

in like ratio, and animals depend for their food on vegetable production no more than vegetables on animals for the materials for their structure. Every tree, plant and shrub that grows purifies the atmosphere, and furnishes air for the use of man and the inferior animals; every thing that breathes the air, from man, the lord of the creation, to the veriest reptile, is a purveyor of food for vegetable subsistence. Wherever, therefore, animals abound, carbonic acid is largely formed; but this carbonic acid, in giving its carbon to vegetables, gives also its oxygen to purify the air, and furnishes the means of breathing to men and animals. Decomposition of animals, and the decay of vegetables also, afford both carbonic acid and ammonia, the very materials for the growth of a new series of life. The death of one generation thus becomes the source of life to another, and each living generation is the phoenix arising from the ashes of that which preceded it, a life whose very existence depends upon previous death. This is a type of what revelation teaches, that we shall not "surely die;" but that death is but a means to and a necessary precursor of a glorious resurrection. There is taught too by this simple yet beautiful and perfect process, the mutual dependence which exists, not for pleasure only, but for life itself, between all the systems of animated nature, that nothing is in vain, nothing lost, each humble plant that grows may be nourished by the breath of the greatest of mankind, and in its turn purify the air for the life of a hero. The frailest flower, though perchance "born to blush unseen," does not "waste its fragrance on the desert air." The perfume of flowers is a compound of carbonic acid and ammonia, and may be taken up by corn, wheat, or any other plant used as food by man.

The mode in which the various changes are effected deserve a passing notice. In the process of germination oxygen is absorbed, heat is developed, and probably acetic acid is formed, whose use is to extract from the soil bases useful for the further progress of the plants. The substance of the seed (starch and albumen) become soluble, and undergoes certain changes by which the woody fibre required for the stem and leaves is produced. The plant now must absorb from the air and soil matter necessary for its growth. By means of its roots the necessary mineral matter is taken up, and also ammonia and some portions of its carbonic acid. By far the greater portion of the latter is, however, absorbed by numerous pores on the bottom of the leaf, and under the influence of light, carbon necessary for its woody fibre, gum, &c., is separated and retained; whilst oxygen, fit for the respiration of animals is thrown out by pores on the top of the leaf. During daylight plants are continually absorbing carbonic acid and giving out oxygen; in the night the contrary, to some extent, prevails; they then throw out carbonic acid. This ex-