

## CONDITIONS OF PLANT LIFE.

IN dealing with the conditions of plant life it is well to dwell on the fact that each species and variety even requires conditions of its own for its best development, and that it is the object of scientific culture to discover and provide those conditions as nearly as possible. Thus, recent experimentation has proved incontestably that flat cultivation is incomparably the best for corn and potatoes. The old-fashioned and long continued ridge or hill culture destroyed many of the most useful fibres of the root system, for these extend out much farther from the plant than is usually supposed. It is now known also that frequent shallow cultivation will do very much to prevent the ill effects of drought in the case of all crops where it can be applied, and especially with fruits. The top soil thus kept loose acts as a mulch checking evaporation, and conserving the moisture beneath. The best results yet reached in apple culture have been attained by keeping the ground fallow, thus retaining all the fertility and moisture of the soil for the trees alone, and preventing the waste of this moisture from the open ground by frequent shallow culture. Thus the trees get the benefit of the immense quantity of moisture that would have been transpired through the leaves of the other crop, and besides the frequent stirrings of the soil have made the supply of plant food stored therein more soluble and more available for the use of the trees.

Another interesting discovery bearing on the conditions of plant growth has regard to the beet crop—a crop which is of exceeding importance since it not only yields three-fifths of the sugar supply of the world, but is becoming more

and more recognized as the best of cattle foods for dairy purposes. Innumerable analyses of cross sections of the beet root have shown that the secretion of sugar goes on to a comparatively small extent in the upper end of the root when that has been exposed to the light, and that consequently the value of the root both for sugar manufacture and for feeding purposes is very much increased when top of the root is kept covered by soil.

The processes of pollination are a source of never failing interest to young people. There are several facts of a practical bearing that will bear emphasizing in dealing with this topic. Thus, it will not do to take it for granted now-a-days that flowers that have both stamens and pistils are necessarily self-fertile, or even that any amount of cross-fertilization among plants of the same variety with perfect flowers will avail to produce a fair crop of fruit. Bartlett pears, for instance, are notoriously unproductive unless their blossoms are fertilized from some other variety. Yet Bartlett blossoms are perfect and produce an abundance of pollen, which, however, is for the most part impotent on Bartlett pistils. Several kinds of apples have the same defect.

Such facts as these are beginning to be known to all scientific growers. But why should they not be known also in every family that has a boy or girl studying Botany in our schools? It certainly would be worth while to take up many such facts in our classes if it were only to create a stronger bond between the family and the school.

Some interesting investigations have recently been made in connection with the wonderful production of pollen in