

XXXIX.—*Mallophaga Miscellany*.—No. 3.

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THE TRABECULA.

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I. GENERAL.

IT seems desirable to re-define the terms *trabecula* and *conus* (= *clavus*) as used for certain structures in the Mallophaga; recent literature shows that there is still confusion in regard to these terms and this has contributed in at least one case to an incorrect generic diagnosis.

Kéler (1938 *a*, p. 403 and 1938 *b*, p. 309) was the first author to show that the term *trabecula* was used indiscriminately for two structures morphologically distinct. He restricted the term *trabecula* to the structure in the Ischnocera which arises from the antennal socket, and the posterior margin of which is continuous with the anterior margin of the first segment of the antenna; he showed that it was well developed only in *Philopterus* sens. str. In many other genera it is represented by an inconspicuous fold projecting hardly or not at all beyond the lateral margin of the head. The second structure, also referred to as *trabecula*, is that to which Kéler (1938 *a*, p. 401) gave the German name "*Zapfen*" and later (1939, p. 14) the Latin name "*conus*"\*. The *conus* is a prolongation of the lateral margin of the head, each side, immediately anterior to the antennal socket, of which it forms the anterior margin. Kéler showed that the lateral outgrowths immediately anterior to the antennae of such genera as *Degeeriella* sens. str. are homologous with the postero-lateral or lateral prolongations of the anterior margin of the head in *Goniodes*. The type of *coni* is largely conditioned by the form of the head, depending on the degree of prolongation of the pre-antennal region. In *Philopterus* sens. str. both *trabeculae* and *coni* are well developed; in the majority of Ischnoceran genera it is the *coni* which are prominent, and in some genera both *trabeculae* and *coni* are undeveloped. Kéler has also shown (1939, p. 15) that the *conus* in *Goniodes* is usually divided into an anterior part with internal

\* Clay, 1940, p. 2, used the name "*clavus*."

thickening (the *nodulus* of Kéler, 1939, fig. 1) and a posterior hyaline part. Kéler has shown that this hyaline portion may be separated off as a discrete process as in *Chelopistes* Kéler, when he names it the *appendix conii*. It would seem that the sclerotized process occupying this position in *Goniodes cervinicornis* Giebel should also be regarded as an *appendix conii*. The partly hyaline nature of the *conus* in some species has given rise to confusion in the interpretation of this structure, as in prepared specimens the hyaline part may be shrunk against the upper part and non-apparent. In such cases the upper hard part has been represented as the complete *conus* and shown as a triangle with the apex pointing laterally, and a flattened posterior margin instead of a rounded triangular structure with the posterior margin rounded or pointed and prolonged posteriorly (fig. 1). A case

Fig. 1.

*Goniodes lagopi* (Linn.).

Antero-lateral region of head, ♂, ventral. Posterior margin of hard part of *conus* shown by interrupted line.

in which the hard part of the *conus* has been compared with the complete *conus*, the differences being used as a subspecific character, will be mentioned in a subsequent note.

## 2. PARAGONIOCOTES Cummings and EPIPSITTACUS Carriker.

In the generic description of *Epipsittacus* (Carriker, 1944 p 233, and 1940, p. 294) mention is made of

"curving spines at the base of the antennæ" in the female and of "well developed *trabeculae*" in the male. In fact neither of these are *trabeculae*, but both structures are prolongations of the margin of the head immediately anterior to the antennal socket and are therefore homologous with the *coni* of other genera. In many species where there is sexual dimorphism of the antennæ there is also sexual dimorphism of the *coni*, caused by the increased size of the first antennal segments of the male, the *coni* being closely associated with the antennæ both morphologically and functionally. For this reason it is probable that sexual dimorphism of the *coni* alone, like that of the antennæ, will seldom prove to be a reliable generic character, although the form of the male antennæ (e. g., *Coloceras*) or the male *coni* (e. g., *Chelopistes*) may be characteristic. In this connection it seems somewhat premature to say, as in the description of *Pseudocophorus* (Carriker, 1940, p. 281), "antennæ are strongly dimorphic (decidedly a generic character in this group, but not in all others)," when only four species of the genus are known. It has been shown elsewhere (Clay, 1940, figs. 1 and 2) that there may be considerable variation in the form of the *coni* amongst congeneric species.

Among the characters used to distinguish *Epipsittacus* from *Paragoniocotes* are those of the female genital region. It is stated (Carriker, 1940, p. 285) that the three long curving spines and the genital plate of the female abdomen are on the dorsal surface in *Epipsittacus*, and that the spines are on the posterior margin of the last segment in *Paragoniocotes*. In fact *Epipsittacus c. colombianus*\* Carriker, *Paragoniocotes cornutus* Carriker\*, *P. acutifrons* Carriker\*, *P. gripecephalus* Cummings\*, *P. neivai* Guimarães, and *Goniocotes fasciatus* Piaget\* have the sub-genital plate and associated clusters of spines in the normal ventral position.

The only remaining characters mentioned for the separation of *Epipsittacus* from *Paragoniocotes* are those of the male genitalia. These structures, although of prime importance in the separation of species, are not necessarily of generic importance. In *Goniodes* (see Clay, 1940) the male genitalia cannot be used as generic characters, and the same will probably prove to be the case in many

\* Specimens examined.

other of the large genera. In the group of species under discussion it also seems doubtful whether they will serve as generic characters. *Goniocotes fasciatus* Piaget agrees with *Epipsittacus mirabilis* Carriker in the character of the male and female *coni*, in the form of the male tergites and in the association of sternite X in the female with the genital cluster of spines. The male genitalia show the short parameres and elongated dorsal endomeres\* as in *P. gripocephalus*; the inner "endomeral parts" (see Cummings, 1916, fig. 6) seem in *fasciatus* to be fused medianly. The broad anterior "endomeral plate," bearing a lateral spine, which is found in *Epipsittacus mirabilis*, may be homologous with the elongated "penal complex" (Cummings, 1916, fig. 6) which bears a similar lateral spine; *fasciatus* has an elongated penis.

In conclusion, it can be said that there are known at present a number of species occurring on the *Psittaciiformes* which do not differ in any fundamental characters but which can be split into two groups, one containing species in which the *coni* and antennae are sexually dimorphic, the males have only the first abdominal tergite divided medianly and the females have sternite X strongly sclerotized and lying at the base and partly surrounding the genital cluster of spines; and a second group showing no sexual dimorphism of the *coni* and antennae, the males with only the second abdominal tergite entire and the female with sternite X not strongly sclerotized nor closely associated with the genital cluster of spines. As at present only a fraction of the Mallophaga from the *Psittaciiformes* of the world can be known it is most probable, on the analogy of other groups parasitizing large host orders, that species will be found combining characters from both groups. In support of this can be mentioned a single female from *Amazona aestiva xanthopteryx* (Berlepsch), Bolivia, which has the *coni* of the female not in the form of sclerotized curving hooks, but similar to those of the male *Epipsittacus*; the genital region is typical *Paragoniocotes* in form. Taking into account these points it would seem to be more satisfactory to retain all these species in *Paragoniocotes*.

\* Called parameres by Cummings (1916); it is, however, the shorter outer pair which articulate in the normal manner with the basal plate.

### 3. CHELOPISTES \* Kéler.

As shown above, the male of *Chelopistes* Kéler (1939, p. 180) has elongated, hyaline *appendices coni* prolonged distally into a fine point (Kéler, 1939, fig. 102, and Clay, 1941, fig. 2 a). Carriker (1945, p. 365) has erected a new genus, *Trichodomea*, for a group of species some of which were considered to be congeneric with the genotype of *Chelopistes*, *C. mealeagridis* (Linn.), by both Kéler and Clay. The generic diagnosis of *Trichodomea* contains the supposition that the *appendix coni*, typical of male *Chelopistes*, is not present in those species placed in the new genus. The types of the species of *Trichodomea* listed below, which are in the Meinertzhagen collection, have been examined, and in all the males the typical hyaline pointed *appendices coni* can be seen:—

- Trichodomea latafrons crassus* Carriker.
- T. setosa gujanensis* Carriker.
- T. d. dendrotyx* Carriker.
- T. d. similis* Carriker.

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### XL.—Some Observations on the Woodlouse *Porcellionides pruinosus* (Brandt). By WALTER E. COLLINGE, D.Sc.

IN a recent paper Dr. V. B. Wigglesworth † has stressed the importance of the various contrivances by which insects retain water, and the nature of the cuticle enclosing their bodies. The active agents appear to be waxes, varying widely in their physical properties. "It appears that under the influence of the substrate membrane the wax molecules of the innermost layer are so orientated at right angles to the surface and so closely packed in crystalline form that water will not pass through."

\* Earlier name for *Virgula* Clay, 1941.

† 'Experimentia,' 1946, ii, pp. 210-214, figs. 1-3.