

dicates a certain degree of basaltic fluidity ; others, which have been expanded into vast craterless domes, appear to have been only in a softened condition at the time of their elevation. Other trachytes, like those of the Andes, in which I have frequently perceived a striking analogy with the greenstones and syenitic porphyries (which are argentiferous, and without quartz), are deposited in the same manner as granite and quartzose porphyry.

Experiments on the changes which the texture and chemical constitution of rocks experience from the action of heat, have shown that volcanic masses\* (diorite, augitic porphyry, basalt, and the lava of *Ætna*) yield different products, according to the difference of the pressure under which they have been fused, and the length of time occupied during their cooling ; thus, where the cooling was rapid, they form a black glass, having a homogeneous fracture, and where the cooling was slow, a stony mass of granular crystalline structure. In the latter case, the crystals are formed partly in cavities and partly inclosed in the matrix. The same materials yield the most dissimilar products, a fact that is of the greatest importance in reference to the study of the nature of erupted rocks, and of the metamorphic action which they occasion. Carbonate of lime, when fused under great pressure, does not lose its carbonic acid, but becomes, when cooled, granular limestone ; when the crystallization has been effected by the dry method, saccharoidal marble ; while by the humid method, calcareous spar and aragonite are produced, the former under a lesser degree of temperature than the latter.† Differences of temper-

granite occurs, expresses the general or leading character of the whole formation. But its aspect at some places leads to the belief that it was occasionally more fluid at the period of its eruption. The description given by Rose, in his *Reise nach dem Ural*, bd. i., s. 599, of part of the Narym chain, near the frontiers of the Chinese territories, as well as the evidence afforded by trachyte, as described by Dufrénoy and Elie de Beaumont, in their *Description Géologique de la France*, t. i., p. 70. Having already spoken in the text of the narrow apertures through which the basalts have sometimes been effused, I will here notice the large fissures, which have acted as conducting passages for melaphyres, which must not be confounded with basalts. See Murchison's interesting account (*The Silurian System*, p. 126) of a fissure 480 feet wide, through which melaphyre has been ejected, at the coal-mine at Cornbrook, Hoar Edge.

\* Sir James Hall, in the *Edin. Trans.*, vol. v., p. 43, and vol. vi., p. 71 ; Gregory Watt, in the *Phil. Trans. of the Roy. Soc. of London for 1804*, Part ii., p. 279 ; Dartigues and Fleurieu de Bellevue, in the *Journal de Physique*, t. lx., p. 456 ; Bischof, *Wärmelehre*, s. 313 und 443.

† Gustav Rose, in Poggend., *Annalen*, bd. xlii., s. 364.