

from a depth of nearly four miles in the North Pacific, the place of the mesosarc appears to be taken by a very remarkable layer, whose most striking character is its extraordinary elasticity (see p. 7). It is comparatively thick, and has a distinctly fibrous structure, the fibres running in a circular direction, and being themselves resolvable into finer fibrillæ (Pl. III. figs. 4, 6). Nothing, however, approaching to a true organisation can be detected in this layer, and we shall be probably justified in regarding not only the mesosarc as it elsewhere occurs, but this remarkable modification of it, as an excreted product of the endoderm, as the perisarc is of the ectoderm.

The clear gelatinous substance which forms the principal part of the umbrella in the Medusa must be regarded as representing the mesosarc. In the Hydromedusæ it takes the place of that portion of the mesosarc which lies on the dorsal or exumbrellar side of the radial canals and "endoderm lamella"; while on the ventral or subumbrellar side the mesosarc retains its character as a thin elastic membrane which lies just within the subumbrellar ectoderm and supports the muscular swimming plate. In such Medusæ as are developed directly from the egg, it can be seen to be deposited as an excretion between the ectoderm and the endoderm of the larva, where it holds exactly the place of the mesosarc. (See below, p. xxxvii).

#### 4. *The Perisarc.*

The perisarc affords some of the most obvious diagnostic characters of the Hydroida, and being frequently the only part preserved in dead specimens becomes of much practical value in the identification of species, and even of higher groups.

Except in the case of the Hydractininae and Hydrocorallia it is the most external of all the layers which enter into the formation of the Hydroid body. Like the mesosarc it shows no trace of organised structure; and like that membrane it must be regarded as a simple product of excretion.<sup>1</sup> It is, however, in almost every case much more massive than the mesosarc and often attains a very considerable thickness, showing by its laminated structure indications of its formation by successive deposits from within. As the mesosarc would seem to be an excretion from the outer surface of the endoderm, the perisarc must be regarded as an excretion from the corresponding part of the ectoderm. It shows a remarkable resistance to the action of chemical reagents, which with the exception of the strong acids are usually without any effect on it. In this character as well as in its chemical composition it would seem to be closely allied to chitin, if it be not identical with this substance which forms the principal constituent of the external skeleton of insects and other Arthropoda.

With the exception of *Hydra*, and possibly some doubtful forms (*Nemopsis*, *Acaulis*), there are no Hydroid trophosomes in which the perisarc is not to some extent represented,

<sup>1</sup> Jickeli believes that in some cases (*Tubularia mesembryanthemum*) he has found it to be formed by an induration of the ectoderm.