The leaves being the principal organs of assimilation and perspiration, it follows that when they have fallen off there is no longer much loss of fluid to the tree from these causes. But the power of the roots to absorb moisture from the earth is not diminished by the loss of the leaves; they continue to draw fluid from the earth, and to send it up into the tree. This action continues, except as modified by extreme cold, all winter; the fluids are drawn from the soil by the roots and sent into the tree, and by the time that spring has come the tree is full of fluids and every vessel distended with sap. During the winter we are not able to find sap by cutting the tree, because the process of filling with fluid is gradual.

M. Biot, many years ago, made some very interesting experiments on the flow of sap, and made a contrivance by which the rate of motion could be measured at any season, and showed that there was considerable activity even in winter. He found that the direction in which the sap moved was very considerably affected by frost. When the weather was mild the sap was always ascending; but when it was freezing weather the sap flowed down. This he attributed to the contraction of the sap-vessels by the cold, which forced the sap into the larger vessels which were unaffected by the frost under ground. When, however, the frost was sufficiently severe and continued to reach the roots, then the sap was forced back into the trunk; but when it came on to thaw and the frost left the ground, the sap returned to the roots. Thus we see that, as a rule, the sap is always ascending, and that when it descends it is because it is forced to do so by some temporary cause, and when that cause ceases to act the sap immediately begins to ascend again.

In connection with the supposed ascent of the sap in spring, and growing out of it, is the popular idea that this ascent of the sap is the cause of the expansion of the buds and leaves. It would be nearer the truth to say that the expansion of the buds and leaves was the cause of the motion of the sap. Any of our readers can make the following experiment for themselves, and see the true state of the case. If a tree be cut into or tapped in some of the upright branches near the top very early in the spring, and be again tapped just below the branches on the trunk, and again just above the surface of the ground, it will be found that the sap will flow from the wound that is nearest to the top first, from the one just below the branches next, and last of