A thin ectosome, or dermal membrane, is usually associated with a reticulate dermal skeleton, as in *Pachychalina lobata* (*vide* Pl. XLVI. fig. 4); or it may simply be supported on the ends of brushes of spicules, as already described when speaking of the skeleton. It may perhaps be studied to the best advantage in the Homorrhaphidæ, but is also well illustrated in the Axinellidæ. Thus in *Phakellia ventilabrum*, var. *connexiva* (*vide* Pl. XLIX. fig. 3), it is everywhere a thin membrane, perforated on the one surface of the sponge by the pores and on the other by the oscula, and in this case there is no dermal skeleton at all.

The mesodermal constituents of a thick ectosome are, as we have already indicated, very various in nature. We have found it a very difficult matter to classify them, but have finally decided to distinguish between *stellate*, *amœboid*, *fibrous*, *vesicular* and *glandular?* These elements may be present in various combinations.

It is probable that stellate and amœboid cells are present in greater or less quantities in every ectosome, just as they are normally present in the ground tissue of the choanosome between the flagellated chambers. When they are largely developed but unaccompanied by any fibrous tissue, or with only a small proportion of it, they give rise to a thick, gelatinous ectosome, such as we have found in *Spirastrella massa*, nobis, *Axinella* (?)*paradoxa*, nobis, and in the genus *Esperella* (*Esperella gelatinosa*, Ridley, *Esperella murrayi*, nobis, and *Esperella lapidiformis*, nobis); in such cases there is, at any rate very often, a thin outer layer separable from the remainder of the ectosome as a dermal membrane.

As an example of a thick gelatinous ectosome we may take for more detailed description that of *Esperella murrayi*. In this sponge the ectosome varies much in thickness in different places, interdigitating in an irregular manner with the choanosome (Pl. XLVIII. fig. 2), a condition which appears to be rather characteristic of the genus, and strongly contrasting with the sharp distinction between ectosome and choanosome in most of those cases where the former forms a true cortex (*Suberites caminatus*, nobis, *Stylocordyla stipitata*, var. *globosa*, &c.). Immediately beneath the epidermis, which consists of the usual flattened epithelial cells, there is a thin, fibrous layer, usually about 0·01 mm. thick, resting upon a strongly developed, reticulate dermal skeleton. Below the dermal skeleton comes another thin, fibrous layer, resembling that just mentioned, and the soft tissues between the two, in which the dermal skeleton is embedded, are also more or less fibrous. Down to the bottom of the lower fibrous layer may be considered as "dermal membrane," between the ends of the primary fibres it is about 0·14 mm. thick.

The dermal membrane covering over the subdermal cavities (*vide infra*), is, however, excessively thin, and contains no dermal skeleton; it is perforated by the pores (Pl. XLVIII. fig. 2*b*), and in these areas the fibrous tissue is concentrated in special bands running from side to side between the pores (Pl. XIII. fig. 16, *b*; Pl. XLVIII. fig. 2*b*, *f*). These fibrous bands are composed of densely packed, very much elongated cells, with rather faintly discernible nuclei scattered here and there. They do not run straight from side to