truly knowing what they see, think they know those regions of the earth which can never be seen, and who judge of the great operations of the mineral kingdom from having kindled a fire and looked into the bottom of a little crucible." [1]

Sir James Hall, notwithstanding his veneration for his master, could not agree with him in this verdict. He was confirmed in his opinion by an accident which had occurred at Leith glass-works, where a large mass of common green glass, that had been allowed to cool slowly, was found to have lost all the properties of glass, becoming opaque, white, hard and crystalline. Yet a piece of this substance, when once more melted and rapidly cooled, recovered its true vitreous characters. Hall's shrewd instinct at once applied this observation to the Huttonian doctrine of the igneous origin of granite and other rocks. It had been objected to Hutton's views that the effect of great heat on rocks was to reduce them to the condition of glass, but that granite and whinstone, being crystalline substances, could never possibly have been melted. Yet here, in this glass-house material, it could be demonstrated that a thoroughly molten glass could, by slow cooling, be converted into a crystalline condition, and could be changed once more by fusion into glass. Hutton had overlooked the possibility that the results of fusion might be modified by the rate of cooling, and Hall at once began to test the matter by experiment. He repeated the process by which the devitrified glass had been accidentally obtained at the glass-house, and found that he could

[1] *Theory of the Earth*, vol. i. p. 251.