A Study of Twigs and Winter Buds of the Apple Tree.

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Aim.—To interest pupils in the twigs and buds of fruit trees; to show them how to become intelligent regarding their formation and function.

Materials.—Apple twigs showing at least two years growth—one or two twigs for each pupil.

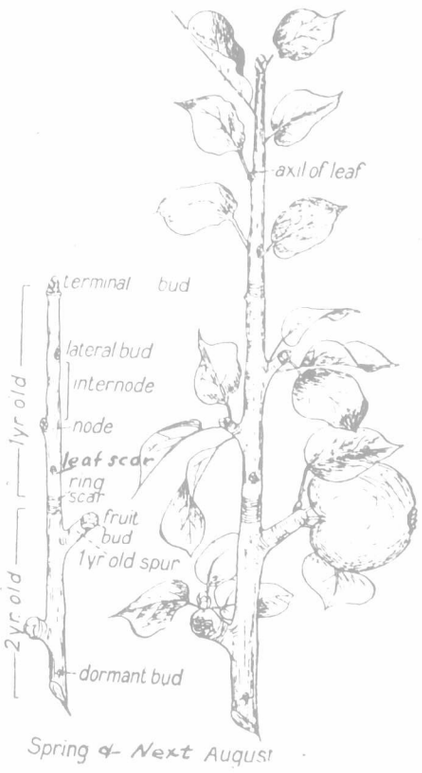
What to Teach.

I. INTRODUCTION.

The parts of an apple tree are the roots, the trunk, the branches, the twigs, and the leaves.

The leaves and blossoms come out on the twigs in the spring when the growth begins.

II. INVESTIGATION.



Spring & Next August

The terminal buds are larger than the lateral buds, and the largest buds are on the spurs of the two year-old part. These blunt spurs grow very little each year, consequently their ring scars are close together, while on the main shoot they are much farther apart.

Leaf scars are found at the base of each bud. Hence in every axil a bud was formed. The leaf starts first and as the growing season advances the bud forms in its axil. When the leaves have fallen in the autumn, the buds remain. The buds are covered with bud scales to protect the young leaves from the rain beating upon them and to prevent them from drying out. In the spring the growing leaves will push open the bud, and the scales will fall off, leaving ring scars.

The terminal buds on the spurs are larger, for these may be the beginning of five or six blossoms, and as many leaves tucked snugly together in this bud. Such buds as contain both leaves and flowers are also called mixed buds. One or two of these blossoms may develop into fruit. Apples are usually borne on spurs older than two years.

The twigs grow in a horizontal position and the largest and strongest shoot of the year is the terminal one. The next in strength is the uppermost lateral bud and the weakest shoot or spur is that one nearest the base of the twig. The dormant buds are mostly on the under side. All this indicates that those buds grew which had the most sunlight and room. Winter buds show what has been the effect of sunlight during the past growing season.

Since the lateral or side-producing buds are always located in the axil of a leaf, the twigs and branches necessarily follow the same arrangement in the trees. However many of the axillary buds fail to grow, and consequently the trees are more or less [illegible]

How to Teach it.

Name our commonest orchard tree. What are the parts of the apple tree? On which part do the leaves and blossoms come in the spring? Let us learn what we can about these twigs.

"Supply each pupil with a suitable twig for investigation."

Look at your twig. What color is the bark? Describe the color on the different parts. Where it is the smoothest? How old do you think your twig is? How can you tell? (Make sure that all pupils find the ring scar.) What do you find on the two-year-old part that is not present on the one-year-old part? Each of these is called a spur or shoot. What caps each of these spurs? These are called terminal buds. Find the terminal bud at the end of last year's growth. Look for other buds. These are called lateral buds. The part of a twig where a lateral bud has formed is called the node, and the part from one bud to the other, the internode. Which of the two parts is the thicker? Are there any lateral buds on the growth of two years ago? They are called dormant buds. These did not grow last year while the others grew and formed a spur and a terminal bud. How many dormant buds on your twig? Compare the size of the lateral buds with that of the terminal.

Examine a three-year-old part of a twig and find how much the blunt spurs grew each year. Why are the ring scars close together on the spurs and farther apart on the main shoot.

Find a scar at the base of each bud. What caused this scar? (By an illustrative sketch show the pupils what the axil of a leaf is.) Where did these buds form? When? What did these twigs look like last summer? What will come out on the twigs during the warm spring weather? Examine closely one of the lateral buds. How is it covered? Remove the scales and then what do you find? This light-colored woolly interior is the beginning of the new leaves waiting for the spring. Of what use are the bud scales? What will happen to them when the young leaves grow bigger? What causes ring scars?

Investigate the interior of one of the largest terminal buds. What do you find? (Explain to the class what such a mixed bud contains.) Do all these blossoms later develop into fruit? Watch for this in the spring.

In what position do these twigs mainly grow? Which is the strongest? Where do you find the weakest shoot? Where are most of the dormant buds found? Can you account for these differences? There were too many buds for the space, and in the struggle for existence those that had the best start and most sunlight and room made the largest growth. (Compare the effect of sunlight on house-plants growing in a window.)

How does the arrangement of the twigs on the main shoot compare with that of the lateral or axillary buds? Why should they be the same? Why does a tree not look more regular in its arrangement of twigs and branches?

Cut some healthy twigs from apple, pear, cherry or plum trees. Stand them in water in the class room where pupils may watch the buds swelling from week to week. Have the class keep a record of their likenesses and differences, based on their observations. Have pupils watch an apple tree in the spring, and have them record briefly all the changes they observe until the leaves are out and the blossoms have fallen.

Find the number of apples that are formed on the average fruit spur.