

converted into carbonic acid, which, when daylight prevails, is decomposed; the oxygen being dissipated, and the carbon retained. It is evident that the object of the whole process is to obtain carbon in that precise state of disintegration, to which it is reduced at the moment of its separation from carbonic acid by the action of solar light on the green substance of the leaves; for it is in this state alone that it is available in promoting the nourishment of the plant, and not in the crude condition in which it exists when it is pumped up from the earth, along with the water which conveys it into the interior of the plant. Hence the necessity of its having to undergo this double operation of first combining with oxygen, and then being precipitated from its combination in the manner above described. It is not the whole of the carbon introduced into the vegetable system, in the form of carbonic acid, which has to undergo the first of these changes, a part of that carbon being already in the condition to which that operation would reduce it, and consequently in a state fit to receive the decomposing action of the leaves. The whole of these chemical changes may be included under the general term *Aeration*.

Thus the great object to be answered by this vegetable aeration is exactly the converse of that which we shall afterwards see is effected by the respiration of animals; in the former it is that of adding carbon, in an assimilated state, to the vegetable organization; in the latter, it is that of discharging the superfluous quantity of carbon from the animal system. The absorption of oxygen, and the partial disengagement of carbonic acid, which constitute the nocturnal changes effected by plants, must have a tendency to deteriorate the atmosphere with respect to its capability of supporting animal life; but this effect is much more than compensated by the greater quantity of oxygen given out by the same plants during the day. On the whole, therefore, the atmosphere is continually receiving from the vegetable kingdom a large accession of oxygen, and is, at the same time, freed from an equal portion of carbonic acid gas, both