HOW PLANTS COME FROM SEEDS.

BY ANNIE J. MACKINTOSH.

We are going to assist you in finding out yourselves some of the wonderful things connected with the life and growth of plants; and if you will try the simple experiment here mentioned, you will surely be interested, and, besides, will learn a great deal that you ought to know.

Let us begin at the beginning, then; and as most plants grow from seeds, we shall talk first about seeds.

We will suppose that you have collected a few seeds, such as may be easily obtained—peas, beans, grains of wheat, corn, &c. Of course you have a penknife in your pocket; and if, in addition to the knife, you can have a small magnifying glass, many of your lessons will be much more interesting.

FIG. 1.—A SPLIT BEAN.

Take a bean first (Fig. 1), and with your knife remove the skin, which is called the seed-coat. You will find that the bean separates into halves as soon as the covering is removed. Now, each part is called a lobe, and seeds which naturally split in two are called two-lobed.

Take a grain of corn, and treat it in the same way. It does not split; if you want to part it, you must cut it. Seeds which do not split in two are called undivided; and you will find that all seeds belong to one or other of these classes.

Now examine those from which you have removed the seed-coats, and you will find at the end of each a small worm-like object (Fig. 1, *a*, and Fig. 2, *a*), which may easily be removed with the point of the knife. If you look carefully at the specimen removed from the bean, you will be able to see that it bears somewhat the appearance of a little plant. Such in truth it is—the germ, or baby plant. But put your germs aside for a while, and let us look at the rest of the seed. You will find in the corn that it resembles dry flour or starch, while in the bean it looks more like a mixture of flour and water which has become dry. This is the food of the baby plant, and consists mostly of sugar and starch. Upon this the germ lives till old enough to obtain nourishment from the earth and air.

FIG. 2. — A SPLIT GRAIN OF CORN.

Perhaps you think it strange, if the plant and its food are both contained in the seed, that it is necessary to sow seeds in order to have them grow. But the plant cannot appropriate the food until it has been moistened. But if moisture can be obtained in any other way than from the ground, the seed will begin to grow just as if part in the earth; and you may prove this for yourselves.

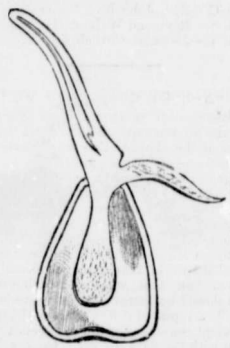

FIG. 3—A GRAIN OF CORN BEGINNING TO GROW.

Fill a tumbler with water, and cover the top with cotton-wool, on which you may place a few beans or some seed of the kind. Place the glass in the window, and in a few days you will find that your seeds have sprouted; and they will continue to grow until the nourishment is exhausted.

But let us return to the germs. Place them under the magnifying-glass, and you will find that some have a root, stem, and two leaves, while others have a root, stem, and but one leaf. You will also notice that all those having two leaves have been taken from two-lobed seeds, while those having only one leaf have come from the undivided seeds; and you will find, when they begin to grow, that they present the same differences. The two-lobed seeds put out two leaves at first, the undivided only one. So, that, by looking at a young plant, you can tell at once from which class of seeds it has sprung; or, looking at a seed, you will be able to foretell the appearance of the plant.

Now we shall require the plants in the tumbler, and such leaves as you may be able to collect.

Observe first, that although you may have placed the seeds in various positions upon the cotton, still in every case the leaves have shot upward into the air, while the roots have passed downward through the cotton into the water. Some of them have had to do a good deal of twisting in order to accomplish it. It has been hard work, but they have succeeded. It is one of Nature's laws that leaves must go up, roots down. But how or why the plants should know what this law requires of them, we cannot tell. Experiments made upon this point prove that, rather than break the law, plants will sometimes slowly transform their parts; that is, the branches of trees which have been planted upside down, will in time become roots, while the roots will turn into branches.

Now take the leaves which you have before you, and examine the veining of each, by holding it between your eye and the light. In some of them—maple, oak, and beech leaves, for instance—you will find the veins, or fine lines of the leaf running in every direction; while in others, as the leaves of the calla, lily-of-the-valley, grasses, etc., they are parallel to each other—that is, they run side by side, extending from the top of the leaf to the bottom, or else from the outer edge to the stem, which passes down the middle. The blades of grass and lily-of-the-valley leaves are examples of the first; the calla leaf of the second.

Look at the plants in the tumbler, and you will find that the leaves all come under one or other of these two classes; they are either net-veined or parallel-veined.

Next consider the seeds; those that are two-lobed have all produced net-veined leaves, while the leaves growing from the undivided seeds are all parallel-veined.

Let us sum up what we have learned in this way. Two-lobed seeds: Two leaves at first, net-veined leaves. Undivided seeds: One leaf at first, parallel-veined leaves.

If you will commit these two short lists to memory, you will often find it an advantage, as one point will immediately recall the others,

But let us look once more at our young plants. You will notice that in the case of the two-lobed seeds, the lobes have grown up with the plant, and are now to be found one on each side of the stem (Fig 4. *a*, *a*,). They have changed not only their appearance, but their name, since our last lesson, and are now called seed-leaves. Perhaps by this time they may have turned green; but they will never resemble the other leaves in anything but color. By and by they will begin to look shrivelled, as they part with the nourishment which is stored in them, and when it is all gone they will drop off.

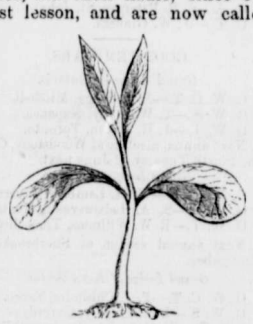

FIG. 4—A BEAN GROWING.

Perhaps you are wondering what the plant is going to do after it has exhausted the food contained in the seed, but by that time it is quite able to support itself, by drawing upon the earth and the air. From the earth it obtains earthy matter and moisture: from the air, some of the gases of which it is composed; and these three things constitute the food of the plant.—*St. Nicholas.*

THE FOX, THE MONKEY, AND THE PIG.

BY HOWARD PYLE.

The fox, the monkey, and the pig were once inseparable companions. As they were nearly always together, the fox's thefts so far reflected upon his innocent associates, that they were all three held to be wicked animals.

At length, the enemies of these three laid a snare, in a path they were known to use.

The first that came to the trap was the pig. He viewed it with contempt, and, to show his disdain of his enemies and his disregard for their snare, he tried to walk through it with a lofty tread. He found he had undervalued it, however, when, in spite of his struggles, he was caught and strangled.

The next that came was the monkey. He inspected the trap carefully; then, priding himself upon the skill and dexterity of his fingers, he tried to pick it to pieces. In a moment of carelessness, however, he became entangled, and soon met the fate of the unfortunate pig.

The last that came was the fox. He looked at the snare anxiously, from a distance, and, approaching cautiously, soon made himself thoroughly acquainted with its size and power. Then he cried, "Thus do I defeat the machinations of my enemies!"—and, avoiding the trap altogether, by leaping completely over it, he went on his way rejoicing.—*St. Nicholas.*

THERE WAS ONCE a little bird chased by a hawk, and in its extremity it took refuge in the bosom of a tender-hearted man. There it lay, its wings and feathers quivering with fear, and its little heart throbbing against the bosom of the good man, whilst the hawk kept hovering overhead, as if saying, "Deliver up that bird, that I may devour it." Now, will that gentle, kind-hearted man take the poor little creature, that puts its trust in him, out of his bosom, and deliver it up to the hawk? What think ye? Would you do it? No, never. Well then, if you flee for refuge into the bosom of Jesus, who came to seek and save the lost, do you think he will deliver you up to your deadly foe? Never! never! never!—*Duncan Matheson.*