; hairs at

Fig. 147.—Trichodectes tibialis: a, female; b, male—enlarged (original).

Fig. 148.—Trichodectes parallelus: female—enlarged (original).
angles, short, a row of fine ciliate hairs near posterior border of metathorax and each abdominal segment except last; claspers or brushes small or wanting.

Length, 1.70 mm.

Described from three specimens (females) from deer, collection Cornell University, kindly loaned by Prof. J. H. Comstock. Comes nearer to tibialis Piaget than any other species, but differs from that in narrowness of abdomen, lack of transverse bands upon metathorax, etc., and while possibly it could be referred to some of the species from deer of Europe, it seems safer to give it a new description than to increase the confusion regarding the European species affecting deer. Species of deer is not given, but probably Virginia deer (Cariacus virginianus) is meant.

Trichodectes castoris, n. sp.

Short, broad; head wider than long. Antennae of male enlarged.

Head wide, antennae deeply set, front border regularly convex, not hairy, apex with shallow, curved incision, with transparent space running backward.

Antennae long, proximal joint in male enlarged, distal joint with sensory hairs on outer tip; temporal lobes full, not angulate; occiput strongly convex; abdomen

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membranous ovate, with slender, curved hooks on eighth segment in female and conspicuous genital apparatus in male.
Length, male, 0.95 mm.; female, 1.15 mm.

From beaver, collected by Prof. Lawrence Bruner. * This species simulates both *geomydis* and *mephitidis*, and were it not for the wide separation of the beaver and skunk I might be tempted to consider them the same. There appears, however, some pretty constant differences. The shallowness of the frontal hollow separates it easily from *geomydis*, and the form of head and greater length of female antennae from *mephitidis*.

**Trichodectes mephitidis** n. sp.

Short and broad, male antennae large, front slightly excised.
Female, head wider than long, transversely oval, front regularly curved, slightly excised at apex, the space directly behind the excision transparent, and the internal bands coming to a prominent right angle at each side of hollowed portion.

Temporal lobes rounded posteriorly, no angle; occiput convex, a few short hairs on posterior lateral border of head, none on front; thorax very short; legs as usual; abdomen without transverse bands or chitinous structures, except a pair of curved hooks on eighth segment at outer margin; scattering hairs, thickest on central portion.

Male with frontal incision deeper, some very minute hairs on front edge. Antennae much larger than in female, basal joint enlarged, terminal joint curved, short hairs on outer part near tip; abdomen tapering, membranous, not banded, stiff hairs at angles and on the terminal segment, finer hairs on disk; genital apparatus conspicuous. Immature specimens have the frontal incision more conspicuous.

Length, female, 1.20 mm.; male, 0.95 mm.

Collected from polecat (*Spilogale interrupta*), Tama County, Iowa. Numerous specimens from the skunk (*Mephitis mephitica*) collected by Lawrence Bruner, Holt County, Nebr.; also from Palo Alto, Cal.
SUBORDER MALLOPHAGA.

(Johnson collection). This species is allied to the *T. retusus* occurring on weasel, etc., and also to *T. geomydis* on pocket gopher, but differs from the former in form of front of head, the absence of bands, size of male antennae, temporal lobes, and other characters which make it easy of separation. The same species, apparently, also collected from the ringtail cat (*Bassariscus astuta*), Lake County, Cal. (Johnson collection).

**Family LIOTHEIDÆ.**

**Menopon rusticum** Giebel.
Giebel, Epiz., p. 288; Piaget, Les Pédic., p. 443, Pl. XXXVI, fig. 2.

**Occurred in large numbers on a house martin (*Progne subis*), at Ames, Iowa.**

**Menopon pallidum** Nitzsch.
*Pulex capi* Redl. Tab. XVI, fig. 1 (vide Piaget).
*Pediculus galline* Linné, Syst. Nat. II, p. 1023, probably; Panzer, p. 51, fig. 21 (vide Piaget);
*Nirmus trigonocephalus* Ophera, p. 90.
**Menopon pallidum** Denny, p. 217, Pl. XXI, fig. 5; Gurtt, Vol. VIII, p. 428, Taf. IV, fig. 14; Giebel, p. 291, Pl. XVII, fig. 11, and Pl. XIX, figs. 2 and 5; Piaget, p. 459, Pl. XXXVII, fig. 7; Osborn, Bull. 7, Div. Ent., Dept. Agr.

A universal parasite of the domestic fowl. I have examined many specimens in different collections, and have seen and collected it on many occasions myself.

**Menopon biseriatum** Piaget.
Piaget, Les Pédic., p. 469, Pl. XXXVII, fig. 2.

Collected at Baltimore, from domestic fowl, by Dr. A. Hassall. Also in Cornell University collection. It appears to be less common than the preceding, though often associated with it, and probably generally mistaken for large specimens of that species.

**Menopon titan** Piaget.
*Les Pédiculines*, 1880, p. 500, Pl. XI, fig. 7.
**Menopon titan** Kellogg, New Mallophaga, p. 183.

Recorded by Kellogg from *Pelicanus californicus*. He proposes three varieties to represent the species.

**Menopon consanguineum** Piaget.

**Menopon consanguineum** Piaget, Les Pédic., Suppl., p. 116, Pl. XII, fig. 7.

Occurs in great numbers in buccal cavity of pelican. Has been collected at Ames, Iowa, and specimens examined in collections of National Museum, Kansas University, Boston Society of Natural History, etc. A record of its occurrence has been given in Insect Life, V, p. 284.


It seems to me the variations exhibited in this species may be due to its peculiar habit and the probability that this habit is of recent origin.

**Menopon pallescens** Nitzsch.

**Menopon perale** Denny, Monog., p. 225, Pl. XXI, fig. 9.
Insects Affecting Domestic Animals.

One male and one larva. Burnett collection. From "Perdix americana" (Colinus virginianus).

Nitzsch described the species from specimens taken from Caccabis rufa. Denny's description would seem to have priority. He says common on the partridge (Perdix cinerea).

**Menopon tridentis** Nitzsch.


*Menopon scopolacorne* Denny, Monogr., p. 221, Pl. XXVIII, fig. 9.

*Menopon tridentis* Giebel, Epiz., p. 296, Pl. XVII, fig. 9.

*Menopon tridentis* Piaget, Les Pédic., p. 479, Pl. XXXIX, fig. 1.

From coot (Fulica americana), Ames, Iowa. Agrees closely with European description, except that abdomen appears broader than figured. The peculiar structure running forward from occiput beneath seems to be characteristic. Also in Burnett collection.

Recorded by Kellogg, who suggests three varieties to include the American forms, (New Mallophaga, p. 165).

**Menopon crassipes** Piaget.

Les Pédiculines, p. 450, Pl. XXXV, fig. 7.

A specimen which I refer to this species is from the Baltimore oriole, (Icterus galbula) (Burnett collection).

**Menopon carduelis** Denny.

Monogr. Anop. Brit., p. 228, Pl. XX, fig. 7.

On *Spinus tristis* (Burnett collection).

**Menopon fulvo-fasciatum** Piaget.

Les Pédiculines, p. 417, Pl. XXXIII, fig. 3.

On *Mitus* sp. incog. (Burnett collection).

**Menopon crocatum** Nitzsch.

Giebel, Insecta Epiza, p. 295; Piaget, Les Pédic., p. 47, Pl. XXXIX, fig. 3.

On *Philoella minor* and *Limosa hemastica* (Burnett collection).

**Menopon navigans** Kellogg.

New Mallophaga, p. 156, Pl. XIV, figs. 4 and 5.

On short-tailed albatross, Monterey, Cal. (Kellogg).

**Menopon indistinctum** Kellogg.

New Mallophaga, p. 157, Pl. XIV, figs. 6 and 7.

From American avocet (*Recurvirostra americana*), Lawrence, Kans. (Kellogg).

**Menopon numerosum** Kellogg.

New Mallophaga, p. 159, Pl. XV, fig. 1.

From Pacific fulmars (*Fulmarus glacialis glipuscha* and *rodgersii*), Monterey, Cal. (Kellogg).

**Menopon infrequens** Kellogg.

New Mallophaga, p. 161, Pl. XV, fig. 5.

On *Larus glauceneens*, Monterey, Cal. (Kellogg).

**Menopon loomisii** Kellogg.

New Mallophaga, p. 162, Pl. XV, fig. 6.

On white-winged scoter (*Oidemia deglandi*), Bay of Monterey (Kellogg).
Menopon expansum n. sp. (Pl. II, fig. j).
Abdomen very broad, ovate. Head with a sinuous margin and very deeply emarginate occiput; orbital sinuses entirely covered; temporal lobes with two long bristles and two or three short hairs; prothorax nearly as broad as head and closely fitting into the occipital cavity, the lateral angles in contact with temporal lobes; posterior margin semicircular; metathorax short, rounded in front, with two bristles at the lateral angles; legs robust, femora very large, irregularly set with short hairs; abdomen nearly as broad as long, uniformly yellowish brown, margins of segments above with a closely set series of hairs which are longer at the lateral angles posteriorly, and the entire ventral surface irregularly set with short hairs arising from minute clear pustules.
Length, 1.31 mm.; head, 0.18 mm.; abdomen, 0.80 mm. Width, head, 0.47 mm.; abdomen, 0.80 mm.

On Dolichonyx oryzicorutus. Burnett collection (No. 67). Distinguished by the extreme width of the abdomen.

Menopon interruptus n. sp. (Pl. II, fig. h).
Light yellow, with conspicuous dark-brown bands and black lines. Abdominal bands of female broken and irregular near margin of segments 3 and 5. Legs strong, lined with black.
Head semicircular in front, a few hairs on margin, antennae scarcely passing margin of head, orbital pits deep, fringed with hairs behind; temporal lobes rounded, three long bristles arising from circular clear spots, dark brown on front, each side connecting with orbital black spot, temporal margin deeply infuscated occipitally; prothorax with sharp lateral angles broader than long, posterior margin rounded; metathorax broad and long, widening rapidly behind, posterior margin rounded, produced over abdomen, sides deep brown; sternal markings, on prothorax a brown patch broadening in front, acute behind, and with the blunt process behind the posterior lateral portion expanding and connecting with fuscos bands that extend latero-cephalad to the margin; on mesothorax a central pentagonal patch extending in fuscos bands postero-laterally and laterally; on metathorax a sub-triangular patch acutely angled behind, slightly convex in front; legs with enlarged femora, blackish border externally on femora and tibiae, and blackish annule at the apical end of tibiae; proximal joint of tarsus with an enlarged membranous disk; abdomen with sides somewhat parallel and heavy transverse bands, which in female are interrupted and dislocated upon the third to fifth segments, but particularly upon the fourth.

Apparently a very common species upon the American crow (Corvus americanus). A number of specimens in the Burnett collection. Also collected at Ames, Iowa.

Menopon fusco-marginatus n. sp.
Head with rather deep orbital sinus, a large fuscos patch beneath with bands running latero-cephalad to the orbital sinuses and posteriorly along the gular margin; prothorax with a miter-shaped sternal plate; abdomen with broad lateral fuscos margin, head rounded in front with scattering slender hairs, palpi reaching to the margin of the head; antennae barely visible, the orbital sinuses beneath margined with stiff hairs and with a dark-brown border; temporal lobes broad, bearing three long bristles, head beneath with large brown patch forked in front, the branches extending to the orbital sinuses and thence connecting with the brown spots at lateral margin of clypeus; prothorax broad, closely joined to head, posterior margin rounded beneath with an acuminate miter-shaped sternal plate and dark-brown bands; metathorax enlarging behind, legs strong, marked with brown, the distal portions of femora and tibiae annulate with dark fuscos; abdomen oval, margin broadly fuscos, fuscos bands crossing the disk but uniting into a long brown patch upon the seventh, eighth, and ninth segments; posterior margin of the segments
with a row of short hairs most conspicuous on the lateral dense portion. Male somewhat similar to the female with a brown patch on the abdomen, including only the eighth and ninth segments.

♀ Length, 1.73 mm; head, 0.32 mm; abdomen, 1.03 mm. Width, head, 0.50 mm; abdomen, 0.63 mm.

♂ Length, 1.41 mm; head, 0.35 mm; abdomen, 0.70 mm. Width, head, 0.47 mm; abdomen, 0.51 mm.

On "Turdus minor" in Burnett collection. This species approaches the *Menopon interruptus* occurring on the common crow, but differs distinctly in the patch on the under side of the head, sternal plate, and especially the abdominal bands, which are not interrupted as in that species.

Ancistrona gigas Piaget.

Les Pédiculines, Suppl., 1885, p. 117, Pl. XII, fig. 8; Kellogg, New Mallophaga, p. 150.

This species is recorded by Kellogg, as collected from the Pacific fulmar, *Fulmarus glacialis rodgersii* and *glupischa*, Bay of Monterey, California.

Colpocephalum pustulosum Piag.

Les Pédiculines, p. 559, Pl. XLVI, fig. 8.

On kingfisher, *Ceryle alecton* (Burnett collection).

Colpocephalum subpachygaster Piaget.

Les Pédiculines, p. 517, Pl. XLIII, fig. 2.

On *Bubo virginianus* (Burnett collection.).

Colpocephalum flavescens Nitzsch.

Nitzsch, German's Mag., Vol. III, p. 298; Lyonet, p. 262, Pl. XII, fig. 2; Denny, p. 206, Pl. XVIII, fig. 2; Giebel, p. 262, Pl. XIII, fig. 10, and Pl. XIX, figs. 3, 4, and 7; Piaget, Les Pédic., p. 515, Pl. XLII, fig. 10.

A common species on various birds of prey. Collected from swallow-tailed kite, Ames, Iowa. Other authors have cited it from a large number of rapacious birds.

Colpocephalum longicaudum Piaget.

Les Pédiculines, p. 534, Pl. XLIV, fig. 6.

On carrier pigeon (Burnett collection). Also a specimen very similar on *Gallus gallus*. (Burnett collection).

Colpocephalum ochraceum Nitzsch.

A specimen which agrees very closely with this species is credited to *Tringa maculata* in the Burnett collection.

Colpocephalum assimile Piaget.

Les Pédiculines, p. 544.

Described from specimens taken from *Grus americana* in zoological garden at Rotterdam. Also collected at Ames, Iowa (H. O. collection). Also on whooping crane, Lamar, Colo. (Gillette).

Colpocephalum fusiceps Piaget.

Les Pédiculines, p. 567, Pl. XLVII.

From gull, *Larus* sp. in the Cassino collection.

Colpocephalum unciferum Kellogg.

New Mallophaga, p. 140, Pl. XII, figs. 1, 2, and 3.

On *Pelecanus Californicus*, Monterey, Cal. (Kellogg).
Colpocephalum uniforme Kellogg.
New Mallophaga, p. 142, Pl. XII, fig. 4.

On American avocet (Recurvirostra americana), Lawrence, Kans. (Kellogg).

Colpocephalum pinge Kellogg.
New Mallophaga, p. 144, Pl. XII, fig. 5.

On short-tailed albatross (Diomedea albatrus) (Kellogg).

Colpocephalum timidum Kellogg.
New Mallophaga, p. 145, Pl. XII, fig. 6.

On golden plover (Charadrius dominicus), Lawrence, Kans. (Kellogg).

Colpocephalum laticeps Kellogg.
New Mallophaga, p. 149, Pl. XII, fig. 8.

On Ardea egretta, Lawrence, Kans. (Kellogg).

Colpocephalum funebre Kellogg.
New Mallophaga, p. 147.

From Larus glaucescens, Monterey, Cal.

Nitzschia pulicaris Nitzsch.
Nitzschiaria burmeisteri Denny, p. 230, Pl. XXII, fig. 5.
Moscon pulicaris Giebel, p. 290.
Nitzschia pulicaris Piaget, p. 574, Pl. XLVIII, fig. 6; Osborn, Can., Ent. (record); Osborn, Insect Life (period of incubation).

Common on chimney swift. Collected at Ames, Iowa.

Leamobothrium atrum Nitzsch.
Pulex fulicæ Redi, Exp., Table IV, fig. 1.
Louse of the Coot, Albin., Aran., pl. 44.
Leamobothrium atrum Nitzsch, German’s Mag., Vol. III, p. 302.
Leamobothrium atrum Denny, p. 240; Giebel, p. 253, Pl. XVIII, fig. 5; Piaget, p. 586.

A specimen of this well-marked species was in a small collection of Mallophagidae sent me for determination from Mr. Ph. Laurent, of Philadelphia.

Also recorded by Kellogg (New Mallophaga, p. 155) as collected from the coot, Fulica americana.

Leamobothrium giganteum Nitzsch.
(1762) Pediculus cisticor Geoffry, Hist. des Ins., Vol. II, p. 596, Pl. XX, fig. 1.
(1763) Pediculus marinus Scopoli, Ent. Carn., pp. 382, 1036.
(1781) Pediculus buteoni Fabricius; Ricinus vulgaris Latreille.
(1819) Leamobothrium giganteum Nitzsch, German’s Mag., Vol. III, p. 301.

A specimen of this large species is in my collection, kindly sent to me by Mr. William Beutenmueller. It was marked from harpy eagle.

Leamobothrium hastipes Nitzsch.
Frisch, Vol. XI, fig. 24; Redi, Tab., 13.
Nemurus hastipes Olfers, p. 87.

Piaget questions the separation of this species from giganteum. Specimens kindly presented to me by Dr. Merriam agree well with the descriptions, and differ sufficiently from the giganteum in my collection so that it seems proper to indicate the form, at least.
Læmobothrium similis Kellogg.
New Mallophaga, p. 153, Pl. XIV, figs. 1 and 2.

On Columbus nigricollis californicus, Lawrence, Kans. (Kellogg).

Trinoton luridum Nitzsch.
Figured (?) Redt.: Pl. X (vite Piaget); Albin., Aran., pl. 48.


(!) Trinoton consecratum Gurtl. Vol. VIII, p. 438; Pl. IV, fig. 15; Pl. II, fig. 6.

Trinoton luridum Piaget, p. 591, Pl. XLIV, fig. 3; Osborn, Bull. 7, Div. Ent., Dept. Agr.

Trinoton luridum Nitzsch.

Trinoton lituratum Nitzsch.

Trinoton minor, n. sp.

Light brown, with fuscous markings, much smaller than other members of the genus. Head subtriangular, with obtuse clypeus and temporal lobes rounded in front; antennal pits covered by rounded swelling; eyes divided, prominent; head below the eyes heavily fringed with short hairs; temporal lobes with four long bristles, a blackish patch in front of the orbital swelling, and a reddish-brown patch just within and behind the eyes; occiput with a blackish margin and two diffuse brown bands running forward to join the blackish patches in front; prothorax with lateral angles produced anteriorly, narrowed behind, a fuscous submarginal band laterally; mesothorax short, with an angular process in front; metastorax longer, margin curved; legs robust; coxae large; tarsal pallettes fully developed; first and third pairs of legs wanting in specimen; abdomen rather narrow, tapering posteriorly; lateral angles set with long bristles; eighth segment set at posterior margin with two bristles at each side, which are longer and stronger than the others.

Length, 2.67 mm.; head, 0.59 mm.; thorax, 0.94 mm.; abdomen, 1.14 mm. Width, 0.84 mm.; abdomen, 0.87 mm.


Physostomum frenatum Nitzsch.

Burmeister, Handbuch, Vol. II, p. 442; Giebel, p. 256, Pl. XVIII, fig. 6; Piaget, p. 606.

From golden-crowned kinglet, Laurent collection. Very similar forms from Passerella iliaca, Cassino collection, and Pipilo erythropthalmus, from Dr. Merriam.

Physostomum lineatum n. sp.

Light brown unicolorous, except for brown line parallel to sides of thorax and abdomen. Small for the genus.

Head subconic, sides very slightly concave, front rounded with a few very short
Species of Mallophaga.

Figure a. Nirmus cordatus n. sp.; b. Nirmus marginatus n. sp.; c. Nirmus abruptus n. sp.; d. Nirmus paralleus n. sp.; e. female, f male, Lipeurus infuscatus n. sp.; g. Lipeurus subanguliceps Denny; h. Monopous interruptus n. sp.; i. Dicothorax testudinarius Denny; j. Monopous expansum n. sp.

(From photographs by the author.)
hairs, pallettes small, beneath with a central elevated ridge; posterior edge above
sinuous, distinctly concave each side of occiput, lateral angles produced; prothorax
widening a little behind, posterior margin concave.

Legs rather long, hind ones reaching nearly to end of abdomen; abdomen of usual
form for genus, sides slightly arcuate but nearly parallel, of the same color as head
and thorax. A very narrow brown line parallel to sides of thorax and abdomen
(in line of spiracles).

Described from three specimens from the ruby-throated humming
bird (*Trochilus colubris* Linn.) in Cornell University collection, kindly
loaned by Prof. J. H. Comstock.

It is quite different from any other species of the genus known to me
in the uniform color.

*Gyropus ovalis* Nitzsch.

Denny, p. 246, Pl. XXIV, fig. 1; Giebel, Epiz.; Plagget, p. 609, Pl. L, fig. 5; Osborn, Bull. 7,

Specimens received from Dr. A. Hassall, of Baltimore. Evidently
a common parasite of the Guinea pig, its only host.

*Gyropus gracilis* Nitzsch.


*Gyropus gracilis* Nitzsch, Germar's Mag., Vol. III, p. 304; Burmeister, Vol. II, p. 443; Denny,
p. 246, Pl. XXIV, fig. 2; Plagget, p. 611, Pl. L, fig. 6; Osborn, Bull. 7, Div. Ent., Dept. Agr.

Common, along with preceding, upon the Guinea pig. Numerous
specimens collected by Dr. Hassall, Baltimore, Md.
INSECTS AFFECTING DOMESTIC ANIMALS:

AN ACCOUNT OF THE SPECIES OF IMPORTANCE IN NORTH AMERICA,

WITH

MENTION OF RELATED FORMS OCCURRING ON OTHER ANIMALS.

PREPARED UNDER THE DIRECTION OF THE ENTOMOLOGIST,

BY HERBERT OSBORN,

Professor of Zoology and Entomology, Iowa Agricultural College, Ames, Iowa.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1896.