

The leaves fall simply because the tree cuts them off. They have done their work and are no longer needed. The tree does not eat during its winter sleep and therefore does not need the food that the leaves manufacture, and though it always has to breathe, it can breathe through its roots and bark, just as animals can breathe through their skins. So it casts aside its useless leaves as a woman discards her summer gowns, cutting them off silently and without observation, but as surely and smoothly as they could be cut with a sharp knife.

Besides being useless the leaves would also be dangerous if left on during the winter, as they would catch the snow and wind and thus cause the breaking of twigs and branches. Sometimes an early snow finds the trees unprepared, and then they are sure to suffer severely. The snow collects on the leaves and the weight breaks off great branches as thick as one's arm. This would happen every year if the trees had not learned to take off their summer clothes in good time.

The cutting-off process begins when summer is at its height. As early as the dog days the trees begin to grow some cork cells between the leaf stem and the twig. This is to prevent an open wound when the leaf falls, for a tree can be wounded just like an animal. Then above the cork cells they grow a layer of another kind of cells. This is called the layer of separation or cutting-off layer, and can easily be seen on the blackberry, for instance, where it forms a yellowish green ring on the purple leaf stalk. There are three rows of cells in this cutting-off layer, and after a while the middle one dissolves into a kind of mucilage, so that nothing is left to hold the leaf to the twig except some woody threads which pass through the cutting-off layer and the layer of cork. Then the cells that are left begin to swell and push the leaf stem from the twig, until at last a puff of wind or a frosty night snaps the threads and the leaf falls to the ground.

The reason frosty nights help is because they freeze the water in the cutting-off layer. The resulting expansion causes the threads that still hold the leaf to the twig to break and as soon as the ice melts in the morning it falls. After frosty nights in the late fall, therefore, there is apt to be a great fall of leaves. That is why people think that the frost makes them fall. But if the