

is the curious apparatus spoken of in this Report as the coupling-spines.<sup>1</sup> Among the Gammarina occasionally these spines are numerous; among the Hyperina there are rarely, normally perhaps never, more than two to each peduncle. In both groups they are clearly spines that have been modified to serve one and the same purpose, namely, to hold the peduncles together for the swimming-stroke. For this purpose the apex of each spine is blunted and has backward directed teeth, the edges also often having a retroverted serrature, so that the spines of each pair of peduncles can be interlocked. That both groups, notwithstanding their otherwise extremely divergent forms, should so universally possess these coupling-spines, is surely a note of common ancestry. It is also easy to see that two quite simple spines in this position might be of some service for the object in view by the effect of mere friction, while natural selection would be ready to avail itself of any variation in the direction of the roughening of the spine, until the strongly serrate edges and dentate apices had been at length evolved. In the branches of the pleopods we find another note of community of origin for the two groups above mentioned. Besides the obvious similarity which these branches display in almost all the genera and species, they have in common the less easily noticed feature of carrying one or more cleft spines<sup>2</sup> on the inner margin of the first joint of the inner branch. To this there are only rare exceptions, and those, perhaps, not difficult to explain. Throughout the Hyperina it appears that the joint in question never has more than one such spine, while in the Gammarina the number varies. The object served by these spines is no doubt similar to that of the coupling-spines. One arm of the cleft apex has a subterminal expansion, and the other arm is internally roughened or serrulate. By these contrivances a pair of the spines lying crosswise helps to keep together the branches of the pair of pleopods, and so to add force to the swimming-stroke. But these spines with cleft terminations have plumose shafts, and are evidently plumose setæ modified for a special purpose. Indeed, in some species, in which the pairs of cleft spines are numerous, some of them show a gradational form combining the flexibility of the seta with the cleft termination of the spine.

Another example of gradational forms is exhibited by the maxillipeds of the Gammarina. The outer plates of these organs are commonly fringed with an apparatus, parts of which may be distinguished as respectively, teeth, spines, and setæ, yet the teeth pass into spines, and the spines into setæ by gradations so minute, that the practical difficulty arises in description of determining how many of these little appendages ought to be grouped under one name, and how many under another, yet no one would dream of interchanging the names of the two extremes of the series, the tooth and the seta.

In classifying the families of the Amphipoda within the principal divisions, not a few difficulties are encountered. We may attempt to place side by side those which in the

<sup>1</sup> Described and figured by G. O. Sars in his account of "*Gammarus neglectus*, Lilljeborg," Hist. Nat. Crust. d'eau douce de Norv., p. 53, pl. v. fig. 8, "épines particulières," and indicated by S. I. Smith in his figure of *Cerapus tubularis*, Say, Trans. Connect. Acad., vol. iv. pl. ii. a, fig. 5, but not, I think, alluded to by any other writers.

<sup>2</sup> "Soie particulière à bout bifurqué," Sars, loc. cit., fig. 8.