The experiments of Gregory Watt, in fusing rocks in the laboratory, and allowing them to consolidate by slow cooling, prove distinctly that a rock need not be perfectly melted in order that a re-arrangement of its component particles should take place, and a partial crystallization ensue.* We may easily suppose, therefore, that all traces of shells and other organic remains may be destroyed; and that new chemical combinations may arise, without the mass being so fused as that the lines of stratification should be wholly obliterated.

We must not, however, imagine that heat alone, such as may be applied to a stone in the open air, can constitute all that is comprised in plutonic action. We know that volcanos in eruption not only emit fluid lava, but give off steam and other heated gases, which rush out in enormous volume, for days, weeks, or years continuously, and are even disengaged from lava during its consolidation. While the materials of granite, therefore, came in contact with the fossiliferous stratum in the bowels of the earth under great pressure, the contained gases might be unable to escape; yet when brought into contact with rocks, they might pass through their pores with greater facility than water is known to do (p. 35). These aeriform fluids, such as sulphuretted hydrogen, muriatic acid, and carbonic acid, issue in many places from rents in rocks, which they have discolored and corroded, softening some and hardening others. If the rocks are charged with water, they would pass through more readily; for, according to the experiments of Henry, water, under a hydrostatic pressure of 96 feet, will absorb three times as much carbonic acid gas as it can under the ordinary pressure of the atmosphere. Although this increased power of absorption would be diminished in consequence of the higher temperature found to exist as we descend in the earth, yet Professor Bischoff has shown that the heat by no means augments in such a proportion as to counteract the effect of augmented pressure.† There are other gases, as well as the carbonic acid, which water absorbs, and more rapidly in proportion to the amount of pressure. Now even the most compact rocks may be regarded, before they have been exposed to the air and dried, in the light of sponges filled with water; and it is conceivable that heated gases brought into contact with them, at great depths, may be absorbed readily, and transfused through their pores. Although the gaseous matter first absorbed would soon be condensed, and part with its heat, yet the continual arrival of fresh supplies from below might, in the course of ages, cause the temperature of the water, and with it that of the containing rock, to be materially raised.

M. Fournet, in his description of the metalliferous gneiss near Clermont, in Auvergne, states that all the minute fissures of the rock are quite saturated with free carbonic acid gas; which gas rises plentifully from the soil there and in many parts of the surrounding country. The various elements of the gneiss, with the exception of the quartz, are all softened;

* Phil. Trans. 1804.

† Poggendorf's Annalen, No. xvi. 2d series, vol. iii.