but more delicate in structure. These vary in number and in thickness of clusters, but, as far as my experience goes, are invariably present on the upper antennæ."

More extended research has led to these membranous cilia, or rods, being regarded as sensory organs, but their exact function has not yet been definitely determined. In some genera they are extremely numerous and they are usually more abundant in the males than in the females. By Leydig they have been regarded as having an olfactory function, but M. S. Jourdain[1] says that they are each covered by a delicate chitinous layer and divided into a variable number of joints; the free end has the form of a truncate cone and bears a hyaline process, which probably has a sensory function; within the sheath is a granular substance, derived apparently from the dermal layer, or chorion, and a nerve fibril has been traced to its base. These sensory rods are variously distributed in the different groups, but when the flagellum is branched they occur in one of the branches only. And thus they are almost invariably present in the Macrura, since the first antennæ are almost invariably biflagellate. Among the Edriophthalma, on the other hand, it is frequently uniramous; but even here the second branch is almost universally present in a rudimentary condition in the young, and the structure of the membranous cilia is essentially the same as in the other orders, but their arrangement shows an immense number of variations. M. Jourdain says that the first pair of antennæ has no special movements, and the number of rods is not great, but my own experience is at variance with these assertions, for the Amphipoda always while swimming carry the flagella of the first pair of antennæ elevated in the water, and slowly waving about as if watching for impressions, while in the Brachyura and Anomura, and in those Macrura where the flagella are short, they are kept in a constant state of vibration. But I agree with M. Jourdain in the belief that while admitting the function of these rods, or membranous cilia, to be sensory, there is nothing in their structure to prove them to be specially devoted to the sense of smell.

M. Robin, in a memoir on the subject,[2] after reviewing M. Jourdain's observations on the sensory rods, says that in all cases we find a very delicate chitinous sheath, which is penetrated by an offshoot from the hypodermic layer, and which at its base is found to be in relation to a branch of the antennary nerve; the free end is truncated and carries a hyaline body, which appears to be comparable to the rods found at the ends of sensory organs. These may be known as the "poils à batonnet." The hairs are cylindrical in some cases, and then the chitinous cylindrical sheath is made up of a number of joints; the basal ones have thicker walls, and are shorter than those which are more distal. In other cases the hairs are stipitate and then the joints are ordinarily reduced to three, and the basal one, which is of some length, is constricted in its middle.

A detailed study shows that the former arrangement is confined to the Podoph-

[1] *Comptes rendus*, tom. xci. pp. 1091–3, 1880.
[2] *Journ. Anat. et Phys.*, tom. xvii. pp. 402–418, 2 pls., 1881.