



Analysis of hailstones

M. Girardin

To cite this article: M. Girardin (1839) Analysis of hailstones, Philosophical Magazine Series 3, 15:95, 252-253, DOI: [10.1080/14786443908649867](https://doi.org/10.1080/14786443908649867)

To link to this article: <http://dx.doi.org/10.1080/14786443908649867>



Published online: 01 Jun 2009.



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These results, M. Marchand remarks, agree with the formula admitted for formic æther [acid?], and are confirmed by the specific gravity.—*Journal de Pharm., Juillet 1839.*

ANALYSIS OF HAILSTONES. BY M. GIRARDIN.

In a letter addressed to M. Arago, and read at the Academy of Sciences, on the 22nd of April last, M. Girardin gives the results of the analysis which he has made of hailstones collected in the month of February preceding; the following details are extracted from the latter.

The hailstones, collected with the requisite precautions, were introduced into a bottle washed with distilled water, they weighed about 500 grains; the hail readily melted, and the liquid had the appearance of water into which a few drops of milk had been suffered to fall; it was turbid and whitish. Gradually there were formed in it a considerable abundance of white and very light flocks, which soon formed into one cloudy mass, and deposited at the bottom of the vessel. The next morning, the liquid was perfectly limpid.

A portion of the water, whilst it was still whitish and milky, was put into a glass, and a few drops of nitrate of silver were added to it. The glass, stopped with paper, was placed in the dark and allowed to remain for twelve hours. The addition of the reagent produced no apparent effect, and the liquid preserved its original aspect without becoming coloured. On being afterwards put into a place brilliantly lighted, it became almost suddenly reddish; then in about an hour, it assumed a brown colour, and deposited grayish flocks, and brilliant white pellicles were at the same time formed on the surface. The flocks, separated from the liquid, were calcined in a small glass tube; they emitted a smell of burnt animal matter, and reddened litmus paper was rendered blue by exposure to them. There remained at the bottom of the tube a grayish powder, which was a mixture of charcoal and metallic silver.

The greater portion of the hailstone water was evaporated while turbid and milky, cautiously in a platina capsule. During the evaporation, no trace of ammonia was perceptible; the residue was of a yellowish brown colour, but the quantity was so small that the weight could not be determined. A similar evaporation having been made in a glass tube, the residue was heated to incipient redness. It exhaled during calcination a very sensible odour of ammonia, and reddened litmus paper was rendered blue by it: there remained a trace of charcoal at the bottom of the tube.

Hailstone water filtered and clear became slightly turbid with oxalate of ammonia, and more so with nitrate of barytes, and nitric acid did not restore the transparency. No other reagents produced any effect. In the small quantity of this hailstone water which I had, I could not discover the existence of nitric acid.

It follows from what has been stated that the hailstones examined contained a considerable portion of organized and azotized matter, a sensible quantity of lime and sulphuric acid, but no sensible trace of ammonia.

Several chemists have directed their attention to the existence of an organic substance and saline matters in the atmosphere. Their experiments have unquestionably proved, that rain water in falling through the atmosphere carries with it in solution into the earth, ammoniacal salts, calcareous salts, and a flocky matter, which is without doubt the origin of the deleterious principles which are designated by the term *miasmata*. Hitherto, however, no one has stated the existence of this organic matter in hailstones.—*Journal de Pharm.*

VERATRIC ACID. BY M. MERCK.

I have convinced myself, observes M. Merck, by repeated observations that the seeds of cevadilla contain, besides the bodies already known, several new and extremely interesting substances; and I have obtained a quantity of one of them in a state of purity. Professor Schrötter has analysed it in M. Liebig's laboratory, and has determined its formula, and his experiments prove that it is a new and peculiar acid. This acid, which I shall call *veratric acid*, is very readily obtained by treating cevadilla, in the manner directed by M. Couerbe, with alcohol and sulphuric acid, for preparing veratria; hydrate of lime is to be added to the alcoholic tincture, and the alcohol is to be distilled from the filtered liquor. The watery liquor which remains with the residue on the separated veratria, then contains the new acid in combination with lime, and it is requisite only to supersaturate it with sulphuric acid to separate the veratric acid, which, if the liquor is sufficiently concentrated, crystallizes in a few hours. Sometimes it is necessary to evaporate the mother waters to one half, and to heat them for some time after the addition of the sulphuric acid, in order to separate the sulphate of lime; the concentration, however, ought not to be carried too far, because the viscosity of the liquor then renders the crystallization of the acid difficult. The crystals are completely purified by washing them repeatedly with cold water, dissolving them in boiling alcohol, and treatment with purified animal charcoal. In this condition they are colourless acicular crystals or tetrahedral prisms, according as they are obtained from a concentrated or dilute solution. This acid reddens moist litmus paper, it is soluble in alcohol, and much more so when hot than cold; it is insoluble in æther. In cold water it is but little soluble, in hot water it is more readily dissolved, and on cooling it is deposited in the form of a white crystalline powder. With the alkalies it forms compounds, which are soluble both in water and alcohol; its compounds with potash and soda are crystallizable, not deliquescent but very soluble in water. The solutions of nitrate of silver and acetate of lead produced in the concentrated solution of veratrate of ammonia white precipitates, which dissolve completely on the addition of water or of alcohol.

Fuming sulphuric acid and nitric acid of 40° B. do not appear to decompose this acid; if on the contrary some crystals be put into a mixture of sulphuric and nitric acid, they become, after a short time, of a fine yellow colour.

* When cautiously heated on platina foil by a spirit lamp, the cry-