

CHEMISTRY

Discovering the Sweet Element

"A Classic of Science"

How Beryllium Was Found in the Aqua Marine
By a French State Chemist of the Directoire

ANALYSIS OF THE AQUA-MARINE OR BERYL; AND THE DISCOVERY OF A NEW EARTH IN THAT STONE. Read before the French National Institute 26 Pluoise, in the Year VI. (Feb. 14, 1798.) By Citizen Vauquelin. In Nicholson's Journal of Natural Philosophy, Chemistry, and the Arts. Vol. II. London: M.DCC.XCIX (1799).

THE analysis of minerals is one of those operations which are usually considered to be of little importance and are submitted, by chemists of the first order, as unworthy of their care, to the manipulation of their pupils.

I am well aware that the greater number of analyses afford results of little importance, which do not repay the labour and the time bestowed in obtaining them. I am likewise aware that they do not offer so brilliant a prospect, nor promise to afford results of so general a nature, as the plan of operation which has been formed with regard to some of the most important points in chemistry. But I am not, from these reasons, of opinion, that this class of processes, which has likewise its difficulties, and requires, for its successful conduct, a certain series of reasoning and particularly an exact knowledge of the bodies described; I am not of opinion that it is so little entitled to engage the attention of philosophical chemists. For they must recollect, that it has afforded them the solid foundation of their theories, and new objects for the exercise of their abilities.

From a disregard of this kind it was that Bergmann, whose active mind could not submit to the details of experiment, has committed so many faults, by trusting his operations to young pupils, who had not acquired the habit of distinguishing new substances from those which were already known.

The analysis of the beryl, already made by Bindheim, will be a proof of what I here advance. It is composed, according to him, of silex 64, alumine 27, lime 8, and iron 2.

Citizen Hauy having found a perfect agreement between the structure, hardness and weight of the beryl and the emerald, engaged me, some months ago, to compare these two stones by chemical means also, in order to know whether they were composed of the same principles in similar proportions.

The most interesting circumstance to the Institute in this result being a new earth, which I have discovered in the beryl, I shall pass slightly over the other subjects, and dwell more particularly on its distinctive properties.

The Method of Analysis

Experiment 1. One hundred parts of beryl reduced to fine powder were fused with 300 parts of caustic potash; the mass, after cooling, was diffused in water, and treated with the muriatic acid; by this means the solution was completed.

The muriatic solution was evaporated to dryness; towards the end of the evaporation the fluid assumed the form of a jelly; the dried matter was then diffused in a large quantity of water. Part of the matter was dissolved; but a white, granulated transparent powder remained. This substance, collected on a filter, washed with much water, and dried by ignition, weighed 69 parts. It had all the properties of silex.

Experiment 2. The fluid separated from the silex was precipitated by the carbonate of potash of commerce; the precipitate collected and drained was treated with a solution of caustic potash. The greatest part of the matter was dissolved; but there remained a certain quantity of earth which was not taken up. This being separated, washed, and dried by ignition, was of a brown greyish colour; it weighed nine parts. In these nine parts it is that our new

¹ Since the above was written, I have ascertained, that there was in fact a certain quantity of the earth of beryl dissolved by the potash with the alumine; and that instead of 8 per cent, the beryl contains 16.

² The most characteristic property of this earth, confirmed by the latest experiments of our colleague, being, that it forms salts of a saccharine taste, we propose to call it Glucine, sweet. . . . Note of the Editors of the Annales.



NICHOLAS LOUIS VAUQUELIN
French chemist who discovered beryllium
and many other elements.

earth is contained. We shall speak of it again in the subsequent part of this Memoir. . . .

Exposition of the Properties of the new Earth contained in the Beryl

Experiment 1. The 12 parts of earth united with carbonic acid, as before mentioned, were put into sulphuric acid, which dissolved them completely with effervescence. The solution had a very saccharine taste at first, and astringent at last. The solution left till the following day afforded irregular crystals, very solid and saccharine like the solution which afforded them.

Experiment 2. These crystals were again dissolved in water; the solution mixed with sulphate of potash did not afford alum either immediately nor by evaporation, as happens in the alumine when combined with sulphuric acid. Each of these salts crystallizes separately, without contracting any union. . . .

With regard to the proportion in which I have obtained this earth of the beryl, I do not give it as strictly accurate; for it is possible that part may have been dissolved at the same time as the alumine by the potash.¹

I have not yet thought it proper to give a name to this earth. I shall wait till its properties are better known; be-

sides which, I should be glad to have the advice of my brother-chemists on the subject.³

In a second memoir, I shall speedily give the most complete account in my power, of its combinations with the acids and some of the combustible bodies.

INFORMATION RESPECTING THE EARTH OF THE BERYL; in Continuation of the First Memoir on the same Subject. By Citizen Vauquelin.

A Table of the general Properties of the Earth of the Beryl

1. It is white.
2. Insipid.
3. Soluble in water.
4. Adhesive to the tongue.
5. Infusible.
6. Soluble in the fixed alkalis.
7. Insoluble in ammoniac.
8. Soluble in the carbonate of ammoniac.
9. Soluble in almost every one of the acids (except the carbonic and phosphoric acids).
10. Fusible with borax into a transparent glass.
11. Absorbs one-fourth of its weight of carbonic acid.
12. Decomposes the aluminous salts.
13. Is not precipitable by well-saturated hydro-sulphurets.

A Table of the specific Characters of the Earth of Beryl

1. Its salts are saccharine, and slightly astringent.
2. It is very soluble in the sulphuric acid by excess.
3. It decomposes the aluminous salts.
4. It is soluble in the carbonate of ammoniac.
5. It is completely precipitated from its solutions by ammoniac.
6. Its affinity for the acids is intermediate between magnesia and alumine.

None of the known earths unite the six properties announced in this table.

I present to the Institute a certain quantity of this earth, and shall produce at one of its future sittings a series of combinations formed with this earth, extracted from a considerable quantity of beryl given to me by Citizen Patrin, whose zeal for the advancement of the sciences is well known to every one of their cultivators.

Proof by Sir Humphry Davy
that the alkaline earths are oxides of metals will be presented in next week's
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