THE MALLOPHAGAN FAMILY MENOPONIDAE.

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PART I.

(With 5 Text-figures.)

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A. INTRODUCTORY.

It is perhaps unnecessary to introduce this series of papers with the remark that the chief interest in the study of the Mallophaga centres about the problems associated with their distribution and that these problems are in some measure at least coincident with the problem of the genetic relationship of their hosts. All this has been said very clearly, many times and by various writers. Yet I repeat it again, for it is this interest which is responsible for the papers to follow and it is as a contribution toward the study of these problems that they are intended, notwithstanding the circuitous route that may be followed in arriving at this goal.

Such problems as these are the factors that redeem systematic biology from the dreary round of describing and naming and cataloguing in which some profess to see its only function. And yet it is only by way of this very describing and naming and cataloguing that any light can be obtained by which even to formulate these questions of broader interest. The unfortunate thing is that this basic systematic work is so often hurried over, so often skimmed, so often done poorly instead of being done with the same care and skill and patience that is expended upon other fields of endeavour. Of what value are conclusions and theories based primarily upon the results of systematics when the systematics themselves are deficient or perhaps even misleading? Of what value are discussions as to the distribution of species and larger groups when the identifications of the species themselves or the limits of the other groups are open to question? Of what value is a classification that conceals rather than reveals the actual relationships of the forms with which it deals?
All of these queries may justifiably be uttered by students of the Mallophaga. The broader problems upon which the study of this group—and other ectoparasitic groups as well—may throw some light have long been realized, yet the tools that alone are available for clearing the way to these problems have remained strangely dull and inadequate. The systematics of the Mallophaga are in the main little short of chaotic. In but a few groups—and these of but small size—is the work that has been done of a quality even approaching adequacy. The identification of species is in large measure a matter of the application of a theory of probabilities based upon the identity or relationships of the host rather than upon structural criteria of the parasites themselves. The genera are for the most part simply heterogeneous assemblages of superficially similar forms held together by a flimsy structure of artificialities and awaiting a drastic dividing and delimiting to be of any particular significance.

All these conditions are well illustrated in the group of species included in Harrison’s admirable catalogue of the Mallophaga\(^1\) under the family *Menoponidae*. The catalogue lists 453 species in this family—nearly one-fourth of all the species of Mallophaga—distributed among twelve genera. There are three genera which are not included in this catalogue and the inclusion of which would change the figures somewhat, but if we take the catalogue as a basis we find 414 of the 453 species comprised within three genera, *Menopon* with 192, *Colpocephalum* with 166, and *Myrsidea* with 56. The largest of the other nine genera contains but eleven species.

There are no subgenera recognized under these large genera, nor are there any keys to the included species. Concealed within them there are unquestionably a considerable series of groups of species, the recognition of which will be necessary in order to bring out the facts of distribution and relationship. That the two largest genera are highly artificial is obvious. In fact, the examination of a series of the species now referred to them will almost leave one with the suspicion that they have been allocated to their respective genera by some one of the many methods in favour among those who follow the Goddess of Chance!

But little seems to have been done in the way of a search for available characters by which either to separate the species or the groups. Such striking and undoubtedly significant structures as the combs on the posterior femora and the ventral side of the abdomen, which occur in a long series of species, have been mentioned in the descriptions of perhaps not more than half a dozen. The only detailed observations appear to be included in a paper by Harrison\(^2\) and another by the present writer\(^3\), with at the most an occasional note by earlier authors.

The purpose of this and the papers to follow is that of attempting the

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reorganization of the systematics of this family with a view to bringing out as clearly as may be the facts of relationship as a preliminary to the study of the significance of these facts. The plan that I propose to pursue involves the following steps. First of all the types of the existing genera, or typical species if the actual types be not available, will be described and figured with a view to fixing the starting points for these genera. Succeeding this a review of the species of the family will be carried as far as the available material and the literature will permit and new generic groups will be defined, their types described and figured and species assigned to them as far as possible. The residue of species will then be placed in the existing genera or as unassignable. Subfamilies and tribes will be indicated if they prove desirable, keys to the genera will be given and finally a discussion of the problems of distribution as they appear at the conclusion of this work will be undertaken.

In the figures accompanying these papers I shall endeavor to include as far as practicable every structure to be found on the insects. The actual realization of this ideal is probably—if not certainly—beyond attainment, for scantiness of material will preclude the dissections which are necessary in order to show some structures such as the maxillae, the details of the labium and the actual structure of the male genitalia. Some other structures such as the internal framework of the head will scarcely show to advantage in any but detailed drawings which their probable importance is hardly sufficient to justify. The descriptions will call attention only to the important features that are possibly of generic value and other details may be obtained from the figures. The female alone will be figured in full except perhaps in cases where the male may differ so markedly that it can hardly be visualized by reference to the figures of the female.

B. THE TYPES OF THE EXISTING GENERA.

1. Menopon gallinae (Linnaeus).

Fig. 1.

Material examined. Specimens from domestic fowl from the United States and South Africa.

Female (Fig. 1 A). A pale species, without dark markings or strongly chitinized regions. Head triangular, about three-fifths as long as wide, the greatest width at the posterior border. Lateral margins but very slightly excavated, with a deep slit in front of the eye (Fig. 1 D). Antennary fossa deep, open ventrally, the ventral margin, which is the ventral prolongation of the temporal margin, being much surpassed by the dorsal margin. Pharyngeal sclerite and glands strongly developed. Antennae (Fig. 1 B) apparently five-segmented, the third segment being extremely minute, the fifth quite long and slender. Labial palpi slender. Gular region (Fig. 1 E) with a faintly chitinized plate.

Prothorax with acute wings, the lateral and posterior margins smoothly confluent and forming an arc of a circle. Mesothorax much reduced, the notum
being scarcely indicated, the sternum with a faintly chitinized area which bears several quite long setae. *Metathorax* narrow and with its straight sides strongly divergent, its posterior margin nearly straight, the sternum faintly chitinized and bearing several setae. *Legs* of ordinary form, the coxae small, the femora of the anterior pair not at all enlarged, the femora of the third pair with a very distinct brush of 15 to 20 closely set small setae on the ventral side.

*Abdomen* elongate, tapering, with the tergal and sternal plates extremely weakly chitinized, the sternal plates apparently almost membranous. There

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**Fig. 1.** *Menopon gallinae* (Linnaeus). A, female; B, antenna; C, genitalia of male; D, outline of dorsal aspect of lateral margin of head; E, portion of ventral aspect of head.
are no visibly differentiated pleural plates, but there is a rather conspicuous internal chitinous pleural thickening on each segment. Tergal plates with but a single transverse row of setae. Stermites with two partial transverse rows and with a pair of conspicuous little brushes of small setae on the fourth segment. Lateral margins of the segments with several long, stout setae. Apex of the abdomen terminating in a rounded dorsal plate and a shorter ventral plate, each of which is fringed by small setae. There are no vestiges of gonapods.

**Male.** In general appearance practically identical with the female except that the abdomen is slightly less tapering and terminates in a single rounded plate which bears four long setae. Distribution of setae on the abdomen essentially as in the female.

**Genitalia** (Fig. 1 C) very small. I am unable to homologize the parts except for the small, indistinct basal plate (bp) and what are apparently the parmers (par). Articulating with the tips of the basal plate is a peculiar piece (x) which has the appearance of a V the apex of which has been given a quarter turn.

2. **Colpocephalum zebra** Nitzsch.

**Fig. 2.**

**Material examined.** A male and a female from the type host, *Ciconia alba*, Ain, France, received through the kindness of Professor J. Pelosse of the Faculty of Sciences of Lyons.

**Female** (Fig. 2 A). A very elongate form, with very conspicuous markings on the head. **Head** slightly wider than long, the greatest width at a point just behind the eyes, the anterior margin rounded, the lateral margins (Fig. 2 F) somewhat excavated and with a deep notch just in front of the eye, the temporal margins strongly convergent. Framework of the head very heavily chitinized and forming conspicuous blotches, there being such a blotch about the base of the lateral notch and a pair on the posterior border of the head. These areas appear to extend, at least in part, entirely through the head from dorsal to ventral side. Connecting the two occipital areas is a transverse dorsal band and a fainter band connects these areas with those at the lateral notch. On the ventral side of the head (Fig. 2 G) just in front of the antenna is a small, more weakly chitinized area.

Pharyngeal sclerite and glands present. Antennary fossa shallow, owing to the excavation of the side of the head, the ventral and dorsal borders coinciding except about the base of the antenna where the dorsal exceeds the ventral. Antennae (Fig. 2 D) with the terminal segment rather short. Labial palpi slender. Gular region with a faintly chitinized plate.

**Prothorax** with acute wings, the lateral margins practically confluent with the posterior margin and strongly convergent. **Mesothorax** much reduced, the notum consisting merely of a narrow, chitinized band. **Metathorax** with the lateral margins strongly divergent, the posterior margin nearly straight, the sternum weakly chitinized and bearing a few small setae. **Legs** of ordinary
form, the anterior femora not expanded, the posterior femora with a series of combs of setae on the ventral side. These combs (Fig. 2 B) are disposed in four transverse rows, the proximal row with two or three setae, the second with ten or twelve, the last two with fourteen or fifteen.

*Abdomen* elongate and slender, the tergites strongly chitinized, the sternites very weakly so. Tergites of the third to ninth segments divided longitudinally.
into three distinct areas, the median area being about half as long as the others. All the tergites with two transverse rows of small setae. Sternites with numerous irregularly disposed small setae and on the third segment two groups of combs. These combs (Fig. 2 C) are set on a slight diagonal in the posterior lateral angles of the sternite, there being two rows. Pleurites distinct but small, all bearing several slender setae. Spiracles present on the third to eighth segments, very small, borne at the lateral margin of the tergites. Apex of the abdomen with a rounded dorsal plate and a shorter ventral plate, both fringed with numerous short setae. Gonapods entirely obsolete.

**Male.** In general characters practically like the female except that the body is shorter and broader and the tergites are not divided. The distribution of the setae is practically as in the female.

**Genitalia** (Fig. 2 E) with the basal plate (bp) very long and slender, strongly expanded at the apex where it articulates with a complex of structures that seem to be formed from the walls of the preputial sac. I am unable to identify any parameres and the most conspicuous structure is a flat plate (x) which in its form and the serrations of its lateral margins suggests a barbaric spear head.

3. **Menacanthus robustus** (Kellogg).

**Fig. 3.**

**Material examined.** The single female upon which the species was originally based, from *Psaltririparus minus*, Palo Alto, California, and a female and two males from *Pentheestes rufescens neglectus*, Marin County, California. The figures are from the specimens from the second host as the type is not in the best of condition. The determination of these specimens is positive, however.

**Female** (Fig. 3 A). A robust and rather strongly chitinized form. **Head** noticeably short and broad, being slightly more than twice as wide as long, the greatest width close to the posterior border. Lateral margin very slightly excavated and with a distinct slit just in front of the eye (Fig. 3 E). Antennary fossa (Fig. 3 F) deep, backed up by an oval chitinized area, the ventral side partially floored by the prolongation of the temporal margin of the head, this much exceeded by the dorsal margin. **Antennae** (Fig. 3 C) four-segmented. Labial palpi slender. From just behind and slightly lateral of the base of the palpus (Fig. 3 F) arises a stout, backward pointing spine which is apparently an outgrowth from the internal skeleton at this point. Gular region with a large, but rather weakly chitinized plate which bears several long setae.

**Prothorax** rather large and broad, with moderately acute wings, the lateral margins strongly convergent but not merged with the posterior margin; sternum with a small plate which bears a few small setae. **Mesothorax** much reduced, the notum consisting merely of a faint transverse band; sternum with a small chitinized plate bearing several small setae; coxal cavities margined by a strongly chitinized band. **Metathorax** with the lateral margins strongly divergent, the posterior margin straight; sternum distinctly chitinized
and bearing several small setae. Legs of ordinary form, the anterior femora not expanded, the posterior femora with merely a few scattered setae on the ventral side.

![Diagram of Menacanthus robustus](image)

Fig. 3. *Menacanthus robustus* (Kellogg). A, female; B, portion of ventral aspect of genital region of female; C, antenna; D, genitalia of male; E, outline of dorsal aspect of lateral margin of head; F, portion of ventral aspect of head.

*Abdomen* quite broad, the plates well defined and strongly chitinized. Tergites continuous with the pleurites and extending to the ventral side of the body, bearing a single marginal row of small setae except in the pleural region where these give way to short, stout setae together with one or two that are long and slender. Sternites with a few small, irregularly disposed
setae which are somewhat clustered at the lateral margins but not sufficiently
to form distinct brushes. Spiracles extremely small, present on the third to
eighth segments. Apex of the abdomen rounded, the ventral side (Fig. 3 B)
with a circket of closely set, slender setae, without gonapods.

**Male.** Practically identical with the female in general characters. *Genitalia*
(Fig. 3 D) with the basal plate (*bp*) long and slender, the apex expanded and
articulating with a pair of outwardly curved pieces that I take to be the
parameres (*par*). Between the parameres is a plate that is apparently a
prolongation of the preputial sac.

4. **Pseudomenopon tridens** (Nitzsch).

Fig. 4.

*Material examined.* Females from *Fulica atra*, Ain, France, received through
the kindness of Professor J. Pelosse of the Faculty of Sciences of Lyons, and
a male and female from *Fulica americana*, Lawrence, Kansas, U.S.A. The
latter specimens are a part of the co-type material of Kellogg’s *Menopon
tridens pacificum* but I can see no basis whatsoever for separating them from
the European form in any degree. The figures of the female are from the
European specimens and of the male from the American specimens.

**Female** (Fig. 4 A). A moderately robust form. *Head* triangular in general
outline, very slightly wider than long, the greatest width across the posterior
margin. Lateral margins (Fig. 4 E) not at all excavated, forming an unbroken
parabola, with a distinct slit in front of the eye. This slit is backed up by
a small but strongly chitinized area, from which a faint band extends to the
posterior border of the head to meet a narrow occipital band. Pharyngeal
sclerite and glands apparently lacking. Antennary fossa very deep, the dorsal
and ventral borders almost coinciding. Antennae four-segmented, the second
segment with a marked anterior expansion, the fourth short and broad.

Gular region (Fig. 4 F) with a remarkably modified plate. This appears
to consist of an elongate central piece which is attached only at its anterior
extremity and is flanked by a narrow and less heavily chitinized piece on
each side. The whole structure is apparently merely the modified gular plate
and it does not project past the posterior margin of the head.

*Prothorax* large and broad the lateral margins moderately convergent;
sternum with a distinct plate but without setae. *Mesothorax* much reduced,
the notum very faintly indicated; sternum with a distinct and large chitinized
plate which bears a very few small setae; coxal cavities margined by a very
distinct band. *Metathorax* with the lateral margins quite strongly divergent,
the posterior margin straight; sternum with a very small plate. *Legs* of
ordinary form, the anterior femora not expanded, the posterior femora with
a somewhat indistinct brush of setae on the ventral side.

*Abdomen* with the plates well defined. Tergites continuous with the
pleurites and extending somewhat to the ventral side of the body where they
terminate in a conspicuous, pointed process, margined with a series of small slender setae, these becoming longer and larger in the pleural region. Sternites with two partial rows of small setae and a slight clustering of setae at the posterior lateral angles hardly sufficient to be called a brush. Apex with a

![Diagram of Pseudomenopon tridens](image)

Fig. 4. *Pseudomenopon tridens* (Nitzsch). *A*, female; *B*, portion of ventral aspect of genital region of female; *C*, antenna; *D*, genitalia of male; *E*, outline of dorsal aspect of lateral margin of head; *F*, portion of ventral aspect of head.

rounded plate bearing a few small setae and on the ventral side a partial circle of closely set, slender setae (Fig. 4 *B*); with small ventral, chitinized areas that perhaps are the vestiges of gonapods. Spiracles very small, present on the third to eighth segments.
Male. In its general characters practically the same as the female but much more slender, the body narrower than the head. Genitalia (Fig. 4 D) with a slender basal plate (bp) which is slightly expanded at the apex where it articulates with a pair of slender processes that are probably the parameres (par). Between these are vague structures that are apparently part of the preputial sac and overlying the apex of the basal plate is a conspicuous, trumpet-shaped structure that is part of the same organ.

5. **Somaphantus lusius** Paine.

Fig. 5.

*Material examined.* A single female from the type lot, received some years ago through the kindness of Mr. J. H. Paine.

**Female** (Fig. 5 A). A very slender, weakly chitinized and hairy form. Head slightly longer than wide, the greatest width near the posterior border. Lateral margin (Fig. 5 B) very slightly excavated, without either a notch or a slit in front of the eye. Pharyngeal sclerite and glands strongly developed. Antennary fossa extremely shallow, open beneath. Antennae (Fig. 5 D) relatively very large, the terminal segment very elongate. It is difficult to decide whether there is a very minute third segment or whether this is merely the pedicel of the third. Labial palpi relatively very large, slender, much exceeding the margin of the head. Gular region (Fig. 5 C) not chitinized, but bearing four pairs of long setae. Across the gular region there extends a faint band that is apparently internal and that terminates on each side in a clear area.

**Prothorax** relatively rather large, about two-thirds as long as wide, without wings; sternum not chitinized. **Mesothorax** with the notum very much reduced, but quite definitely indicated by a transverse, chitinized band, and with the sternum noticeably enlarged, encroaching upon the metathorax so that the anterior and middle legs are widely separated; sternum with numerous slender setae. **Metathorax** scarcely distinguishable from an abdominal segment, with the sternum quite large and encroaching upon the first abdominal sternite and bearing numerous small setae. **Legs** of ordinary form, the anterior femora not enlarged, the posterior femora with a distinct brush of small setae on the ventral side.

**Abdomen** long and slender, unchitinized, all the segments with a closely set row of slender setae along the posterior margin and numerous scattered seta elsewhere, together with long setae at the lateral margins. Fourth sternite with a pair of distinct brushes of small setae. Apex of the abdomen with a rounded plate fringed with a few small setae; ventral side without vestiges of gonapods. Spiracles evidently extremely minute as I have been unable to detect them.

**Male.** According to Paine the male is larger than the female. His figure and description of the genitalia are of no aid.
Fig. 5. Somophantus lusius Paine. A, female; B, outline of dorsal aspect of lateral margin of head; C, portion of ventral aspect of the head; D, antenna.

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