

even into the most difficult places. You have noticed that roots are very pliable—easily bent or twisted; in fact, not unlike thread or cord.

If the region of growth were some distance back from the tip, the root would have the same trouble pushing its way through the soil that you would have if you were to try to thread a small needle by holding the thread two or three inches back from the end. I may also tell you, because you cannot see it without a strong microscope, that each root tip has a sort of cap or cushion of cells which protects the true living part of the root in its act of pushing in and out among the particles of soil. Thus, you see, the little roots by being so pliable, by having their growing regions so near



Fig. 15. Showing the protecting cap of a root.

the tip, and by having these protecting caps, are well fitted for growing in the soil. If you carefully lift a young wheat or other plant from the dry earth, you will notice that each rootlet is coated with particles of soil. These stick closely to the root, and it takes much shaking, and even washing, to remove all of them. Thus you see how closely roots, by means of their fibrous branches and root hairs, come into contact with the particles of the soil in which they grow, and hence they have every chance to get all the food the soil can give them, and, besides, become so securely fastened in place that it is almost impossible to pull some plants out of the earth. You remember that in the very first part of our story we wondered why roots should be so different from leaves, which are also feeding organs of plants. You see now that if roots were shaped like leaves they could never hold so closely to the particles of the soil.

Roots are certainly wonderfully adapted to their life in the soil, and, although there are many other interesting things you might learn about them, yet I think you have learned enough this time to make you take a greater interest in even such things as roots; and, I hope also, to make you take a greater interest in the way in which farmers prepare the soil for the roots to grow in.



Fig. 16. A young seedling wheat plant pulled out of dry earth to show how intimately the roots come in contact with the particles of soil.