

That the contact of air to the roots of plants was always considered necessary, is evident from the oldest agricultural writers; but the principle was never so fully understood and acted upon, as it has been of late years. The first and most striking instance confirmatory of the opinion was the fact of large, full-grown, ornamental forest trees having been killed by their roots being too deeply covered up with earth when leveling lawns; and planters and gardeners have long been aware of the injurious effects of planting as well as sowing too deep. Formerly it was thought that the earthy materials in which valuable exotic plants were to be placed could not be too finely sifted and mixed; whereas experience at length showed that the small particles of such soils soon run together and become a compost mass after heavy rains, thus operating against the extension of the young roots, and in great measure excluding the external air and moisture. Among coarser and looser materials, however, a considerable body of air was found to repose, and the more active fibres to extend much more luxuriantly than in closer and denser soils.

The gardener's improved practice is only another proof how much a porous soil and presence of air are necessary to the roots of plants; and yet we often see the most luxuriant vegetation produced by soils which are apparently very close in texture; such as alluvial soils and fertile clays. Both these descriptions of soils being composed of the finest atoms, become exceedingly close and compact if undisturbed; but when ploughed or otherwise periodically moved, the stirred portion attracts as much of the qualities of the air as suffices for the following crop. It is rather remarkable that while oak thrives best on a clayey subsoil, it does not seem to affect rich alluvial land, owing probably to its closeness of texture preventing all access of air to the place of the roots.

Aquatic plants, which live entirely submerged, although defended from external air, receive as much as they need from the surrounding water, which always contains a notable measure, besides nutritive bodies in solution, which form the pabulum of plants, whether aquatic or terrestrial.

Another tribe of plants are attached to the earth so slightly that their system of roots is nothing compared with the bulky heads sustained; and as these plants are mostly found on rocks, or on the driest tracts of country, it is evident that the greatest portion of their nutriment is drawn from the atmosphere.— Another tribe of curious and beautiful flowering plants is called Epiphytes; because they attach themselves to the stems and branches of trees, not to sustain themselves by extracting their juices, but to be supported in the deep shade and moist air of thick tropical woods. Some of these are called *air plants*, and grow as well in a basket without earth, suspended in a warm, damp, shady place, as if they were in their native habitat.

Thus it is apparent that atmospheric air is essentially necessary to plants, and as much so to the roots, as to the stem and foliage; and it is this fact, as already observed, that justifies all the means of cultivation which the farmer and gardener have recourse to with a view of rendering the staple of the soil more loose and consequently more permeable to all atmospheric influences.

There is one circumstance, however, which deserves to be noticed along with these general remarks; it is this, that all seeds require to be closely embedded in the soil, that is, they should be in close contact with the mould on all sides; and, that this should be completely secured, some seeds in particular soils require a mechanical pressure of the earth upon them, as wheat for instance. Now, we have only to consider that as the soil has been previously prepared, and more or less reduced to the finest practicable state, a considerable volume of air is incorporated therewith, and that this air, according to its temperature and the moisture of the soil, facilitates the germination of the seed, and continues to assist the development of the plant. To obtain this close embedding of the seed