

It is well known to chemists, that the metallization of oxides, the most difficult to reduce, may be effected by hydrogen brought into contact with them at a red heat; and it is more than probable that the production of potassium itself, in the common gun-barrel process, is due to the power of nascent hydrogen derived from the water which the hydrated oxide contains. According to the recent experiments, also, of Faraday, it would appear that every case of metallic reduction by voltaic agency, from saline solutions, in which water is present, is due to the secondary action of hydrogen upon the oxide; both of these being determined to the negative pole and then reacting upon one another.

It has never been disputed that intense heat might be produced by the occasional contact of water with the metallic bases; and it is quite certain that, during the process of saturation, vast volumes of hydrogen must be evolved. The hydrogen, thus generated, might permeate the crust of the earth in different directions, and be stored up for ages in fissures and caverns, sometimes in a liquid form, under the necessary pressure. Whenever, at any subsequent period, in consequence of the changes effected by earthquakes in the shell of the earth, this gas happened to come in contact with metallic oxides at a high temperature, the reduction of these oxides would be the necessary result.

No theory seems at first more improbable, than that which represents water as affording an inexhaustible supply of fuel to the volcanic fires; yet the hypothesis is far from visionary; and it is a fact that must never be overlooked, that while a great number of volcanos are entirely submarine, the remainder are for the most part in islands or maritime tracts. There are a few exceptions; but some of these, as Dr. Daubeny observes, are near inland salt lakes, as in Central Tartary; while others form part of a train of volcanos, the extremities of which are near the sea.

Sir H. Davy supposes that, when the sea is distant, as in the case of some of the South American volcanos, they may still be supplied with water from subterranean lakes; since, according to Humboldt, large quantities of fish are often thrown out during eruptions.* Mr. Dana, also, in his valuable and original observations on the volcanos of the Sandwich Islands, reminds us of the prodigious volume of atmospheric water which must be absorbed into the interior of such large and lofty domes, composed as they are entirely of porous lava. To this source alone he refers the production of the steam by which the melted matter is propelled upwards, even to the summit of cones three miles in height.†

When treating of springs and overflowing wells, I have stated that porous rocks are percolated by fresh water to great depths, and that sea water probably penetrates in the same manner through the rocks which form the bed of the ocean. But, besides this universal cir-

* Phil. Trans. 1828, p. 250.

† Geology of American Exploring Expedition, p. 369.