

Some Observations on Boyling Fountains, and Subterraneous Steams: by Dr. Tancred Robinson, Fellow of the R. S.

Walking out one day from *Montpelier* in company of my ingenious, and worthy freinds Dr. *Sloan*, and Dr. *Wakely*, in order to visit the famous boyling fountain near *Peroul*, a small Village lying east about a league from thence, not far from the *Etang*, I found the water to heave, and boyle up very furiously in small bubbles; as the learned Mr. *Ray* relates in his travells p.459, and it was very manifest, that this *Phenomenon* proceeded from a Vapour breaking out of the Earth, and rushing through the water, so as to tols it up with noise, and in many bubbles; for upon digging any where near the ditch, and pouring other water upon the dry place newly dug, I observ'd in it immediatly the same boyling; which the afore mentioned exquisite naturalist does likewise remark in his travells. The like bubbling of water is also found round about *Peroul*, upon the Sea shore; and in the *Etang* it self: in order to search out more narrowly the cause of this odd *Phenomenon*, I took some of the sand and Earth out of the fountain, and ditch, putting it into Vessels, and pouring the same water upon it, but there did not appear the least perturbation, or alteration thereupon; the superficies of the water continuing very smooth, equal, and quiet: yet still, for further satisfaction, I sought out, and discover'd in severall dry places of the ground thereabouts, many little Venti-ducts, passages, or clefts, where the steam issued forth; at the mouths of these channells or pipes, placing some light bodys, as feathers, small thin pieces of straws, leaves, &c. I found them soon remov'd away; this va-
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pour upon the application of a lighted candle, or torch did not flame, or catch the least fire; as the fumes running through a boiling spring near *Wigan* in *Lancashire* do; for Mr. *Sherley* made them burn, and flame very vigorously at the contact of a lighted candle; *Philosoph. Transact.* N. 26, p. 483. so that here we have two different sorts of steams causing these boylings, yet neither of the fountains are Medicinal, or so much was arm; the like is related by *Varenius*, [*primo lapide à Culmæ* (says he,) *fons magno spiritu emittit aquam quasi ferventem, cum tamen sit frigidissima, unde vocant Insanam.*] The learned Dr. *Plott*, in his late book *De Origine Fontium*, mentions some fountains in *England*, [*qui cum sonitu erumpunt, impetu ferri & fragore ruunt.*] Many hissing springs bubbling at the top, I have found in *Switzerland* (the best water'd Country that ever I saw,) and in many places near the *Rhine*; but I had not opportunities to experiment and Philosophize, upon them. There are other boiling waters of a quite contrary temper, being actually hot to severall degrees, so as to boyl eggs, and many other things put into them; as those near the *Solfatara* not far from *Naples*, before you descend by the little *Capuchin-Cloyster* to *Puzzuolo*, antiently call'd *Puteoli*; as also upon the top of Mount *Zebio* in the *Duke* of *Modena's* Territories, not far from his villa near *Sassolo*; and in the source of the Emperour's Bath at *Aken*, in the Country of *Juliers*. *Varenius* tell us, [*quod in Japonia fons adeo fervidus, & Ebulliens, prorumpit, ut ignis vehementissimi licet fervore nulla aqua ad eum gradum caloris perducere possit, triplo enim diutius retinere fervorem quam nostra aqua calefacta, consueverit; non fluit continue, sed bis de die per unam horam, & tunc temporis tanto spirituum impetu, & vehementia fertur, ut incumbentia puteo ingentia saxa commoveat, & ad trium vel quatuor ulnarum altitudinem tanto fragore, ut explosionem magni tormenti bellici referat.*

From the foregoing History, we may take occasion to reflect a little upon the manifold Variety of exhalations prepared in, and flying out from the vast *Magazines*, and severall reconditories below, as to their qualities and effects; some being cold, and dry, resembling air, or wind, as those near *Peroul*, and in the Caverns of Mountains, especially those of *Æolus*, and other hills of *Italy*; as also in mines upon the meeting of water; others are inflammable, and of a bituminous nature, though not actually warm, as those near *Wigan* in *Lancashire*; and those as I conjecture, (for I never saw them,) at the much talk't of burning fountain in *Dauphine*: there are also many steams very hot, Sulphureous, and saline; more especially those in the naturall stoves, sweating vaults, grotts, baths, and the *Vulcano's* near *Naples*, *Bajæ*, *Cuma*, and *Puzzuolo*, as also in some of the subterraneous works at *Rome*; others there are of an *Arsenical*, and such like venenose qualities, as in the *Grotta del Cane* on the Bank of the *lago Agnano*; in many mines; in poysonous springs; and lakes; now these various steams meeting with, and running through waters, must cause a great variety of *Phenomena*, and effects in them.

Whether this great diversity proceeds from the Various breaths of the *Pyrites*, and the *lapis Calcarius*, whilst under their different states, and changes, or from other sorts of effluvioms, (the store of nature being vast, and very copious) I dare not determine; however I am convinced that Sulphur is sublimed from the *Pyrites*, according to the opinion of that most excellent Naturalist, and Universally learned Physitian Dr. *Martin Lister*; especially that gather'd upon Mount *Ætna*, *Vesuvius*, the *Solfatara*, (antiently call'd *Campo Phlegraei*, *Leucogei*, and *forum Vulcani*.) and in the stoves of *S. Gennaro*, not far from thence; for most of the stones and Cinders, thrown out of those mighty furnaces do manifestly contain Iron, if we may believe the Magnet: as to the salt (taken by many
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writers to be a sort of *Sal Armoniac*,) found together with the Sulphur in the forementioned places, it appear'd to me to be a kind of *Nitrum Calcarium* for, as I remember, it had not any Urinous qualities, that I could perceive by slight tryalls of mixture; and I was the more confirm'd in my opinion after I had seen, and consider'd, the great quantity of Lime Stone round about *Naples*; many beds of it lying up and down the *Terra di Lavoro*, or *Campania felice*; so that Dr. *Lister's* notions concerning the *Pyrites* and the *lapis Calcarius*, may reach further, and prove in time more fruitfull, then the *Epicureans*, or *Corpufcularians*, may be willing to admit; for other mineralls and metals (at least as many as I know of them,) are not so plentifull as those are, neither are these, or any other bodys whatsoever under ground so sensibly busy, and active in their fermentations, breathings, emanations, and changes, as the *Pyrites*, and the *lapis Calcarius*, are known to be: what there is under our shell, in the deep, and dark regions of the Globe, where humane industry never yet penetrated, I cannot conceive, however I dare not deny, but that all bodys as well above, as under us, may send forth their secret effluvioms, and have their peculiar *Atmospheres*; there being scarce any absolute rest in bodys, as our great and famous Philosopher, Mr. *Boyle* does evince in severall tracts.