

ANALYTICAL ESSAYS
TOWARDS PROMOTING
THE
CHEMICAL KNOWLEDGE
OF
MINERAL SUBSTANCES.

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CHEMICAL EXAMINATION

OF

PHARMACOLITE.

THE fossil denoted by the specific name, *Pharmacolite*, breaks in the mine *Sophia*, near *Wittichen*, in the *Fürstenberg* territory. It occurs there in the separations and clefths of a cobaltiferous granitic rock, in small white crystals of a silky gloss, which seldom are prismatic, but commonly capillary, and accumulated sometimes in the small botryoidal, sometimes in a fascicular manner; it also now and then exhibits a red cobaltic investment. Mr. *Selb* was the first who directed our attention to this fossil, and has, from his previous experiments, suspected it to be *arseniated lime*. This conjecture is fully confirmed by the following examination; to perform which, Mr. *Selb* himself has kindly sent me the necessary quantity.

The mineralogical Public has already received a sufficient description of the external characters of this fossil from Mr. *Selb**, and *Karsten*†; to which, therefore, I refer the reader.

Its specific gravity, in the botryoidally aggregated crystals, I found to be = 2.640. Mr. *Selb*, who probably

* *Scherer's Journal der Chemie.* 23 Numb. pag. 537.

† *Mineralogische Tabellen.* Berlin, 1800. pag. 75.

weighed,

weighed, for the same end, single or detached crystals, states its specific gravity only at 2.536.

Mr. *Karsten* thought the name *Pharmacolite*, suiting this fossil, because of the considerable quantity of arsenical, or poisonous acid which it contains.

A.

One hundred grains of pharmacolite were mixed with 20 grains of powdered charcoal, and heated to redness in a small retort. Upon cooling, 6 grains of metallic arsenic were found sublimed.

b) The residue was extracted by *nitric acid*, the filtered solution reduced by evaporation, and treated with sulphuric acid.—It then yielded sulphate of lime.

B.

After these proofs of the presence of arsenical acid and calcareous earth in the fossil, as constituent parts, I attempted to ascertain their proportions in the following way.

a) One hundred grains lost, by being moderately heated in a porcelain-crucible, 22½ grains. As in this operation, neither by the smell nor by the sight, any volatilization of any principle could be observed, this loss of weight must have been caused by the escaping of the water of crystallization. On the other hand, the specimens had undergone no other change by this heating, except their surface being rendered a little duller. But the places, spotted red from the cobaltic crust, had now assumed a light-bluish colour.

b) Those $77\frac{1}{2}$ grains which remained after the ignition, dissolved in *nitric acid*, leaving a grey residue of 6 grains of siliceous, mixed with argillaceous earth.

c) The filtered-nitric solution, which somewhat inclined to the reddish, was evaporated to a smaller volume, and mixed with a solution of *acetate of lead* as long as any precipitation ensued. The precipitate, when collected, washed and dried at a raised temperature, weighed 138 grains. It consisted of arseniated lead.

Agreeably to a counter-experiment, in which 100 grains of dry acid of arsenic, dissolved in water and combined with the quantity of acetated lead requisite to effect a saturation, yielded 297 parts of arseniated lead, those 138 grains mentioned before, indicate $46\frac{1}{2}$ grains of *concrete acid of arsenic*.

d) What remained of the fluid after the separation of the precipitate, together with the washings c), was evaporated to some degree, during which *green* coloured borders appeared on the inner surface of the vessel. In order to separate the small quantity of undecomposed acetate of lead, it might yet have contained, I added the requisite quantity of *muriatic acid*. When upon farther evaporation no muriate of lead any longer appeared, I mixed the fluid with *sulphuric acid*. This produced a copious precipitate of sulphated lime, which being collected on the filter, washed with weak spirit of wine and heated to redness, weighed 54 grains. Therefore, since in 100 parts of ignited gypsum the pure calcareous earth amounts to $42\frac{1}{2}$ parts, the mentioned 54 grains determine the portion of *lime* contained in the fossil examined at 23 grains.

e) The remainder of the liquor was neutralized with carbonate of soda, and reduced to the state of ficcidity. On re-dif-

re-dissolving in water the dry saline mass, there remained a powder of the colour of flax-blossoms, and $\frac{1}{2}$ grain of weight, which tinged the borax-glass with a fine deep blue, and thus proved to be an *oxyd of cobalt*.

Those hundred grains of *Pharmacolite*, submitted to this analysis, have, therefore, been decomposed into:

<i>Acid of arsenic</i>	. . . . .	46. 50
<i>Lime</i>	. . . . .	23.
<i>Oxyd of cobalt</i>	. . . . .	0. 50
<i>Aluminous Silex</i>	. . . . .	6.
<i>Water</i>	. . . . .	22. 50
		<hr/>
		98. 50

But since the *cobaltic oxyd* is here but casually admixed, as also the *siliceous earth* originates merely from the granitic matrix, it follows, that after subtracting these, the proportions of the constituent parts in the *pure Pharmacolite*, are,

<i>Acid of arsenic</i>	50. 54
<i>Lime</i>	25.
<i>Water</i>	24. 46
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		100