

containing carbon, oxygen, hydrogen, nitrogen, potassium, and other materials. The pressure exerted by the liquid as it comes into the roots, together with the attraction exerted by a constant process of evaporation from the leaves, causes the "sap," which is the plant food, to rise, and gives us what is known as the plant circulation. When, by this osmotic action, the sap finally reaches the leaves, it, in conjunction with carbonic acid derived from the air, is converted, in the chlorophyll grains under the influence of sunlight, into organic materials, which pass into a whitish granular liquid called protoplasm, and are used in "growth," that is in the building of new cells to form plant tissue. Assimilation takes place only in sunlight, but growth goes on most rapidly at night. In the former process oxygen is set free and given off through the leaf-pores or stomata, but in the latter air is taken in through the stomata, and, as its oxygen is used up, carbonic acid gas is given off. It will thus be seen as tersely put by Mr. L. H. Bailey, Jr.,—"If the leaves are the lungs of the plant because they breathe, they are more emphatically the stomachs of the plant because they assimilate and digest."

It is now in order for the student to learn something of classification, as it is by this means he is enabled to analyze and recognize by name the plants with which he meets, thus to avail himself of all that has been recorded concerning them by botanists before him.

To the ordinary observer plants differ so much from one another that he can see no points of resemblance which could connect them naturally. For example, what likeness is there between the common strawberry and the mountain ash? Yet both belong to the rose family. Notwithstanding this great external dissimilarity, the botanist can readily point out in both, characters which at once stamp them as closely akin. The points which determine the relationship of plants are not confined to any one part of them; they may exist in the roots, leaves, flowers, or fruits, but the natural system now in use aims to bring together those which most closely resemble each other in all these particulars, laying especial stress on the flowers and fruit. In this respect it differs from the Linnæan and all other artificial systems, which took up a certain set of organs and based kindredship on those alone.

The means by which a plant reproduces itself and is prevented from becoming extinct is evidently its most important and essential