higher grades of metamorphism, moisture at a temperature that made it superheated steam. In the state of steam it spreads through the rocks with all the chemical energy derived from its high temperature, a destroyer of cohesion, a powerful solvent, and a promoter of decompositions preparatory to recompositions.

The making of deposits of *silica* in the form of quartz or opal does not require high heat, as already explained (page 135). In addition to the facts there stated, it may be added that geodes of chalcedony and agate, 8 to 10 inches in diameter and of modern origin, come from Florida, that are the remains of hemispherical masses of coral, the exterior still showing the stars of coral, while the interior is a great agate-lined cavity; they were made by the siliceous waters of the region, and it is not certain that the waters were even warm. J. Arthur Phillips found crystallized quartz and chalcedony among the recent deposits of Borax Lake, in Lake County, north of San Francisco, and at Steamboat Springs, in Nevada; and Le Conte and Becker have reported other similar facts. Daubrée detected quartz in the form of chalcedony among the deposits of the hot waters of Plombières. It should be considered, further, that the quartz which makes the flint and chert of the world, and has silicified the fossils of many strata, was dissolved by cold waters; it was mostly in the opal state when dissolved, but was deposited in the state of quartz. Thus the solidification of rocks by means of silica is an easy effect in the presence of hot moisture, and but little heat is necessary.

Many experiments of recent years illustrate the efficiency of superheated steam in confined spaces or under pressure. Mr. J. Jeffrys, in 1840, subjected some feldspathic and other siliceous minerals to a current of steam inside of a kiln made for vitrifying brown stone-ware, and with them a few articles of the stone-ware. At a full red heat, little effect was produced; but above that of fused cast iron, there was rapid erosion, and in ten hours "more than a hundredweight of mineral matter had been carried away in the vapors." Daubrée, having inclosed a little water in a strong glass tube and subjected it to a temperature of 750° F. (400° C.) for several weeks, obtained, besides a hydrated silicate allied to the zeolites, quartz in well-defined crystals, and, in another case, perfect crystals of the light-colored variety of *pyroxene*, called diopside. The glass was completely dissolved and used in making the crystals. A clay, from near Cologne, used in making crucibles, heated in the glass tubes, became charged with scales of a *mica* or *chlorite* (the quantity being too small for an analysis). Crystals of the feldspar, orthoclase, occur in the cavities of some igneous rocks in the copper region of Lake Superior as a secondary product, and the accompanying facts make it certain that it was made by means of heated moisture. But experiments in closed tubes containing the ingredients and water have succeeded in making *orthoclase* and *albite*, with also *tridymite* (Hautefeuille, Friedel and Sarrasin), while dry heat has always proved a failure. Experiment has been successful in obtaining, by fusion, the feldspars, *oligoclase*, *labradorite*, and *anorthite*, and also the rocks containing them.