inner branch, on the other hand, is entirely free from these sensory appendages, and is generally smooth, slender, and flexible; it varies in length, being frequently much longer than the outer flagellum, and in other species it is considerably shorter. The constant presence of an organ of such simple character indicates that it fulfils some permanent function, which, I believe, consists in protecting and keeping clean the mass of membranous cilia attached to the outer flagellum. This idea receives support from a consideration of the relative positions of the two flagella, and from the fact that in *Pandalus modestus*, as may be seen in Pl. CXIV. fig. 4*b*, the inner flagellum has a tendency to curl spirally around the outer; when the flagella are long the membranous cilia are less aggregated, extending sometimes to the very extremity.

In the genera *Palæmon*, *Bithynis*, *Lysmata*, and *Alpheus*, the outer or primary flagellum divides at a greater or less distance from its base into two branches of varying length, the basal part of which carries the sensory organs, while the other part is slender and unadorned.

According to Mr. Gulland, on the inner or secondary flagellum "the arrangement of the tactile setæ is the same, but there they are rather longer."[1]

*The Second Antennæ.*—The third pair of appendages consists of the second antennæ. These are often very large and powerful organs, frequently adapted for weapons of offence. Each consists of two distinct portions, the peduncle and the flagellum. The peduncle has five joints in all the Macrura excepting the Synaxidea, in which there are only four, and the flagellum is composed of a series of short articuli which together form a long and slender flexible rod, generally gradually tapering from base to apex.

The most simple and characteristic form of the second antennæ is to be seen in the Palinuridæ, in which family also some of the most interesting and peculiar features in the antennæ of Crustacea are exemplified.

In *Palinurus*, the first or coxal joint is fused more or less perfectly with the somite to which it belongs, and with the ventral surface of the fourth mandibular somite. The under surface alone of the coxal joint is calcified, and near its posterior margin stands the phymacerite, a prominent tubercle, at the extremity of which is an opening closed by a very thin chitinous membrane.

This passage is in connection with the organ known as the green gland, which in this family is largely developed and is lodged both within the coxal joint and posterior to it within the cephalon. The function or nature of this organ has not been satisfactorily determined, but its anatomy has received the attention of naturalists, chiefly in the case of the Entomostracous Crustacea and the Amphipoda, and especially by Dr. Carl Grobben in a memoir on The Antennal Gland of the Crustacea.[2] According to this author the antennal gland is a renal organ with a saccular appendage and urinary passage. The

[1] *Loc. cit.*, p. 161.

[2] *Arb. Zool. Inst. Wien*, Bd. iii. Heft 1, p. 18, 1880.