

In carrying out the determinations a measured quantity of the molybdic acid solution was introduced into an Erlenmeyer flask. This was followed with a definite volume of hypophosphorous acid of known strength. The mixture was then diluted to 150 cc. with water, and boiled on a stove plate for a definite period. After this the solution was chilled and immediately titrated with the permanganate solution.

An examination of the results warrants the conclusion that hypophosphorous acid reduces molybdic acid to the pentoxide (Mo_2O_5), and further that the method can not be regarded as applicable for trustworthy quantitative determinations of molybdenum.

UNIVERSITY OF PENNSYLVANIA.

ON THE CONSTITUTION OF BARYTOCELESTITES.¹

BY C. W. VOLNEY.

Received January 5, 1899.

ON a former occasion² I presented the result of analytical work and investigations on barium and strontium minerals occurring in the crystalline limestone of Eastern Ontario. I now have the honor to report on the analysis of a fourth species of these minerals from the same locality.

In the previous report, I have described the analytical methods. The principal interest may be found in the deductions and conclusions which follow the chemical work.

To judge from current literature, opinions seem to be uncertain as to the composition or existence of barytocelestites. Rammelsberg³ states that Thomson's barytocelestites from the Lake Huron district was found by Professor Hunt to be free from barium. Dana, in his system,⁴ is of the same opinion, and in the sixth edition⁵ mentions merely the analyses, showing celestites with varying amounts of barium sulphate.

The celestite from Lausdowne, Eastern Ontario, reported from my analysis in 1891 as containing over three per cent. of barium sulphate, was likewise found by the analyst of the Canadian Geological Survey to be pure strontium sulphate, with only

¹ Read at the New York meeting of the American Chemical Society, December 28, 1898.

² This Journal, 13, 290 (1897).

³ Rammelsberg, *Mineralchemie*, 2d edition, p. 255.

⁴ Dana's System, V, p. 620.

⁵ Dana's System, VI, p. 906.

a trace of barium sulphate.¹ This is the same mineral which had been formerly² noted by Professor Hunt as barite.

So far, then, although various mixtures of barium sulphate and strontium sulphate have been mentioned as existing in minerals, we know of no definite occurrence of minerals constituted of these two sulphates.

The mineral, which I now place before you, gave on analysis the following results:

| | Per cent. |
|--|-----------|
| BaSO ₄ | 30.850 |
| SrSO ₄ | 70.010 |
| Al ₂ O ₃ } | 0.005 |
| Fe ₂ O ₃ } | |
| CaO | |
| MgO | |
| H ₂ O | |
| | 100.865 |

It occurs also in the Silurian crystallized limestones of Eastern Ontario, and is usually mentioned as fibrous, radiated celestite.

The mineral, reported upon previously, consisted practically of

| | |
|-------------------------|--------|
| BaSO ₄ | 39.850 |
| SrSO ₄ | 58.200 |
| | 98.050 |

Their constitution may be thus represented:

| | Calculated. | Found. |
|---|-------------|---------|
| BaSO ₄ | 39.026 | 39.850 |
| (SrSO ₄) ₂ | 60.974 | 58.200 |
| | 100.00 | 98.050 |
| | Calculated. | Found. |
| BaSO ₄ | 29.67 | 30.850 |
| (SrSO ₄) ₃ | 70.24 | 70.010 |
| | 100.00 | 100.860 |

The sulphuric acid of these minerals determined from the alkaline sulphates gave the following results:

| Barium sulphate. | Barium sulphate. |
|------------------|------------------|
| I. | II. |
| 1.179 | 1.203 |
| 1.186 | 1.198 |
| 0.163 | 1.201 |

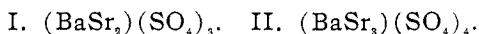
¹ Report of the Geological Survey of Canada (1894.)

² Report of the Geological Survey of Canada (1863-1867.)

or an average of 1.176 and 1.201, which makes the percentage of sulphur trioxide in either as follows:

| | | |
|----------|-------|--------|
| I | 40.03 | 40.377 |
| II | 40.89 | 41.23 |

From these data, the constitution of these two minerals may be expressed as



The four minerals collected from the above-named districts, have the following specific gravities:

| | Sp. gr. |
|--------------------------|---------|
| Barite | 4.3989 |
| Celestite | 4.410 |
| Barytocelestite, I | 4.188 |
| " II | 4.123 |

The celestite and the two barytocelestites afford well-defined and distinct crystals. As they differ more or less from each other, although both of orthorhombic crystallization, the differences in crystallization may lead to some conclusion as to the influences, which different equivalent proportions of the strontium sulphate may have upon their isomorphous relation to each other. I hope to be enabled to lay these crystallographic relations before you at an early date, and thus conclude this investigation.

NEW YORK, December 17, 1898.

NOTES.

The Determination of Arsenic in Glycerine.—Mr. G. E. Barton has called my attention to the fact that in my outline of his paper on this subject, I quoted only one of the methods used by him, and neglected "to state that a direct addition of the glycerine (without charring) to the reduction flask was finally used as more accurate." Mr. Barton considers that this should be accepted as his method.

A. C. LANGMUIR.

Corrections in Baumé's Hydrometer Tables.—I am advised by Mr. G. E. Barton of three errors in the hydrometer tables printed in the March number. On page 127 at 28.6° read '0.8827' instead of '0.8821', and at 36.3° read '0.8419' instead of '0.8418'; on page 132 at 75.0° read '0.6829' instead of '0.6830'. Mr. Barton also states that he has checked all the figures except those for the eighths of degrees; this fact will doubtless add to the confidence in the accuracy of the tables.

SIDNEY S. EMERY.