

II. *Extract of another Letter, from Mr. Hamilton, to Dr. Maty, on the same Subject.*

Naples, March 5, 1771.

Read May 30, 1771. **S**INCE I had the pleasure of sending you my letter, in which the nature of the foil of more than twenty miles round this capital is described; examining a deep hollow way cut by the rain waters into the outside cone of the Solfaterra, I discovered, that a great part of the cone of that ancient volcano has been calcined by the hot vapours above described. Pumice calcined seems to be the chief ingredient, of which several specimens of (as I suppose) variegated uniform marble are composed, and the beautiful variegations in them may have probably been occasioned by the mineral vapours. As these specimens are now sent to the Royal Society, you will see that these variegations are exactly of the same pattern and colours as are met in many marbles and flowered alabasters; and I cannot help thinking that they are marble or alabaster in its infant state. What a proof we have here of the great changes the earth we inhabit is subject to! What is now the Solfaterra, we have every reason to suppose, to have been originally thrown up by a subterraneous explosion from the bottom of the sea. That it was long

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an existing volcano, is plain, from the ancient currents of lava, that are still to be traced from its crater to the sea, from the strata of pumice and erupted matter, of which its cone, in common with those of all other volcanos, is composed, and from the testimony of many ancient authors. Its cone in many parts has been calcined, and is still calcining, by the hot vapours that are continually issuing forth through its pores, and its nature is totally changed by this chemical process of nature. In the hollow way, where I made these remarks, you see the different strata of erupted matter, that compose the cone in some places perfectly calcined, in others not, according as the vapours have found means to insinuate themselves more or less.

A hollow way cut by the rains on the back of the mountain, on which part of Naples is situated, towards Capo di China, shews that the mountain is composed of strata of erupted matter, among which are large masses of bitumen, in which its former state of fluidity is very visible. Here it was I discovered that pumice stone is produced from bitumen, which I believe has not yet been remarked. Some specimens shew evidently the gradual process from bitumen to pumice; and you will observe that the crystalline vitrifications, that are visible in the bitumen, suffer no alteration, but remain in the same state in the perfect pumice as in the bitumen.

In a piece of stratum, calcined from the outside of the Solfaterra, the form and texture of the pumice stones is very discernible. In several parts of the outside cone, this calcining operation is still carried on by the exhalation of constant very hot

and damp vapours, impregnated with salts, sulphur, alum, &c. Where the above-mentioned vapours have not operated, the strata of pumice and erupted matter, that compose the cone of the Solfaterra, are like those of all the high grounds in its neighbourhood, which I suppose to have been thrown up likewise by explosion. I have seen here, half of a large piece of lava perfectly calcined, whilst the other half out of the reach of the vapours has been untouched; and in some pieces the center seems to be already converted into true marble.

The variegated specimens then, above described, are nothing more than pumice and erupted matter, after having been acted upon in this manner by the hot vapours; and if you consider the process, as I have traced it, from bitumen to pumice, and from pumice to marble, you will think with me that it is difficult to determine the primitive state of the many wonderful productions we see in nature.

I found in the *tufa* of the mountain of Paufilipo, a fragment of lava: one side I polished, to shew it to be true lava; the other shews the signs of the *tufa*, with which it is incorporated. It has evidently been rounded by friction, and most probably by rolling in the sea. Is it not natural then to imagine that there must have been volcanoes near this spot, long before the formation of the mountain of Paufilipo? This little stone may perhaps raise in your mind such reflections, as it did in mine, relative to the great changes our globe suffers, and the probability of its great antiquity.