

incandescent elements, wholly incompatible with any condition of life, which can be shown to have ever existed, formed the entire substance of the globe.\*

\* In adopting the hypothesis that the primary stratified rocks have been altered and indurated by subjacent heat, it should be understood, that although heat is in this case referred to as one cause of the consolidation of strata, there are other causes which have operated largely to consolidate the secondary and tertiary strata, which are placed at a distance above rocks of igneous origin. Although many kinds of limestone may have been in certain cases converted to crystalline marble, by the action of heat under high pressure, there is no need for appealing to such agency to explain the consolidation of ordinary strata of carbonate of lime; beds of secondary and tertiary sandstone have often a calcareous cement, which may have been precipitated from water, like the substance of stalactites and ordinary limestone. When their cement is siliceous, it may also have been supplied by some humid process, analogous to that by which the siliceous matter of chalcedony and of quartz is either suspended or dissolved in nature; a process, the existence of which we cannot deny, although it has yet baffled all the art of chemistry to imitate it. The beds of clay which alternate with limestone, and sand, or sandstone, in secondary and tertiary formations, show no indications of the action of heat; having undergone no greater consolidation than may be referred to pressure, or to the admixture of certain proportions of carbonate of lime, where the clay beds pass into marl and marlstone. Beds of soft unconsolidated clay, or of loose unconsolidated sand, are very rarely if ever found amongst any of the primary strata, or in the lower regions of the transition formation; the effects of heat appear to have converted the earlier deposits of sand into compact quartz rock, and beds of clay into clay slate, or other forms of primary slate. The rock which some authors have called primary grauwacke, seems to be a mechanical deposit of coarse sandstone, in which the form of the fragments has not been so entirely obliterated by heat, as in the case of compact quartz rock.