

### WHY THE LEAVES CHANGE THEIR COLOR.

The change in the color of leaves in autumn is not, as many people suppose, due to the action of frost, but is a preparation for winter. All during the spring and summer the leaves have served as factories, where the foods necessary for the trees' growth have been manufactured. This food making takes place in numberless tiny cells of the leaf and is carried on by small green bodies which give the leaf its color. These chlorophyll bodies, as they are known, make the food of the tree by combining carbon taken from the carbonic acid gas of the air with hydrogen, oxygen, and various minerals supplied by the water which the roots gather. In the fall when the cool weather causes a slowing down of the vital processes, the work of the leaves comes to an end. The machinery of the leaf factory is dismantled, so to speak, the chlorophyll is broken up into the various substances of which it is composed, and whatever food there is on hand is sent to the body of the tree to be stored up for use in the spring. All that remains in the cell cavities of the leaf is a watery substance in which a few oil globules and crystals, and a small number of yellow, strongly refractive bodies can be seen. These give the leaves the yellow coloring so familiar in autumnal foliage.

It often happens, however, that there is more sugar in the leaf than can be readily transferred back to the tree. When this is the case the chemical combination with the other substances produces many-colored tints varying from the brilliant red of the dogwood to the more austere red-browns of the oak. In coniferous trees, which do not lose their foliage in the fall, the green coloring matter takes on a slightly brownish tinge, which, however, gives way to the lighter color in the spring.

While the color of the leaf is changing, other preparations are being made. At the point where the stem of the leaf is attached to the tree, a special layer of cells develops which gradually sever the tissues which support the leaf. At the same time Nature heals the cut, so that when the leaf is finally blown off by the wind or falls from its own weight, the place where it grew on the twig is marked by a scar.

Although the food which has been prepared in the cell cavities is sent back to the tree, the mineral substances with which the walls of the cells have become impregnated during the summer months are retained. Accordingly, when the leaves fall they contain relatively large amounts of valuable elements, such as nitrogen and phosphorus which were originally a part of the soil. The decomposition of the leaves results in enriching the top layers of the soil by returning these elements and by the accumulation of humus. That is why the mellow black earth from the forest floor is so fertile.—(From the Forest Service, U. S. Dep. Agric.)