

become obliterated, so that an obvious cellular structure becomes obscured, or entirely effaced.

The muscular fibrillæ of the ectoderm are in most cases well developed. Where they exist in the trophosome they always run longitudinally, and form a continuous fibrillated layer in contact with the external surface of the mesosarc. This ectodermal musculature is well developed in the body and tentacles of the hydranth. In those genera in which the body of the hydranth is much elongated so as to assume the form of a naked stem (*Hydractinia*, *Clava*, *Clavatella*, *Gemmelaria*, *Myriothela*), this part of the animal manifests a high degree of contractility, and the fibrillated tissue is here always especially well developed. In the cœnosarc of *Tubularia* in which this part is closely invested by the perisarc no fibrillæ can be detected, while in the allied genus *Corymorpha*, whose stem is not as in *Tubularia* enclosed in a thick perisarc tube, the fibrillated tissue may be traced through the whole length of the stem. It is worthy of remark that though no fibrillæ can be detected in the cœnosarc of the adult *Tubularia* these are present on the whole body of the Actinula or larval stage of this genus. The fibrillated tissue, however, is not necessarily absent from such cœnosarcs as are enclosed in a firm perisarc. In *Plumularia echinulata* of Weismann this observer has detected and described the fibrillæ of the cœnosarc.

The tentacles of the hydranth in the various genera have an especially well developed system of ectodermal fibrillæ. In the tentacles of *Tubularia indivisa* the fibrillæ of the ectoderm may be seen to be true muscle-cells, being greatly elongated fusiform cells, each with a nucleolated nucleus.<sup>1</sup> A similar structure has been shown by Weismann<sup>2</sup> in the fibrillated tissue of the cœnosarc of *Plumularia*. In *Myriothela*, however, the fibrillæ would appear to be on a higher grade of development, for here they do not present the condition of nucleated fusiform cells. In this remarkable genus the fibrillæ have a uniform thickness throughout, showing no tendency to thin away into the terminal points of fusiform cells, and are without any visible nucleus.<sup>3</sup>

The ectodermal fibrillæ in the body of *Hydra* were examined by Kleinenberg<sup>4</sup> and shown by him to be in direct continuation with certain tail-like processes which are given off from the deep side of the most superficial cells of the ectoderm in this genus. Kleinenberg, believing that in this relation we have a low stage of development of a combined muscular and nervous system, designates the whole cell with its caudate process and fibrilliform continuation by the name of "neuro-muscle-cell." This capital discovery of the caudate processes of the ectoderm cells in *Hydra*, and their connection with the muscular fibrillæ, has been amply confirmed by subsequent observers and extended to many genera besides *Hydra*, so that it must now be accepted as representing

<sup>1</sup> *Gymnoblasic Hydroids*, p. 206, pl. xxiii. fig. 6.

<sup>2</sup> August Weismann, *Die Entstehung der Sexualzellen bei den Hydromedusen*, Jena, 1883.

<sup>3</sup> Allman, *On the structure and development of Myriothela*, *Phil. Trans.*, vol. clxv. part ii.

<sup>4</sup> Nicolaus Kleinenberg, *Hydra, eine anatomisch-entwicklungsgeschichtliche Untersuchung*, Leipzig, 1872.