

PLANT LIFE

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SOME SUGGESTIONS FOR SPRING STUDY.

Out on the hills along the shaded rocky ledges grows the pretty little rock fern, *Polypodium vulgare*. Its leaves or fronds are thick and leathery and you might not think it beautiful at all when compared with the more delicate forms of our summer ferns, but it keeps green all winter and as you find it peeping through the snow in early spring you suddenly realize that it has a beauty all its own. This little fern seems to prefer the tops and upper shelves of rocks where the soil is shallow and moderately dry. The leaves spring from a slender prostrate stem called a rootstock. Remove such a stem from among the dead leaves and moss in which it lies. On the lower side it gives rise to the roots, and the upper side it bears the leaves. At the tip of the rootstock is the bud, by means of which growth is continued from year to year.

The leaf varies from six inches to a foot in length and is made up of a rather slender leafstalk and a somewhat narrow pinnatifid or pinnate blade. The pinnules are narrow, usually blunt at the ends and slightly broader where they join the mid-rib. The upper end of the leaf is always pinnulate.

During the latter part of June, on the back of the upper pinnules, appear double rows of low wart-like growths of a yellow color but which is turning dark brown with age. These are the fruit dots or sori, and each is made up of many little stalked capsules which contain reproductive bodies called spores. The capsules themselves are called spore-cases or sporangia. The capsule wall is very thin and consists of a single layer of cells. From one end of the little stalk over the spore-case and half down to the stalk again, is a row of ring (annulus) of thick walled cells, which in the ripe capsule, on becoming dry, tends to open outward. This ruptures the thin wall of the capsule and scatters the spores with considerable force. "By mounting sporangia under a low-power microscope, moistening them, and watching them as they become dry, this action may be seen."

Each spore under suitable conditions will grow into a new plant, *but* not into one like the parent fern. In fact the new form is so different that one would never recognize it as belonging to the same

group of plants. When the spore germinates it first produces a long single thread-like growth, divided by somewhat obliquely placed cross walls into three or four long cells. As new cells are formed at the outer end they become shorter and shorter and as the walls are placed more obliquely the structure tends to widen out and it finally grows into a flat heart-shaped green body about a quarter of an inch in diameter. This little plant is called a prothallium.

In the notch or sinus of the plant is the growing point, the point at which cell division continues to take place. The formation of new cells does not

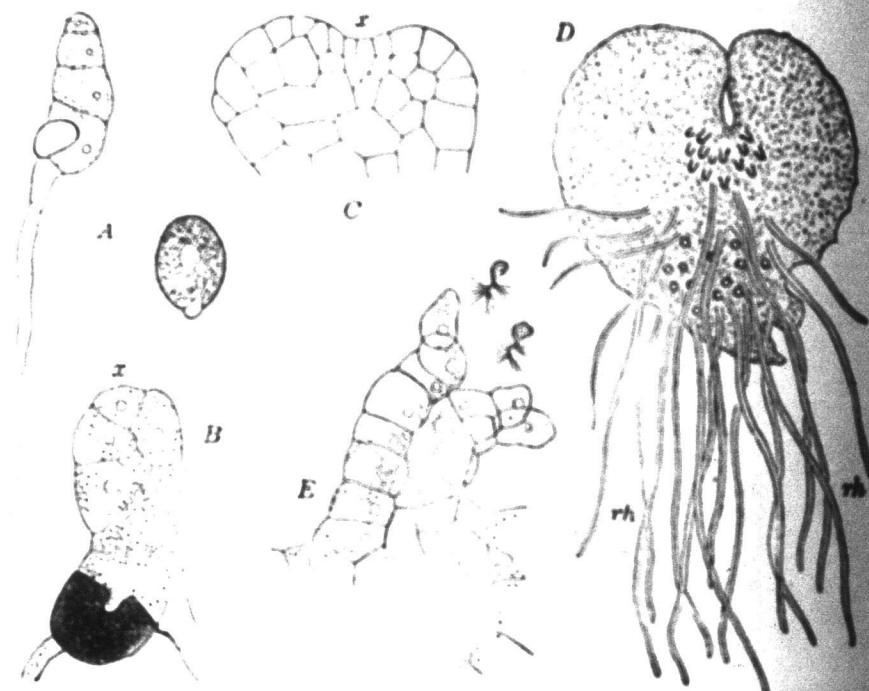


FIGURE 1. The Fern prothallium, archegonium, etc.

A, stages in the germination of the spore. B, young prothallium, showing first appearance of the growing point, the wedged-shaped apical cell *x*. C, tip of the young prothallium beginning to take on the heart-shaped form: *x* the growing point. D, mature prothallium, showing group of archegonia just back of the notch, and antheridia farther back among the rhizoids, *rh*. E, an open archegonium with egg ready for fertilization, and two sperms near the entrance of the neck.

keep pace with the rapid enlargement of cells to the right and left of it, hence the point seems to fall behind the growth on each side of it and the heart-shaped form results.

The spores germinate readily and interesting experiments in growing fern prothallia may be carried on with little trouble in the school room. The cultures grow best in wide flower pots set in saucers of water. After filling the pot with earth to an inch of the top, with finely sieved earth as a top layer, it is often well to sterilize it, to kill fungi, by heating it for two or three hours in a steam sterilizer. When cool it is ready for planting. An