

the earthquakes preceding eruptions. Without adopting an opinion, which seems somewhat bold, I made, in concert with M. Larea, a series of experiments on the tumefaction of the volcanic vitreous substances at Teneriffe, and on those which are found at Quinche, in the kingdom of Quito. To judge of the augmentation of their bulk, we measured pieces exposed to a forge-fire of moderate heat, by the water they displaced from a cylindric glass, enveloping the spongy mass with a thin coating of wax. According to our experiments, the obsidians swelled very unequally: those of the Peak and the black varieties of Cotopaxi and of Quinche increased nearly five times their bulk.

The colour of the pumice-stones of the Peak leads to another important observation. The sea of white ashes which encircles the Piton, and covers the vast plain of Retama, is a certain proof of the former activity of the crater: for in all volcanoes, even when there are lateral eruptions, the ashes and the rapilli issue conjointly with the vapours only from the opening at the summit of the mountain. Now, at Teneriffe, the black rapilli extend from the foot of the Peak to the sea-shore; while the white ashes, which are only pumice ground to powder, and among which I have discovered, with a lens, fragments of vitreous feldspar and pyroxene, exclusively occupy the region next to the Peak. This peculiar distribution seems to confirm the observations made long ago at Vesuvius, that the white ashes are thrown out last, and indicate the end of the eruption. In proportion as the elasticity of the vapours diminishes, the matter is thrown to a less distance; and the black rapilli, which issue first, when the lava has ceased running, must necessarily reach farther than the white rapilli. The latter appear to have been exposed to the action of a more intense fire.

I have now examined the exterior structure of the Peak, and the composition of its volcanic productions, from the region of the coast to the top of the Piton:—I have endeavoured to render these researches interesting, by comparing the phenomena of the volcano of Teneriffe with those that are observed in other regions, the soil of which is equally undermined by subterranean fires. This mode of viewing Nature in the universality of her relations is no doubt ad-