

in cramming a quart of water into a pint cup; perhaps, in order to accommodate the sap, the roots are supposed to be as large and capacious as the trunk and head of the tree; in short, that there is as much tree underground as above. Whence the idea sprang into existence that the sap retires to the roots on the approach of winter, it is not now possible to say, but its very general popular acceptance is an evidence of the way in which false views gain currency because some one ventures to make the assertion, and the public mind stops not even to weigh the probabilities, much less to investigate the ground upon which it rests. Surely the time has come when we should cease to accept assertions upon trust, and demand the facts on which they are based. Having these, we can consider the theory, and if it does not suit us we can make one for ourselves.

Now, in this matter of the sap, by which we mean all the fluids which are contained in the interior of a tree, the facts are these: if the trunk be cut in spring, the sap will run out; in summer, autumn, and winter it will not, except under exceptional circumstances. But nevertheless the sap is in motion in the summer and autumn, and winter too; nay, save when extreme cold may for a time interfere with its flow, it is always in motion; and the reason why it runs out of the trunk in the spring is because it is then present in much greater abundance than at any other season of the year. During the summer, when the tree is covered with foliage, the leaves are evaporating large quantities of the fluid parts of the tree into the air, while another portion is being elaborated and converted into the tissues and structure of the tree, producing what we call growth. When the autumn has come, what with the evaporation and solidification that has taken place, the interior of the tree has become comparatively dry, so that the quantity of sap has become so greatly diminished that it no longer exudes when an incision is made. Our readers are, at least many of them, aware that if a branch be cut off from a grape vine in spring when the buds are starting, the sap will run out quite freely, producing what is called bleeding; but if the same branch were allowed to remain until the leaves on the vine have become fully expanded, then if it be cut off no bleeding will take place. The reason is, that the evaporation which is taking place in the leaves has exhausted the supply of sap to such an extent that there is no surplus in the vine to escape in that way.