

In many instances the inner fibres of the tube, instead of forming a continuous spiral, appear in the shape of rings, succeeding one another at regular intervals, and constituting what are called *annular vessels*, (Fig. 15.) They are generally larger than the spiral vessels. In other cases, as was first observed by Hedwig, the adjacent coils are found to be closely coherent throughout the greatest part of their course; leaving, however, occasional intervals, where the external membrane, being unprotected, appears from its transparency, as if spotted or perforated in various places (Fig. 16.) Every intermediate stage may occasionally be seen in the transition from one of these forms to the other, in consequence of the various kinds of convolution, of branchings, or of transverse junctions of fibres, as well as the greater or less extent of their lateral adhesions. All these varieties are met with, not only in different vessels, but, as was observed by Moldenhawer and Kieser, even in the different portions of the same vessel, when followed by the eye throughout a great extent of its length. Thus, in the course of the same tube, (as seen in Fig. 17,) we find parts exhibiting spiral fibres, which in other parts, bifurcate and again unite; and in others, again, form rings: these may afterwards, by a closer junction, present a reticulated appearance, or a series of transverse lines, which, becoming smaller and smaller, are at length mere points, arranged in circular rows around the cylindrical surface of the vessel.*

What are called the *woody fibres* originate, like all other parts of plants, in cells. These are generally fusiform, that is, of the shape of a double cone, very greatly elongated, and placed close and parallel to one another, with the narrow extremities of one set wedged in between those of another set (Fig. 18.) Their coats are more firm and elastic than those of ordinary vessels, but do not appear to contain any internal fibres, although they receive, in the progress of

* Many distinguished botanists, such as Rudolphi, Link, Treviranus, and Dutrochet, consider these spots as being produced not by the deficiency of the internal coating, but by the addition of granular bodies. See De Candoille's *Organographie Végétale*, tom. 1, p. 56.