

decrease from the base to the apex ; but for about one-half the distance there appears to be a stronger and more important fibrous arrangement than there is within the remainder ; and, coinciding with this variation in internal structure, there is an alteration in the direction of the small stiff cilia that run spirally round the surface externally—those towards the base being directed backwards, those towards the extremity being directed forwards and spirally reversed. This appendage, from its extent and position in the branchial chamber, evidently plays an important function in the branchial system, situated as it is at the anterior opening, and has probably the control over the circulation of the water within the branchial chamber.

The third pair of siagnopoda has not even the rudiment of any mastigobranchial plate. In this it differs from most of the higher Crustacea. Its position is so forced in and compressed that there appears to be scarcely room for the requirements of such an addition, and is absent accordingly.

The mastigobranchia of the first pair of gnathopoda is short, bifid, almost rudimentary, furnished with long rigid hairs at the extremity, and carrying at its base a short podobranchial plume. This plume consists of long trichobranchiate filaments, until they approach the extremity, when they assume a phyllobranchiate character, the petals of which are arranged in a position longitudinal to the axis of the plume. Above, on the membranous articulation, are two arthrobranchiæ. The anterior is trichobranchiate, with the exception of two other phyllobranchiate petals that terminate the plume. This plume is also short, being scarcely as long as the podobranchia. The posterior arthrobranchia is very long and entirely phyllobranchiate, with the exception of a few filaments of an intermediate character at the base. These latter, as they approximate the phyllobranchiate petals, increase their diameter at the base, and become flattened, and so gradually pass from one form into the other. The petals are arranged longitudinally, with the longer axis of the plume on each side of the median line—the longer on the anterior and the shorter on the posterior margin, the longest being the terminal petals, each of which is traversed by a set of channels, without definite walls, that assume an arborescent appearance.

The mastigobranchia attached to the second pair of gnathopoda is short, although a little longer than that of the first pair. It is slightly curved, rigid, furred with numerous short hairs along the lower margin, and subapically tipped with long, straight hairs (which have been accidentally omitted by the lithographer). It supports at its base a long and well-developed podobranchial plume, consisting of a series of phyllobranchiate petals traversing the whole length of the under margin of the longitudinal axis of the plume ; while a series of trichobranchiate filaments are attached to the base. On the coxa, near the branchial articulation, are two fasciculi, or bundles of straight hairs. There are two arthrobranchiæ attached to the membranous articulation ; the anterior is rather shorter than the posterior. Both have a mass of trichobranchiate filaments attached to the base of a long plume of phyllobranchiate petals of considerable number and size. In the