

and starts for ever, and be as powerful a million of years hence as in those incalculably ancient times when our Scottish gneiss was in the forming. Accepting the theory of Sir Humphrey Davy, of an unoxidized metallic nucleus of the globe, capable of being oxidized all around its periphery by the percolation of water, and of evolving heat enough in the process to melt the surrounding rocks, he thus provides plutonic, metamorphic, volcanic agencies ; and whereas Sir Humphrey Davy held, that when a thick crust of oxide had once formed in this way, it served to shut out the water, and the chemical action became in consequence more and more languid, till it altogether ceased, Sir Charles finds, in another but harmonizing theory, an expedient for re-invigorating the slumbering plutonic forces, and thus, after a period of repose, renewing their activity. The oxygen of the water is, of course, the oxidizing agent ; but water also contains hydrogen, and hydrogen is a de-oxidizing agent. 'When the oxidizing process was going on,' says Sir Charles, 'much hydrogen would of necessity be evolved : it would permeate the crust of the earth, and be stored up for ages in fissures and caverns ; and whenever it happened to come in contact with the metallic oxides at a high temperature, the reduction of these oxides would be the necessary result.' And we have thus a circle of forces,—oxidization of the metallic basis to evolve the plutonic agencies, and de-oxidization of the oxides to produce the metallic basis again. The process would somewhat resemble that on which the movement of the steam-engine depends, and in which water is first expanded into steam, and then the steam in turn condensed into water, and thus the action of the engine kept up.

Now, I need not here say how thoroughly I respect the judgment and admire the genius of Sir Charles Lyell,—one of the greatest of geologists, and a man of whom Scotland may well be proud ; nor need I say how much of pleasure