

important are heat and water; and it is doubtful whether there is a single particle of the globe which has not experienced the metamorphic action of the one or the other. Indeed, it is nearly certain that every portion of the globe has been melted, if not volatilized. All the unstratified rocks have certainly been fused, and probably all the stratified rocks originated from the unstratified, and have been modified by water and heat. In many of these rocks, especially the oldest, we perceive evidence of the joint action of both these agents. Evidently they were once aqueous deposits; but they appear to have been subsequently subjected to powerful heat. As we ascend on the scale of the stratified rocks, the marks of fire diminish, and those of water multiply, so that the latest are mere mechanical or chemical depositions from water.

In these facts, then, we see proof that heat and water have been the chief agents of geological change since the first formation of a solid crust on the globe; for some of the rocks now accessible, as already stated, date their origin at that early period. We might also trace back the agency of heat much farther, if the hypothesis adopted by not a few eminent geologists be true, which supposes the earth to have been once in a gaseous state from intense heat. But to press this point will add very little to my argument, even could I sustain it by plausible reasoning. I will only say, that, so far as we know any thing of the state of the earth previous to the consolidation of its crust, heat appears to have been the chief agent concerned in its geological changes.

Among other agencies of less importance, that have always operated geologically, is gravity. Its chief effect, at present, is to bring the earth's surface nearer and nearer to a level, by causing the materials, which other agencies have loosened from its salient parts, to subside into its cavities and valleys. It also condenses many substances from a gaseous to a liquid or solid state, especially those deep in the earth's crust, and thus brings the particles more within the reach of cohesive attraction and chemical affinity, often changing the constitution, and always the solidity, of bodies. And in the position of the ancient mechanical rocks, occupying as they do the former basins of the surface, and in the superior consolidation of the earlier strata, we find proof of the action of gravity in all past geological time.