

by staying undue luxuriance, induce a state of greater fertility, or entirely bring it about in plants that have previously been barren.

Newly planted things, being deprived for a time of a large proportion of their spongelets, require a larger supply of liquid food, if it be in the growing season, that the spongelets which remain may take up a greater quantity of it, and thus make good the deprivation. It is for this reason that the early autumn is considered preferable for planting all kinds of trees and shrubs, because there is not, for a long period afterwards, any demand upon their resources, and they are all able to form new spongelets before these are required. The beginning of the spring, or just before they acquire their full power of vitality, is the next best season, as they then have all the strength of the renewed vital energy to enable them rapidly to form new spongelets.

The excretions supposed to be given off by plants through their spongelets, and which were thought to deteriorate the soil, and render it unfit for a second crop of the same kind, are now proved to have little or no existence. The cause of the deterioration of soils by particular crops, for others of a similar kind, will be found in the fact, that certain plants withdraw peculiar gases or elements from the earth, and these have again to be supplied before similar plants can be satisfactorily grown on the same soil.

IV.—PORES.

In addition to the spongelets as a means of taking up food, plants are dotted all over the leaves, stems, and even roots, with numerous minute openings, called pores, which are often smaller than pin-holes, and by which liquid food in the soil, or that which is floating in the air, is freely received. Until very recently it was believed that the nutriment of plants was obtained almost solely through the roots. But it has now been proved that they *can* exist *wholly* on atmospheric supplies, and that they draw very largely from this resource at all times. The pores, therefore, are no doubt the means through which such nourishment is appropriated. But they are also the agents by which respiration is carried on, and probably are admitted. Those on the leaf undoubtedly lead to small air-cells, and are probably similar to the nostrils of animals, or the pores in the human body, or rather to the breathing pores in the sides of insects.

These pores have usually raised lips, which vary in their external forms, and appear to shut when wetted or in the dark, but they are always open when exposed to the dry atmosphere or the sun's light. It is through their pores that plants evaporate most of their superfluous water, similar to what animals do by breathing and perspiration.

The obstruction of the pores in animal bodies is well known to be productive of cutaneous diseases, and the operation of the like cause in plants is certain to induce a sickly state of the vegetable system. Hence the accumulation of dust of any description on the leaves and stem, is highly injurious; and in the absence of rain the gardener finds it necessary to apply artificial watering to out-of-door plants; while those grow-

ing in rooms or conservatories, exposed to dust, require a frequent and careful watering or sponging of the leaves, in order to keep them in a growing and healthy condition.

V.—SAP AND PULP.

The liquid matters imbibed by the spongelets and pores of plants, and transmitted through their system, acquire, as soon as appropriated, the name of sap; and after the two-thirds of the more watery constituents of this have been thrown off by evaporation, the remaining third, which is like the blood of animals, will be consolidated into a thicker consistence, termed pulp. The sap of plants, then, is the food which they have taken into their system in its crude state. Being diffused through their stems, and elaborated in the leaves, and the mere water discharged through the pores, it becomes pulp. This last, being the vital part and substance of plants, determines, by its abundance or deficiency, their healthiness or strength. If too little solid matter is taken up by the sap, (as will be the case in poor soils,) the plants will be weakly and yellowish; or, if the amount of light and air supplied to the plants, be insufficient to separate the watery from the substantial parts of the sap, and to bring it to its proper consistency, the shoots will become feeble, drawn, wanting in color, and the leaves pale and tender.

Pulp is chiefly composed of the carbon, or charcoal taken up by the sap, and is itself of a dark blue color; but the transparent tissue of the leaf in which it is enclosed, being more or less yellow, the combination of the two colors forms green, as blue paint mixed with yellow produces green. This will account for the yellow color of leaves when the pulp is deficient.

TO MAKE YOUNG PEAR TREES BEAR.—I was afflicted by the sight in my garden for four or five years, of the most luxuriant and thrifty young pear trees, which would not bear, but all their strength ran to wood. Vexed at this, I resolved to try the effect of bending down the branches so as to check the flow of sap and cause them to form fruit buds instead of wood buds. Accordingly, the first week of December, 1847, I filled my pockets with stout twine; I drove down some small pegs into the ground underneath my trees, [which had branched low, so as to make dwarfish heads;] I then tied a string to the end of every long shoot, and gradually bringing down the end of the limb till it curved down so as to make a considerable bend or bow, I fastened it in that position either by tying the other end of the string to the peg, or to another branch or a part of the trunk.

According to my expectation, the tree next year changed its habit of growth, and set an abundance of fruit buds. Since that, I have plentiful crops of fruit without trouble—take good care not to let many branches go on the upright system.—*Horticulturist*.

TAPIOCA.—A milk-white substance is deposited by the juice of the mandioca root, which being collected, and hardened by exposure to the sun, constitutes the article so well known as tapioca, from which wholesome and delicious puddings are made. So very poisonous is the root in its natural state, that it has been found to occasion death in a few minutes when administered experimentally to animals, and it is said that the natives used it with great effect many