THE STORY OF PLANT ROOTS.

PROFESSOR MELVILLE CUMMING.

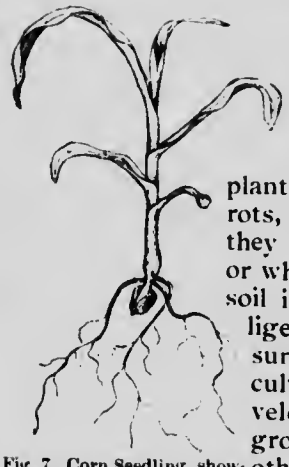

Fig. 7. Corn Seedling, showing leaves, stem, and roots.

Pull up a plant, and you will notice three distinct parts—the leaves, the stem, and roots. The stem and the leaves are the parts above the earth; the roots, the part that is buried in the earth. To the farmer, the roots, being the part in the soil, are in many ways the most important part of the plant. Sometimes he grows such roots as turnips, carrots, and beets for his own use, and then, of course, they are very important; but even when he grows hay or wheat or corn, he can do so only by preparing a good soil in which the roots may grow. With all his intelligence he cannot affect the sunshine and the air which surrounds the stem and leaves; but he can by good cultivation so improve the soil that the roots can develop in the very best way, and by improving the growth of the roots he can improve the growth of the other parts of the plant. Since we are going to study the plant from the farmer's standpoint, we will dig down into the earth and see what we can of the roots of plants.

What are the roots in the ground for? They hold the plant in place. Have you ever walked against a heavy-blowing wind and felt its force, sometimes so strong that you could scarcely stand up? If you have, you can in part imagine the force with which the wind sometimes blows against a tree that is ten or fifteen times as big as you are. The roots of a large oak or maple or pine tree must be very securely fixed in the ground to stand the great strain from such winds; and although most of the plants grown on the farm are very much smaller than trees, yet even they must be very securely held in the soil by their roots.

Not only do roots serve as anchors, but also as the feeding and drinking organs of plants. Plants, as well as animals, must have food and water in order to live and grow; but, unlike animals, they have more than one mouth through which to take in food and drink. By means of their roots they take in all the water they need and all the food which the soil can give them. However, plants do not get all their food from the soil. Part of it they get from the air, and the leaves are the mouths for this food. It will be very interesting, a little further on, to see why these two feeding organs, the leaves and the roots, are so differently formed.

Yet another purpose do roots serve in the life of some plants. As you all know some plants, called annuals, live only one year. Others, called biennials, live two years; and still others, called perennials, live many years. Plants belonging to the last two classes must have some means of storing up food for the winter months. Perennial plants, such as trees and shrubs, generally develop strong stems and branches and store up food in them. But the stems and branches of biennials and