146. On the Branchial Organs of the Sergestidae.

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Spence Bate\(^1\) described in the Challenger Report that the branchial organs of the genus *Sergestes* consist of a single row of branchial plumes, which in accordance with his nomenclature, are all pleurobranchiae. Ortman\(^2\) and Kemp\(^3\) considered likewise the branchial plumes, found in the genus *Acetes*, as the pleurobranchiae. So that at present the arthrobranchiae, which are very well developed in the Penaeidae, are generally believed to be entirely wanting in the Sergestidae, except in the genus *Petalidium*. This is very remarkable, as the pleurobranchiae are generally more or less subordinate in development in the Penaeidae and in other families of the Macrura, being situated at the margin of the pleural muscular chambers. Moreover these branchiae are never found more than one in a somite in the Penaeidae. According to Bate and others, however, two pleurobranchiae are found in the penultimate somite or in the penultimate and antepenultimate somites in some species of *Sergestes*.

Carefully examining the position of the branchial organs in the Sergestidae, I found that the principal branchiae of the family, in *Sergestes* as well as in *Acetes*, are attached nearly to the middle of the membrane which covers the external side of the pleural muscular chamber of each somite. Therefore these branchiae ought to be called arthrobranchiae, and thus we see that the arthrobranchiae are also well developed in the Sergestidae, as in the Penaeidae. The other row of branchial organs in the form of plumes or foliaceous plates is situated a little above the level of the arthrobranchiae. These secondary branchial organs are found in the interstitial groove between somites. Therefore they should be taken as the pleurobranchiae.

In *Sergestes* and *Acetes* an arthrobranchiate plume is found in each of the somites, between the somite of the third maxillipede and that of the penultimate pereiopod. The plume is largest in the middle of the series, generally in the somite of the second pereiopod, and it diminishes gradually in size anteriorly and posteriorly. The plume is attached to the outer membrane of the pleural muscular chamber generally with

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1) Bate - Challenger Report on Crustacea Macrura. 1888.
its lower half in posterior somites, and with its entire length in anterior somites.

The development of the pleurobranchiae varies greatly in different species of the genus *Sergestes*. A pleurobranchiate plume, however, is always found in the somite of the last pereiopod, though previous authors considered it entirely destitute of the branchial organ. The penultimate somite is sometimes found to be furnished with a plume. From the antepenultimate somite we find no pleurobranchiate plume, but in many species there is a foliaceous appendage, instead of the branchial plume in each of these somites. In the genus *Acetes* the pleurobranchiae are never developed.

About the branchial organs of the genus *Petalidium foliaceum* Bate\(^1\) described as follows; — "There is but one plume to each of the five anterior somites of the pereion, the posterior two somites having none; between some of the somites is a large foliaceous plate." The plume is arthrobranchiate, and the foliaceous plate pleurobranchiate. It is rather remarkable that a rudimentary arthrobranchia is found in the somite of the second maxillipede.

A small podobranchia is found at the basal joint of the second maxillipede in the Sergestidae, as in the case of the Penaeidae. The mastigobranchiae are not developed in the Sergestidae, but it is found as a small foliaceous plate at the upper posterior side of the podobranchia in the second maxillipede.

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1) Bate—loc. cit.