

in the composition of these rocks. Some of the soluble materials must be dissolved, and, as the water evaporates, will be redeposited in a new form.<sup>24</sup>

**This power increased by heat.**—The chemical action of water is increased by heat, which may be either the earth's original heat or that which arises from internal crushing of the crust. Mere descent from the surface into successive isogeotherms raises the temperature of permeating water until it may greatly exceed the boiling-point. But a high temperature is not necessary for many important mineral rearrangements. Daubrée has proved that very moderate heat, not more than 50° C. (122° Fahr.), has sufficed for the production of zeolites in Roman bricks by the mineral waters of Plombières.<sup>25</sup> He has experimentally demonstrated the vast increase of chemical activity of water with augmentation of its temperature, by exposing a glass tube containing about half its weight of water to a temperature of about 400° C. At the end of a week he found the tube so entirely changed into a white, opaque, powdery mass, as to present not the least resemblance to glass. The remaining water was highly charged with an alkaline silicate containing 63 per cent of soda and 37 per cent of silica, with traces of potash and lime. The white solid substance was ascertained to be composed almost entirely of crystalline materials, partly in the form of minute perfectly limpid bipyramidal crystals of quartz, but chiefly of very small acicular prisms of wollastonite. It was found, moreover, that the portion of the tube which had not been directly in contact with the water was as much altered as the rest, whence it was inferred that, at these high temperatures

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<sup>24</sup> See further on this subject, *postea*, pp. 534, 617.

<sup>25</sup> "Geologie Experimentale," p. 462.