

the outwardly projecting spicules. This arrangement prevails amongst the Axinellidæ, of which group it is very characteristic.

3. *The Ectyonine type* (Pl. XLVI. fig. 9; Pl. XLVII. figs. 4a, 5).—This agrees with the *Renierine* type, except that the surface of the fibre, instead of being smooth, is “echinated” by spicules projecting outwardly and usually more or less at right angles. The central axis of longitudinally placed spicules is generally present, but may, in a few instances, disappear, leaving only the horny fibre and the “echinating” spicules (*e.g.*, in *Clathria lendenfeldi*, Pl. XLVII. fig. 5). The echinating spicules are generally different from those in the centre of the fibre, but may, though very rarely, be the same (*e.g.*, *Echinoclathria favus*). Such fibre is characteristic of the subfamily Ectyoninæ, and is apparently confined to this group.

These three principal types of fibre all occur in the Halichondrina. In all three the amount of spongin present is extremely variable. In the Clavulina on the other hand, where, it will be remembered, there is no spongin present, we are acquainted only with the *Renierine* type of arrangement; the fibres, when distinct fibres are present, being composed of longitudinally placed spicules lying parallel with one another.

In all Monaxonid sponges there are usually a great number of megasclera scattered irregularly through the tissues, in addition to those which enter into the composition of the fibre.

## (2) *The Arrangement of the Skeleton at large.*

In this case we have only two main types of arrangement to deal with. First, *Reticulate*, and second, *Radiate*.

1. The *Reticulate* arrangement, characteristic of nearly all the Halichondrina. In cases where this arrangement obtains the spicules may either be arranged (at any rate partly) in distinct fibres, or scattered separately through the soft tissues without any arrangement whatever (as in *Halichondria solida*, nobis). The fibres, when present, may belong to any of the three types above described. The essential character of a reticulate skeleton is that the fibres, or individual spicules in cases where no fibres exist, should cross and recross one another, so as to give rise to a network with closed meshes (Pl. XLVI. figs. 2, 3, 4, 6, 9). All gradations exist between a reticulation of separate and quite irregularly scattered spicules and a reticulate skeleton with perfectly definite rectangular meshes whose boundaries are formed of compact fibres (Pl. XLVI. figs. 3, 6).

When the skeleton is rectangularly arranged (as in *Reniera*, *Chalina*, *Esperella*, &c.), it is easy to distinguish between two sets of fibres—(1) *Primary fibres* (Pl. XLVI. fig. 3, a), running vertically towards the surface of the sponge, and (2) *Secondary fibres* (Pl. XLVI. fig. 3, b), crossing the primary fibres at right angles. When the primary fibres are composed of longitudinally arranged monactinal spicules these have, as a general rule, their apices all pointing in one direction, towards the surface of the sponge. At the