

VI. On the boiling springs of Iceland

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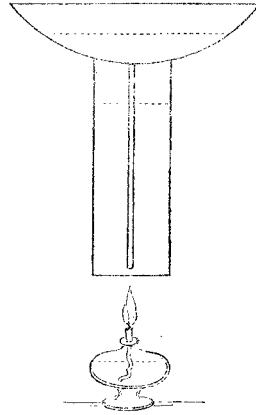


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VI. *On the boiling Springs of Iceland.* By Mr. JOHN MURRAY.*

IN reading the description of the boiling springs or geysers of Iceland, as given to us by Stanley, Hooker, Mackenzie, and by Henderson, I found it difficult to account for the *intermission* of the jets, supposing the subterranean fire to continue *uniform* in temperature.

I caused an apparatus to be constructed, which tended to explain the phenomena of the intermission of the jet and recession from the basin into the central pipe. A section of that simple apparatus is on the margin, and its phenomena clearly and satisfactorily prove that the circumstances adverted to, are ascribable to the *cooling* of the water from the united influences of *radiation* and *evaporation*. Radiation, from the surface of the water in the basin into which it rises; and Evaporation, from that dispersed into the atmosphere in the play of the geyser.



The apparatus consists of a cylindrical tin case surmounted by a concave basin, into which the water rises through a central pipe (representative of the siliceous stalactitic pipe obtaining in the geysers, the consequence of deposition of siliceous matter from the water containing silica and soda in solution), and which descends nearly to the bottom of the cylinder.

The apparatus being supplied with water, and a spirit lamp introduced, the water will, in a short time, be perceived slowly ascending into the basin. The steam finally bursts through the water and forms an irregular jet; and so soon as the water is cooled by the causes adverted to, it retires from the basin into the pipe, and the same phenomena are reiterated at intervals. The experiment is a very beautiful one, and always gratifying.

Dr. Henderson has stated a curious fact with respect to these wondrous phenomena; and though it has been rudely questioned, it is one, surely, that may be conceived a necessary result. I advert to the circumstance of the play of the geysers *being more promptly determined by casting stones into the pipe*. This is easily explained by supposing the pipe at its lower extremity *curved* (a phenomenon which I myself have

* This paper was transmitted to the Wernerian Society of Edinburgh.
witnessed

witnessed in some of the caverns of Derbyshire, where the ends of the stalactites depending from the roof are *hooked*, or curved upwards). Now on this supposition, if a stone or stones were thrown in, either wholly or partially to blockade that orifice, the steam would be thereby confined, and sooner be raised to a maximum, because the water is then prevented from its slow and gradual ascent into the basin, and thus diminishing the amount of the elasticity of the steam; whereas, in common circumstances the steam sallies forth at intervals through the water, before it obtains the force necessary to the propulsion of the jet into the atmosphere.

VII. *On a new Compound of Chlorine and Carbon.* By RICHARD PHILLIPS, F.R.S. E. F.L.S. M.G.S., &c., and MICHAEL FARADAY, Chemical Assistant in the Royal Institution. Communicated by Sir HUMPHRY DAVY, Bart. P.R.S.*

M. JULIN, of Abo, in Finland, is proprietor of a manufactory, in which nitric acid is prepared by distilling calcined sulphate of iron with crude nitre in iron retorts, and collecting the products in receivers connected by glass tubes, in the manner of Woulfe's apparatus. In this process he observed, that when a peculiar kind of calcined vitriol, obtained from the waters of the mine of Fahlun, and containing a small portion of pyrites, known in Sweden by the name of calcined aquafortis vitriol No. 3, was used, the first tube was lined with sulphur, and the second with fine white feathery crystals. These were in very small quantity, amounting only to a few grains from each distillation; but M. Julin, by degrees, collected a portion of it, and, having brought it to this country, inserted a short account of its properties in *The Annals of Philosophy*, vol. i. p. 216, to which a few observations were added by ourselves.

The following are the properties of this substance, as described by M. Julin. It is white; consists of small soft adhesive fibres; sinks slowly in water; is insoluble in it whether hot or cold; is tasteless; has a peculiar smell, somewhat resembling spermaceti; is not acted on by sulphuric, muriatic, or nitric acid, except that the latter by boiling on it gives traces of sulphuric acid; boiled with caustic potash, has a small portion of sulphur dissolved from it; dissolves in hot oil of turpentine, but most of it crystallizes in needles from the solution on cooling; dissolves in

* From the Transactions of the Royal Society for 1821, Part II.