

way. The plant has a skin just as we have, going over it in all its parts, and this skin also covers the leaves on their upper and under surfaces. If you examine a leaf you will find it is thicker and harder on the upper surface than on the under surface, it is fine and glossy on the upper surface and hairy on the under surface. It is more delicate on the under surface. What is the meaning of that? Is that of any use to the plant? How is it caused? We find there are different kinds of cells giving those different appearances, not only different appearances but also different uses. The use of the varnishing of the upper surface is to prevent too rapid evaporation when the sun is shining above, that protects it. On the under surface there is a thinner epidermis as the evaporation would be less. I use that term evaporation, for although we have another term, transposition, the former better expresses the process that is carried on. On the under side the water passes out, and there are little breathing mouths that open and shut. What is the use of these? They are to allow the gas to pass out and in, that the plant needs, carbonic acid gas is obtained from the air, and oxygen expelled. What takes place when the gas comes? The water comes up from the soil bringing with it potash and phosphates and various other things, and these openings take in carbonic acid gas, with what result? A new material is produced in the leaf and fresh leaves are being continually formed, as can be seen if you examine any plant in your window. Does the protoplasm do it? There must be first the chlorophyll granules in the leaf, the material which gives it its green color, a certain number of cells in the leaf contain this green coloring material, and that when the carbonic acid and water are brought in contact with the chlorophyll they change into the organized materials of the plant, sugar, starch, gum, and substances like these, and this change can only take place when green leaves are on the plant, and are acted upon by the rays of light. Why is it that plants are green? Is that an idle question? They are green not only to make them beautiful, but because this green substance is the one which when acted upon by heat and light produces this sugar, starch, gum, &c., which are largely required by the plant, and upon which the existence of the animal creation depends. In order to produce these a certain amount of potash is required by the plant and beside potash, chlorine, otherwise there would be no healthy growth. This then, the leaf tissue, is the most important of all the tissues of the plant, as upon its