substances are rendered more disposed to separate from the fluid, and to become consolidated on the sides of the cells or vessels, to which they are conducted from the leaves. This, then, is the first modification in the qualities of the sap which it undergoes in those organs.

§ 4. *Aeration of the Sap.*

A CHEMICAL change much more considerable and important than the preceding is next effected on the sap by the leaves, when they are subjected to the action of light. It consists in the decomposition of the carbonic acid gas, which is either brought to them by the sap itself, or obtained directly from the surrounding atmosphere. In either case its oxygen is separated, and disengaged in the form of gas; while its carbon is retained, and composes an essential ingredient of the altered sap, which, as it now possesses one of the principal elements of vegetable structures, may be considered as having made a near approach to its complete *assimilation*, using this term in the physiological sense already pointed out.

The remarkable discovery that oxygen gas is exhaled from the leaves of plants during the day time, was made by the great founder of pneumatic chemistry, Dr. Priestley: to Sennebier we are indebted for the first observation that the presence of carbonic acid is required for the disengagement of oxygen in this process, and that the oxygen is derived from the decomposition of the carbonic acid, and these latter facts have since been fully established by the researches of Mr. Woodhouse, of Pennsylvania, M. Théodore de Saussure, and Mr. Palmer. They are proved in a very satisfactory manner by the following experiment of De Candolle.

Two glass jars were inverted over the same water-bath; the one filled with carbonic acid gas, the other filled with water, containing a sprig of mint; the jars communicating below by means of the water-bath, on the surface of which some oil was poured, so as to intercept all communication between