the general structure of the ectoderm in the Hydroida. If, however, Jickeli be correct in assigning a nervous function to certain cells which he finds generally distributed in the ectoderm of the Hydroida, and which he regards as ganglion cells (see below, p. xvii), then the physiological significance which Kleinenberg attributes to his neuro-muscle-cells must be somewhat modified.

While in the Hydroid trophosome the muscular fibrillæ of the ectoderm are thus always longitudinal it is different with the Medusæ. Here a circular musculature is largely and characteristically developed in the ectoderm of the sub-umbrella or concave side of the walls of the bell-cavity, while the velum is itself mainly an offset of the ectoderm in which circularly directed fibrillæ constitute the chief part of its substance. While the muscular fibrillæ of the trophosome, whether in the ectoderm or in the endoderm, show no trace of striæ, the fibrillæ which run in a circular direction in the umbrella of the Medusa are transversely striated.

The ectoderm in most Hydroids is separated from the surrounding perisarcal tube by a wider or narrower space. Across this space, whether it be in the stems or in the gonangia, numerous narrow processes are sent off from the outer surface of the ectoderm to become attached by their ends to the inner surface of the perisarc. In these processes no distinct cell boundaries can be detected, and the same is very frequently the case in the ectoderm from which they proceed. In the living animal a most interesting protoplasmic movement may be seen in them, the processes constantly changing their form, frequently throwing out branches like the pseudopodia of certain Rhizopods, and extending and withdrawing themselves across the intervening space. When they reach the perisarc their ends flatten themselves out on it and emit radiating filaments of protoplasm. From these flattened ends the rest of the process frequently breaks away, leaving the extremity with radiating protoplasmic filaments attached to the walls where they have exactly the appearance of typical stellate cells (Pl. XXV. figs. 1*a*, 2*b*).

Among the Hydroids of the present Report are species (Pls. XXVII. fig. 1*a*; Pl. XXXIII. fig. 2*a*) in which similar ectoderm bands are seen stretching from the body of the hydranth to the walls of the hydrotheca, a condition which I have also observed in some British Sertularians. In the Challenger species in which those bands occur the hydranth would seem to be incapable of complete retraction.

Reichert[1] was the first to call attention to the emission of pseudopodia-like filaments by the ectoderm, and was led by it into the erroneous belief that the Hydroid cœnosarc consists of an undifferentiated protoplasm,—a view which, not obtaining the acceptance of any zoologist who had studied the structure of these animals, resulted in his very interesting and significant observation of protoplasmic movements in the cœnosarcal processes remaining long unrecognised.

Hamann[2] has shown that a similar emission of pseudopodial filaments takes place

[1] Carl B. Reichert, Über die contractile Substanz und ihre Bewegungs-Erscheinungen, Berlin, 1867.

[2] O. Hamann, *loc. cit.*