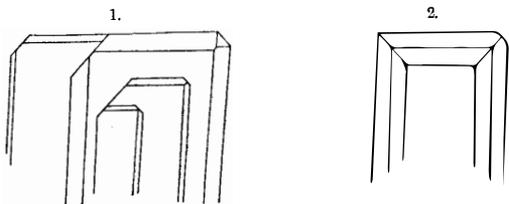


ART. XXIV.—*On the occurrence of Crystallized Carbonate of Lanthanum*; by W. P. BLAKE.

THE mineral I am about to describe was found near Bethlehem, in Lehigh Co., Pa., associated with the zinc ores of the Saucon Valley. It was thrown out from a few feet below the surface, by the miners when sinking an exploring shaft near one of the veins of calamine in limestone. A single specimen of the mineral was preserved by Dr. W. W. Dickenson the superintendent, who at my request furnished me with a part of it for examination. The specimen was about three inches in diameter and attracted my attention by its delicate pink color and peculiar structure, being an aggregation of thin plates and scales of a pearly luster, forming a light reticulated mass which was found to be highly crystalline on examination by a glass, and the crystals were apparently rectangular in form. A more satisfactory examination of them was made by placing some loose fragments upon the stage of a microscope, and viewing them with a glass of moderate magnifying power. The appearance in the field of the instrument was beautiful and exceedingly interesting, each minute fragment being a part of a well formed tabular crystal, and retaining many of its edges and angles. It became evident that the angles formed by the meeting of the principal edges were oblique. Each large crystalline plate had upon its broad surface one or more smaller crystals.

Two of the forms observed are here represented.



The edges of all the crystals appeared to be beveled, and one or two were seen on which there was a double bevelment as represented in the second figure.

The crystals were so very thin that it was not possible to measure the inclinations of these planes.

I however obtained the angles of the tables by the aid of the rotating eye-piece micrometer attached to Nachet's large microscope. The crystal gave the angles  $94^\circ$  and  $86^\circ$ .

The measurements were repeated upon several crystals in different parts of the field with uniform results, as here given.

	I.	II.	III.	IV.	V.
Obtuse,	$93^\circ 30'$	$93^\circ$	$94^\circ$	$94^\circ$	$93^\circ$
Acute,	$86^\circ-86^\circ 30'$			$86^\circ$	

On examination by polarized light, the crystals were found to refract doubly.

The isolated plates or crystals appear transparent, and nearly colorless, but when the mineral is seen in mass it has a beautiful pink or rose color, and is not unlike that of peach blossoms.

The hardness is about 2 (Mohs's scale), or nearly that of gypsum.

I obtained for the specific gravity at  $60^\circ \text{F}$ . 2.666, which is the result of one determination only, and needs repeating, as minute parts of the light scales floated upon the water.

The reactions of the mineral before the blowpipe are as follows.

BB. In forceps—contracts greatly, whitens, becomes opaque, and when cold is brown and has a silvery lustre. Infusible.

BB. In tube, gives off water abundantly. With borax in *oxidizing* flame dissolves, giving a slightly blue glass which becomes reddish on cooling, and when cold has a purple or amethystine tinge. In *reducing* flame nearly the same.

With microcosmic salt; a blue glass, while hot amethystine, and red when cold; the bead becomes opaque when but slightly heated, and retains a pink color. With carbonate of soda, a green reaction similar to that given by manganese.

The crystals dissolve rapidly in dilute chlorohydric acid, with brisk effervescence; ammonia precipitates from this solution a bulky precipitate of a delicate pink color which is insoluble in an excess of the precipitant; the filtrate leaves no residue on being evaporated to dryness.

The following are the chemical characters of the mineral as given by Prof. J. Lawrence Smith, who has kindly examined it for me.

"The mineral gives all the reactions for lanthanum and didymium, water and carbonic acid. A gentle heat expels its water. It is readily dissolved in the stronger acids with violent effervescence, and if sulphate of potash be added to the solution, a granular precipitate takes place (characters belonging to cerium lanthanum and didymium). A concentrated cold solution of the sulphate deposits on boiling small prismatic crystals, which, redissolved on the cooling of the solution, afford unmistakable evidence of the presence of sulphate of lanthanum or its like. The mineral when heated to redness loses all its water, and a large portion of carbonic acid, but it requires a long continued heat to expel the last traces; the residue is of a light brown color; if this be treated with nitric acid re-ignited and then thrown into water containing

one-hundredth part of nitric acid, it will be slowly but completely dissolved, an evidence of the absence of cerium. As to the presence of didymium, it was only indicated by the color of the oxyd; the quantity of the mineral was too small to enable me to decide in any way as to the amount of that substance mixed with the lanthanum.

A quantitative examination, in which every thing was estimated directly, gave,

Water,	-	-	-	-	24.09
Carbonic acid,	-	-	-	-	22.58
Oxyd of lanthanum and didymium,					54.90
					101.57

The excess in the analysis is due to the peroxydation of a portion of the oxyds; but as we are not yet possessed of any accurate method of reducing them, the analysis must stand as it is. Other analyses were made of the separate constituents, the results of which accord with the above, and give the formula,  $\text{La}\ddot{\text{C}}+3\text{H}$ , the per-centage of which is water 25.95, carbonic acid 21.11, oxyd lanthanum 52.94 = 100.00.

This carbonate is the artificial carbonate commonly obtained by adding the alkaline carbonates to a soluble salt of lanthanum."

I have obtained the following per-centage weights, for the separate constituents.

	La	$\ddot{\text{C}}$	$\ddot{\text{C}}+\text{H}$ (by ign.)
I.	54.27	19.13	45.07
II.	54.93	—	45.07
III.	54.64	—	45.36

Another determination of carbonic acid gave 19.936 p. c. Subtracting the mean of the two determinations of carbonic acid from the loss by ignition gives, 25.68 per cent. as the amount of water.

These results are sufficient to show that the mineral is a simple carbonate of lanthanum with three atoms of water, and I prefer to describe it as *Lanthanite*, although its composition is very different from that given by Mosander to the mineral found at Bastnäs in Sweden, which has been examined in small quantities only, and possibly in a state of admixture, so that considerable doubt as to its constitution seems to exist; it is now important that it should receive a reëxamination as it very probably has a composition corresponding with the mineral just described.

The occurrence of carbonate of lanthanum almost chemically pure with zinc ores in limestones of silurian age, is a fact of no small interest. It should be remarked, however, that the limestones have decomposed to a considerable depth, and left the fine ore, together with peroxyd of iron and manganese, in the soil; the Lanthanite was only six feet below the surface.