in contact with the surrounding rock, were vitreous, while the central parts presented the ordinary lithoid texture. This difference, he saw, was fully explained by his fusion experiments. The lava having risen in a cold fissure, and having been suddenly chilled along its outer surface, consolidated there as glass, while the inner parts, which had cooled more slowly, took a crystalline structure.

These observations are of historic interest in the progress of volcanic geology. Hall had sagaciously found the true interpretation of volcanic dykes, and he at once proceeded to apply it to the explanation of the abundant dykes of Scotland. He thus brought to the support of Hutton's doctrine of the igneous intrusion of these rocks a new and strong confirmation from the actual crater of a recent volcano.

When engaged upon his fusion experiments with Scottish whinstones, it occurred to Hall to subject to the same processes specimens of the lavas which he had brought from Vesuvius and Etna. The results which he thus obtained were precisely similar to those which the rocks from Scotland had yielded. He was able to demonstrate that lavas may be fused into a perfect glass, and that this glass, on being re-melted and allowed to cool gradually, passes into a stony substance not unlike the original lava. In this manner, the close agreement between modern lavas and the ancient basalts of Scotland was clearly proved, while their identity in chemical composition was further shown by some analyses made by Dr. Robert Kennedy. Sir James Hall had thus the satisfaction of showing that a fresh appeal to direct experiment