

as has been inferred from seeing many of them grow vigorously which were entirely hollow, then it would seem, that, on a total stop being put to that channel of circulation, death would ensue as certainly, and almost as suddenly as by cutting the arteries of an animal.

Yet it has been observed, that early in the spring, before any thing like a leaf has been put forth, the vine particularly, and some forest trees, the sugar maple, &c. on a transverse incision being made into their wood pour forth a quantity of sap, which is always seen to proceed from the wood, and not from any layer near the bark; which shews that the vascular tissue of the stem, by some supposed to be mere dead wood, contributes largely, if not altogether, to supplying the plant with that portion of its nutriment which it certainly does, and must in a very great degree derive from the earth. And it is not uncommon to see forest trees, which in the winter or summer had been belted by a chop made all round into the wood of the trunk, near the ground, put out their usual amount of foliage in the following spring and sustain themselves during the year; which proves that there is a flow of sap through the wood of the trunk which contributes largely to the support of the vitality of the plant. In corroboration of this, it has been also observed, that besides the ordinary longitudinal vessels, there is what is called the *silver grain*, or medullary rays, consisting of numerous thin plates radiating from the pith to the circumference, intersecting the concentrical layers, and visible in almost all kinds of wood; in the oak every tube is touched by them at short distances, and slightly diverted from its course. These plates, it is supposed, perform some important functions in the circulation of the sap. (n)

(n) Ruffin on Calcarious Manures, chap. 12 and 13; Rees' Cyclo. v. Circulation of Sap and Silver Grain; Thompson's Chem. b. 4, c. 3, s. 3; Roget Anim. and Veget. Physi. pt. 1, c. 1, s. 3.

'To illustrate the theory, that vegetables extract their matter chiefly from the atmosphere, and are of course a powerful vehicle for fixing and bestowing atmospheric manure on the earth, the following fact is circumstantially related, on account of its complete application and to expose it to investigation. Some years ago, a locust tree at Colonel Larkin Smith's in the county of King and Queen, and state of Virginia, received an injury which made it necessary to cut away entirely the bark around its body for eight or ten inches, so that its bark above and below was wholly separated, without a cortical vein between. The wound was entirely covered with a close bandage of some other bark, which lapped beyond the edges of the wounded bark, above and below. And the tree was left to its fate. The plaster bark never grew to the tree, but the edges of the wounded bark, gradually approached each other under its shelter, and after several years met and united. By the time the wound was healed, the body of the tree above had become one-third larger than its