

Piercing Mouth-Parts in the Biting Lice (Mallophaga)

THE Mallophaga, ectoparasites of birds and mammals, are distinguished within the order Phthiraptera (containing also the Anoplura and *Hæmatomyzus*) chiefly by their relatively unspecialized mouth-parts, especially in having heavily sclerotized chewing mandibles. It has recently been found that in the genus *Trochilæcetes*, parasitic on the Trochili (hummingbirds), the species have a piercing type of mouth-parts (Fig. 1) instead of the mandibulate mouth-parts typical of the Mallophaga. Although four species of this genus have been described in the last fifty years, no previous reference to their mouth-parts is known.

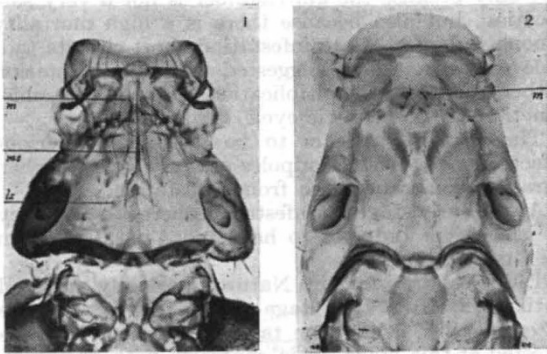


Fig. 1. *Trochilæcetes* sp. $\times 55$ from a hummingbird. *m*, Mandible; *ms*, median structure; *ls*, lateral structure. (Photo. by H. M. Malles)

Fig. 2. *Ricinus* sp. $\times 47$ from a passerine. (Photo. by H. M. Malles)

These structures, which will be fully described and discussed elsewhere, comprise a number of elongated extrusible parts and the modified mandibles. There are three closely associated stylet-like structures, almost certainly of hypopharyngeal origin, which are joined by a common membrane, only the distal tips being free. The median structure (Fig. 1, *ms*) which originates from a sclerotized plate (probably the sitophore sclerite) is heavily sclerotized, and gives rise on each side to a flattened lobe, apparently homologous with the hypopharyngeal lobes characteristic of other Mallophaga. A pair of lightly sclerotized lateral structures have their proximal ends (*ls*) lying lateral and ventral to the sitophore sclerite and seem to represent the modified lingual sclerites. Two flattened elongated outgrowths from the dorsal wall of the distal end of the pre-oral cavity may act as a groove to hold and guide the hypopharyngeal parts. The sclerotized outgrowth of the clypeal wall of the pre-oral cavity (the 'pestle' of the Psocoidea), found in the majority of the Mallophaga, is present in these species. The lacinia are of the typical form found in the Mallophaga, but are distally more elongated and lightly sclerotized. The mandibles (*m*) are lightly sclerotized and the piercing blades lie parallel to the median structure; the end of the left mandible has a minute tooth, the right is sharply pointed. In a related genus *Ricinus* (found on the Trochili and the Passeriformes) the species on the Trochili have also lost the typical Mallophagan mouth-parts, but the modifications both of the mandibles and the hypopharynx are not so extensive. However, in normal *Ricinus* species—which probably

also feed entirely on blood—some modification of the mandibles has already taken place (Fig. 2, *m*), these structures being less heavily sclerotized and toothed, and more elongated and pointed than those of other Amblycera which feed on feather parts. The *Ricinus* species on the Trochili are typical of the genus apart from the modified mouth-parts, and this modification, therefore, must have taken place in the *Ricinus* species of the Trochili after the morphological characters of the genus *Ricinus* had been established; *Trochilæcetes*, closely related to *Ricinus* and restricted to the Trochili, must be a later derivative from a *Ricinus*-like ancestor.

Modification from chewing to piercing mouth-parts is now known to have taken place twice in the Phthiraptera, once in the stock which gave rise to the Anoplura or sucking lice of mammals, and, as here described, in the superfamily Amblycera of the Mallophaga. A recent classification¹ divides the Phthiraptera into three suborders: the Mallophaga with chewing mouth parts; the Rhynchophthirina containing only the genus *Hæmatomyzus*, with mandibulate mouth-parts borne at the end of an elongated proboscis; and the Anoplura with highly modified piercing mouth-parts. Recent authors (Webb² and Hopkins³) have suggested that the Anoplura—in spite of considerable morphological differences, especially those of the mouth-parts—are closely related to the Mallophaga; possibly being derived from an ancestral Ischnoceran stock on a mammal after the mammal-Ischnocera had separated from the bird-Ischnocera. The position of the highly modified elephant louse is still uncertain: it has been placed near the Mallophaga⁴ mainly on the possession of mandibulate mouth-parts, and also near the Anoplura². The present description of chewing and piercing mouth-parts within a group of closely related species in the Mallophaga suggests that these structures tend to be plastic, and are not important characters in showing the phylogenetic relationships of the higher categories within the order.

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¹ Weber, H., *Biol. Zbl.*, **59**, 409 (1939).

² Webb, J. E., *Proc. Zool. Soc. Lond.*, **116**, 49 (1946).

³ Hopkins, G. H. E., *Proc. Zool. Soc. Lond.*, **119**, 389 (1949).

⁴ Ferris, G. F., *Parasitol.*, **23**, 112 (1931).

Modification of the Ectoderm in *Sphenodon*

IN a recent publication¹, attention has been directed to the occurrence of a peculiar modification of the outer layer of the ectoderm of the chorion (and choriogenous ectoderm) of *Sphenodon* (Reptilia, Rhynchocephalia) to produce very large cells with well-marked boundaries, domed free edges and large nuclei. These modified cells show particularly clearly in preparations stained with borax carmine, in which the cells tend to assume a characteristic yellow-orange colour. These cells were first observed by Dendy² and Schauinsland³, who were working independently on the embryology of *Sphenodon*. They applied the term 'teloderm' to the tissue, a term previously used by Mehnert⁴ to describe tissue to which the term 'epitrichial layer' more properly applies⁵.

Teloderm, of the type found in *Sphenodon*, has not been described as occurring in any other reptile and was thought to be characteristic of *Sphenodon*.