The trichobranchiæ exist as bundles, or fasciculi, and are situated at the base of nearly all the branchial plumes, whereas the phyllobranchial plates traverse the stem from the base to the apex, not compressing each other laterally, but implanted with their broad axis in the longitudinal direction of the stem. In some instances the plates slightly overlap one another, but generally they are fixed end to end.

The trichobranchiate filaments are at the base, just within the margin of the carapace, and exist as a peculiar branchial arrangement corresponding with the lower margin of the branchial chamber, increasing in size and number at the anterior and posterior extremities.

The phyllobranchiate plumes lie farther within the branchial chamber, and compared with the area, appear to occupy but a small portion of the space.

Thus we see that the trichobranchiate bundles are arranged mostly where the water plays most actively and freely, that is, along the margin and at the afferent and efferent passages of the branchial chamber, while the phyllobranchiate plumes lie where the water within the chamber is less likely to be disturbed.

I think there can be little doubt that the phyllobranchial plates and the trichobranchial filaments are derived from one and the same origin, as we see at the base that the one gradually passes into the other. In *Cheramus* this also appears to be the case, though the close compression of the one against the other is probably an inducing cause; but probably there are also other conditions brought into play. The foliaceous petals are not implanted one against the other, but are exposed freely in the chamber. Examination of these plates shows that within the several petals the structure is traversed by canals that assume an arborescent appearance, through which the fluid circulates and is brought by the tenuity of the apparatus into closer contact with the aerating agents than it otherwise would be.

In a respiratory chamber, such as in the genus now before us, the water flows in by the posterior extremity, for which purpose the carapace can be raised or depressed at will within certain limits; and as we may assume that in a large chamber such as the present, the water flows along the lower margin, passing out at the anterior end only, it is probable that the largest amount of current will correspond with that portion of the chamber where the trichobranchiate filaments are best developed and most abundant, whereas the phyllobranchial plates are present in the centre and deeper recesses of the chamber, where the circulation will be more quiescent, and the power of oxygenation less efficient.

We do not know much of the habits of this animal, but many of the group are burrowers in the deposits beneath the seas in which they live, hence it is more than probable, from the matted condition in which I found the fur that covers many parts of the animal, that it inhabits hollow passages in the mud, and that the circulation of the