

fied with other rocks, it may be proper to mention certain experiments that have been made, to elucidate the formation of basaltic rocks. All trap rocks are fusible, and most of them, after melting, form a blackish-green glass: hence it was inferred, that trap rocks had never been in a state of fusion; for if they had, they would have been rendered vitreous. Sir James Hall, however, reflecting on the long period of refrigeration that vast masses of melted rock would necessarily require, before they were cooled to the common temperature of the earth, was induced to make experiments on lava and basalt; from which it was ascertained, that if a small portion of liquid lava were suddenly cooled, it formed a black glass, as was well known to be the case with basalt, but if the process of cooling were slow, both melted lava, and basalt became stone. When the glass which had been formed by sudden cooling was melted again, and suffered to cool very gradually, it lost its vitreous character, and was converted into a substance resembling basalt. Mr. Gregory Watt made, in one of his father's furnaces, some experiments on the fusion and refrigeration of basalt, which throws much additional light on the formation of the globular and columnar structure of basaltic rocks. He fused seven hundred weight of the Dudley basalt called Rowley ragg, and kept it in the furnace several days after the fire was reduced. It melted into a dark-coloured glass, with less heat than was necessary to melt the same quantity of pig-iron. In this glass, small globules were formed, which afterwards disappeared; and as the cooling proceeded, the mass was changed from a vitreous to a stony substance: other globes were again formed within the stony mass, which continued to enlarge until their sides touched and pressed against each other, by which pressure the globes formed polygonal prisms. If part of the mass were cooled before the globular structure was destroyed, these globes were harder than the surrounding stone, and broke in concentric layers. In this manner, the balls of basalt and porphyry which fall out of decomposing rocks were probably formed; they derived their superior hardness from the crystalline arrangement of the particles, when in a melted state. When these globes were enlarged by a continuation of the same process, they might press on each other, and form prisms. The upper prisms pressing by their weight upon the lower, might form concavities or sockets, into which they would sink, and remain joined together or articulated. Such is frequently the structure of basaltic columns.

Another experiment, made by Sir James Hall, on the crystallization of common limestone by heat, and its conversion into marble, tends to elucidate the effects produced by basaltic rocks, on limestone and chalk before mentioned. Dr. Hutton had advanced the opinion, that beds of limestone were formed of the shells and exuviae of marine animals, which had been melted by central fire, and crystallized. The first part of this theory respecting the entire forma-