

absorb water. Where are these root-hairs most numerous? Why are roots so irregular, unlike stems? How would the soil affect the regularity of a root?

Each root has a root-cap at its tip, which is constantly renewed as it is worn off by the soil, through which it forces its way. This root-cap is a very important part of the root.

Examine the roots of clover and other members of that family of plants (bean, pea, etc.) You will find small enlargements called "nodules." These nodules play a very important part in the nourishment of these plants, as they are tenanted by minute forms of plant life (bacteria), which have the power of assimilating nitrogen directly from the air, which plants and animals cannot do. Thus the plants of the clover family are rich in nitrogen, and are valuable fertilizers of the soil, as farmers have long known. A crop of clover ploughed under is the very best preparation for a crop of wheat. In Germany, these bacteria have been cultivated and prepared for sale, just as phosphates are sold as fertilizers.

One of the best nature study exercises is to have each pupil plant a dozen or more seeds of various kinds, (wheat, bean, pea, corn, melon,) and report each week or oftener upon their growth. The teacher should keep a few seeds of the same kind growing for class demonstration, to correct errors and suggest new work.

TREES THAT SHED THEIR BARK.

We are all familiar with the phenomenon of trees shedding their leaves. We know, too, that in spring they shed the scales which enclosed the buds all winter. Later they shed most of the parts of the flower, the calyx, the corolla, and the stamens. Then, usually, at the close of the season, the fruit falls. There are exceptions to nearly all these statements, but generally speaking they are true.

Most of our trees shed their bark also. This is most evident on the sycamores and birches, but it is none the less true of other trees. In winter the branches of the sycamore glisten along the river valleys, and the lateness of the leaves in spring marks these trees distinctly against the surrounding greenness. This process of shedding the bark is quite evident in the white pine, from which the bark scales in rather regular four-sided patches. The shag-bark hickory sheds its bark in strips, which gives the name to the tree, while the rough surfaces of the maple, oak, walnut, and other trees shows that the same process is going on there though less regularly. It is, in fact, a necessity of their mode of growth.

The growth of our common trees takes place in the area just under the bark, or between the bark and the wood. This area is called the cambium. It grows both inwards and outwards, forming wood on the inside and bark on the outside. As the tree increases in circumference, the bark of previous years' growth is shoved outward, but being too small to cover the increased circumference it splits more or less irregularly, and eventually scales off very quickly and completely in the sycamore, and more slowly in the maple and other trees.

Some trees, e. g., palm, and some plants, e. g., corn, lily, do not grow as above described, and in these there is no bark, although the outer layers of cells are somewhat different from the inner ones. These trees and plants have points of growth throughout the stem, and the wood is formed at these points in bundles.

In the more advanced classes the pupils should observe the relation between