

the condensation of vapors (pp. 334, 389). This process, called Sublimation, may be the result of the mere cooling and reappearance of bodies which have been vaporized by heat and solidify on cooling, or of the solution of these bodies in other vapors or gases, or of the reaction of different vapors upon each other. These operations, of such common occurrence at volcanic vents, and in the crevices of recently erupted and still hot lava-streams, have been successfully imitated by experiment. In the early researches of Sir James Hall on the effects of heat modified by compression, he obtained by sublimation "transparent and well-defined crystals," lining the unoccupied portion of a hermetically-sealed iron-tube, in which he had placed and exposed to a high temperature some fragments of limestone.<sup>20</sup> Numerous experiments have been made by Delesse, Daubrée, and others in the production of minerals by sublimation. Thus, many of the metallic sulphides found in mineral veins have been produced by exposing to a comparatively low temperature (between that of boiling water and a dull-red heat) tubes containing metallic chlorides and sulphide of hydrogen. By varying the materials employed, corundum, quartz, apatite, and other minerals have been obtained. It is not difficult, therefore, to understand how, in the crevices of lava-streams and volcanic cones, as well as in mineral veins, sulphides and oxides of iron and other minerals may have been formed by the ascent of heated vapors. Superheated steam is endowed with a remarkable power of dissolving that intractable substance, silica; artificially heated to the temperature of the melting-point of cast-iron, it rapidly attacks silica, and deposits the mineral

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<sup>20</sup> Trans Roy. Soc. Edin. vi. p. 110.