

Such is, briefly, the mode of development of these minute plants under favourable conditions. But there are occasional deviations to be met with, which are deserving of attention as throwing a clearer light upon certain forms which are to be mentioned presently. This will be manifest when I state that from the results of numerous experiments I have made, the plant may be caused to remain in any one of its different stages of growth by supplying it with food suitable for that purpose. The bearing of this statement will be seen in the subsequent remarks upon the identity of the parasitic fungi. A familiar illustration of the power above mentioned is to be observed in common yeast, which presents itself as a collection of spherical cells containing nuclei and capable of endless multiplication in two ways, viz. by the formation of buds or by the bursting of the cells and the liberation of nuclei which become cells. Yeast is derived from the aerial spores of one or more common species of mould. This I have proved by experiment; and I have recently obtained additional proof of the correctness of this view from the examination of spontaneous yeast of the tan-pits kindly forwarded to me from Kingston, Canada, by Professor Lawson. This in no way differs from brewers' yeast which has been long kept. The favourite food of the yeast-cell is sugar upon which it acts in such a manner as to disturb the feeble combination of its chemical elements. This process which is termed *catalysis* by chemists causes decomposition of the sugar and a new arrangement of its particles, giving rise to carbonic acid and alcohol. Sugar is essential to the maintenance of yeast in its integrity. As soon as its requirements in this respect fail to be supplied, the plant turns for its prey upon the new element it has evoked, the alcohol; which is at once converted by a similar process into vinegar. Here the cell becomes changed in form. It is now oval and this condition, which has received the name of *torula*, it may be made to retain indefinitely; but under ordinary circumstances, it proceeds to convert the acid into other compounds and its development goes on rapidly until it has assumed the form of a filamentous mycelium: In this stage, again, it can be retained at will, as the vinegar plant or as it is popularly termed the "mother" of vinegar which possesses the power of at once converting saccharine matter into acid apparently without the intermediate alcoholic fermentation: If now exposed to the air it completes its growth by producing spores which in their turn go through the same cycle.

With this slight sketch of the natural history of one of these minute beings, we will now notice some of the more important effects which they are reputed to produce. And, first, let us glance at their influence on the higher forms of vegetable.

It appears certain that, before any great damage can be done by these parasites, there must pre-exist in the objects of their attack an unhealthy condition of structure, resulting partly from being deprived of some chemical element essential to healthy growth, and partly to atmospheric changes which tend to foster a too rapid formation of cellular tissue, at the same time that they favour the rapid development of the parasite. The result of these changes in the plant is a lowered vitality rendering it prone to the attacks of the fungus, which, once having found a habitat, spreads with prodigious rapidity, and by setting in motion chemical changes similar to those already spoken of, soon involves the