the siliceous deposits frequently contain pyrite and *cinnabar* (HgS) and the sulphur bank, which has there been formed through the heated vapors, has been worked as a mercury mine. J. D. Whitney described in 1865 a specimen of *gold* in cinnabar which was supposed to have come from near "Sulphur Springs," four miles south of Bear Valley, between Clear Lake and Colusa; and Mr. M. Atwood removed doubt as to the source of the specimen by finding in a fissure at the place mentioned (as reported by Mr. Phillips) cinnabar *overlaid* by a brilliant deposit of metallic gold. Similar facts are reported by Le Conte (1882, 1883), from the Clear Lake region and Steamboat Springs. In the former, at "Sulphur Bank," occurs sulphur with cinnabar below (which is now worked), and also pyrite and gelatinous silica.

Le Conte explains the occurrence of cinnabar (HgS) on the ground of its solubility in a hot solution of sodium sulphide (Na_2S), — this alkaline sulphide resulting from the action of the sulphur gas on the rocks which contain a soda-lime feldspar,— and its subsequent deposition. (For Le Conte on Vein-making, see *Am. Jour. Sc.*, 1882, 1883.) Becker sustains, by experiments (1887), the view that the metallic sulphides (HgS, FeS_2, ZnS, and less easily Cu_2S) are soluble in solutions of alkaline sulphides, and that they pass in vapors to be deposited in the veinlets and fissures of the rocks above. He observes that the Steamboat Springs are now depositing gold; that gold is dissolved by a hot solution of Na_2S, and that 843 parts of a cold solution of Na_2S will dissolve one part of gold. Deposition of the sulphides is occasioned by cooling; by contact with acid waters — these, according to Le Conte, descending from the surface where some of the sulphur in the gases makes sulphuric acid and aluminum sulphate; and also by dilution. Becker published in 1888 a full report on the quicksilver mines of California. The following facts illustrate further mineral transformations. Daubrée found, in the thermal waters at Bourbonne-les-Bains, in the bottom of a part of which, in Roman times, bronze, silver, and gold coins had become buried, the following mineral species, derived from the alteration of the metal of the first two of these kinds of coins through the agency of the mineral waters, their temperature 140° F.: the copper ores, *chalcocite* (Cu_2S), *chalcopyrite* ($CuFeS_2$), *bornite* (Cu_3FeS_3), *tetrahedrite*, *atacamite*, *cuprite* (Cu_2O), *chrysocolla*, *native copper;* the lead ores, *cerussite* ($PbO.CO_2$), *anglesite* ($PbO.SO_3$), *galena* (PbS), *phosgenite*, and *pyrite*. The bronze was found to consist of copper, tin, and lead, or of copper and zinc, with a trace of iron. The waters afforded, on analysis, chlorides and sulphates of the alkalies (Na_2, K_2, Ca, Mg), with bromides and carbonates of Ca and Fe, an alkaline silicate, with traces of arsenic, manganese, iodine, boron, lithium, strontium, cæsium, rubidium, and, in exhalations, some H_2S, N, and O. Similar results were observed by Daubrée at the warm springs of Plombières, Department of the Vosges.

Veins made by heat in the Earth's Crust, without aid from deep-seated Igneous Ejections.

The crustal heat may be that of the earth's crust either during, or not during, an epoch of metamorphism. Under this head are included most of the great and small granite veins of the world, the auriferous (gold-bearing) quartz veins, and all the common veins of metamorphic rocks. They sometimes intersect the foliation, but very often follow it. Their formation was, in general, part of the results of metamorphic heat and conditions; and the movements attending mountain-making, which produced the metamorphic