

It may be proved, in the following manner, that 140° of caloric is necessary to liquefy ice. Take any quantity of ice at 32° , and pour upon it an equal quantity of water at 172° , the ice will be liquefied, but the water will still be at a temperature of 32° . From this experiment it is evident that 140° of heat have disappeared, for the water has been reduced to the temperature of the ice, which has suffered no other change than liquefaction. There is only one way of explaining the result that it is here observed, and it is by allowing that 140° of heat must be combined with the elementary principles of water, before their cohesion can be so destroyed as to admit their assuming a liquid form.

Water consists of eight parts by weight of oxygen, and one of hydrogen; and by measure, of two parts of hydrogen, and one of oxygen. The compound nature of water may be proved by both analysis and synthesis. The simplest possible means of decomposition is to pass aqueous vapour over red-hot iron in a tube; but the most satisfactory is that effected by the voltaic battery. If two thin wires connected with the poles of a voltaic battery be so placed that one end of each shall enter a glass vessel, a tube being placed immediately over the point of each wire, a portion of water will be decomposed, and the gaseous products will be collected in the tubes. The wire connected with the positive pole of the battery gives out oxygen; that with the negative, hydrogen. For this experiment we are indebted to Messrs. Nicholson and Carlisle, and by it we ascertain the proportions by volume in which the two gases unite to produce water. But we need not satisfy ourselves with this analytical examination; for, if the products of the decomposition be collected in the same tube, and inflamed, they will reassume the liquid state producing water. But, if we take an additional measure of hydrogen, that is, three of hydrogen and one of oxygen, and explode them, one measure of that gas will remain uncombined.

Oxygen and hydrogen, mixed in the proportion to form water by combustion, have been employed by Mr. Gurney for the production of intense heat. It is a singular fact, that these gases, thus united, are so explosive, that it is unsafe to experiment with them except in very small quantities, or with especial provisions calculated to prevent their explosion. Mr. Gurney succeeded in obtaining such means, and invented his