

These were merely flat masses of cells, spread on moist soil. Now came another ministry of progress. Neighboring plants occupying the surrounding territory grow over a flat mass and cut off its supply of light. Protoplasm responds to this danger by breaking the flat expanse into irregular parts attached to a central axis, and this axis soon rises slightly from the soil. This is the condition we find in the mosses. But another danger is at once encountered. Such elevated parts are removed from the necessary water supply, although favorably placed for light and air.

So if elevation of parts is necessary there must be devised a conducting system, and a strengthening system also, to enable the erect plant to resist wind currents. Protoplasm recognizes and meets this difficulty. Among the mosses we find a suggestion of a stem—the green surface is divided into somewhat regular little leaflike parts, and these are placed radially on a short, central axis, which is strong enough to hold them erect a fraction of an inch. But no true conducting structures are met in plants lower than the ferns. There we find that ordinary short roundish cells become immensely elongated, and their side walls strengthened. The presence of these tubes, which permit a ready passage of liquid from the soil to the uppermost parts, makes possible what we have in our most complex groups of plants—roots for absorption deep in the soil, stems and leaves reaching many yards above the soil. These tubes must be held erect against gravity and the destructive rush of the wind. So wood is developed—a mass of cells part of which are modified into tubes and another part into fibres—slender, strong and elastic.

Let us now glance back for a moment and notice that somewhere in the advance from simplicity, there enters the phenomenon of Death, as we think of it. We saw that the simplest organisms cannot be said to die, inasmuch as the living parent is merged in the offspring of which it forms so considerable a part.

But apparently as an associated condition with the evolution of sex came the need of a certain maturity of parent, and the germ cells became at length not the whole of the parent but only a small proportion of its mass. Then we find that the mature plant produces germ cells only once, or a limited number of times, and after such definite effort at reproduction, the parent dies, except as represented by its offspring, to which it has contributed a minute portion. This small contribution from the parent carries with it a wonderful power of heredity, but not sufficient to prevent variation, or to enable us to say that the individuality of the offspring is lost.

The fact of variation is undeniable, we may find examples in every family, and in the leaves of every tree. The possibility of