

assume from the similar character of the petasma in the male *Lucifer*, and in the Penæidæ, that the means adapted for impregnating the female in *Lucifer* is also that in the Penæidæ. It has been long known, but only of late years demonstrated by Dr. Semper, and more recently by Professor Brooks, that spermatophores are developed by the male (Pl. LXXX. figs. 1, 2; Pl. LXXXI. figs. 3, 4), and at certain periods when required are liberated; that these are taken up and held until required, probably only for a limited period, and then projected and retained inserted in the female until the ova are impregnated, as shown on Pl. LXXXI. fig. 1♀ and 2♀. Since the petasma exists in all those Macrura which are known to impregnate the females by means of spermatophores, it is fair to assume that this organ, which shows a remarkable correlation of parts in relation to a special function, fulfils the office in a manner nearly as suggested.

In the males of many genera, and in the females of most of the Macrura that belong to the Phyllobranchiata, there is commonly present, on the inner margin of the inner branch, a long, blunt, style-like appendage, that I have named stylamblys, the apex of which, instead of being sharp, is crowned with numerous small hooks with enlarged points, which have been termed cincinnuli. The hooks are similar to those attached to the inner margin of the petasma on each side.

*The Second Pleopoda.*—The second pair of pleopoda is generally a modification of the type of the first, in the direction of those that are posterior to it. The branches are more normal in form, but the outer carries a stylamblys that is furnished with numerous small hooks or cincinnuli. In some genera, as *Sicyonia*, the inner branch is developed into an imperfect petasma (Pl. XLIII. fig. 2*q*). In *Penæus serratus* the inner branch, instead of being a broad and thin membranous plate, is long and narrow, somewhat like the outer one, and is furnished at the base with two globular organs (Pl. XXXVII. fig. 1*q*).

In *Callianassa* and its near ally *Cheramus* (Pl. I. fig. 2*q*) the first pair of pleopoda is generally absent, or reduced to a rudimentary condition; the second and third are long and slender, the inner ramus being cylindrical and biarticulate, while the outer is long and slender, and also biarticulate, the first joint being extremely long, and the distal one extremely minute; but this condition belongs more to the female than to the male, in which they are smaller and more simple (Pl. VIII. figs. *q*♀ and *q*♂; Pl. XIX. figs. *q*♀ and *q*♂). These distinctions are common throughout the Synaxidea, as well as in many of the aberrant genera.

In the Phyllobranchiata, the inner exists as a submembranous branch, somewhat like that of the Dendrobranchiata, but it differs in the two sexes, being a little broader in the males, and having the margins free from cilia. It varies in different genera or sometimes even in different species of the same genus, as may be seen in *Nemato-carcinus*, in which it may be compared with the same organ as seen in *Oplophorus*.