The reaction is readily understood; the carbonic acid in the water dissolves a little carbonate of baryta, which is immediately reprecipitated in the form of sulphate, carrying down a portion of the sulphuric acid of the soluble sulphate, and replacing the same with carbonic acid; this is rapidly repeated through the agency of the free carbonic acid, until the decomposition of the sulphate is complete.

Among many experimental results, I will give the following: Five grammes of the sulphate of potash, dissolved in carbonic acid water, to which was added seven grammes of precipitated carbonate baryta, after four and a half hours' shaking (being attached to a suitable piece of machinery), on testing showed not a trace of sulphuric acid, care being taken to wipe the neck of the bottle near the end of the stopper before pouring out the liquid.

Other experiments, varying in proportion, gave similar results. I tried to substitute the natural for the precipitated carbonate of baryta, but with very unsatisfactory results.

Directions for Conversion of the Alkaline Sulphates into Tartrates, Oxalates, etc.—As the tartrate and oxalates of baryta are but very slightly soluble in water, we cannot form the alkaline salts of these acids by direct double decomposition of the sulphates of the alkalies and the tartrate, etc., of baryta, as in forming the alkaline chlorides from the sulphates; but it is easily done by the following indirect process:—

Add to the alkaline sulphates in solution, in a porcelain capsule, carbonate of baryta rubbed up into a thick cream in the proportion of about five of the sulphate to seven of the carbonate of baryta; heat the mass and add little by little the requisite quantity of tartaric or oxalic acid; solution of the baryta and precipitation of the sulphuric acid take place rapidly, and the decomposition is soon completed.

I have used this process of forming the bitartrates in the process of separating potassium, rubidium, and cæsium, that were in the form of sulphates.

The carbonate of the alkalies can also be formed by first forming these organic salts from the sulphates, evaporating the solution to dryness, and burning the residue; in fact, I frequently find it more convenient to convert the sulphates of the alkalies into their carbonates by this last instead of the first process. And, finally, I would remark that where magnesia is present with the sulphates, this is also separated from the alkalies.

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