ART. VII.—*On a new mineral, Pyrophosphorite: an Anhydrous Pyrophosphate of Lime from the West Indies*; by CHARLES UPHAM SHEPARD, Jr., Professor of Chemistry in the Medical College of the State of South Carolina.

THROUGH the kindness of Mr. C. C. Wyllie of London, England, I have been put in the possession of a few small fragments of a mineral phosphate from a new locality in the West Indies. Commercial considerations forbid at present the publication of the precise position of this deposit, but later I hope to be able to announce it, as also to give information with regard to the extent, mode of occurrence, and so on.

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The mineral is generally snow-white and opaque, with here and there a slight tinge of bluish-gray. The white portion is dull and has an earthy fracture like magnesite; the grayish—constituting perhaps one-third of the mass—is small-botryoidal like gibbsite, and is somewhat the harder of the two.

The specific gravity varies between 2.50 and 2.53; hardness between 3 and 3.5. Before the blowpipe it melts with difficulty on the edges to a whitish enamel.

The following are the results of several chemical analyses of the mineral, as executed on two different portions of material:

	1st Series.	2d Series.	Mean.
Loss on ignition	0.390	-----	0.390
Lime	44.50	44.424	44.462
Magnesia	3.04	3.141	3.090
Sulphuric acid	0.57	0.687	0.628
Phosphoric acid	50.97	50.629	50.799
Silica	0.30	0.434	0.367
Oxide of iron and alumina ----	-----	0.437	0.437
			<hr/> 100.173

If we add together the adventitious ingredients, viz: the pyrophosphates of iron and alumina (taking an equal portion of phosphoric acid as the oxide of iron preponderates), the sulphate of lime, silica and loss on ignition, we obtain:

	Per cent.
Pyrophosphates of iron and alumina	0.874
Sulphate of lime	1.068
Silica	0.367
Loss on ignition	0.390
	<hr/> 2.699

There remain,

	Per cent.	
Lime	44.022	or 45.16
Magnesia	3.090	3.17
Phosphoric acid	50.362	51.67
	<hr/> 97.474	<hr/> 100.00
		} on raising the
		} 97.474 per cent.
		} to 100 per cent.

The above composition agrees with the formula

which would require the following amounts of

	By calculation.	Actually found.
Lime	45.20 per cent.	{ 45.16 per cent. 3.17 51.67 <hr/> 100.00
Magnesia	3.23	
Phosphoric acid ..	51.57	
	<hr/> 100.00	

* Expressed according to atomic system $\text{Mg}_2\text{P}_2\text{O}_7 + 4 \left\{ \begin{array}{l} \text{Ca}_3\text{P}_2\text{O}_8 \\ \text{Ca}_2\text{P}_2\text{O}_7 \end{array} \right.$

The mineral therefore is (essentially) anhydrous ortho-pyrophosphate of lime with pyrophosphate of magnesia. The absence of water naturally suggests that its repository must have been in contact with some igneous formation. The proportion of phosphoric acid exceeds that of any known calcic phosphate, and it is likewise distinguished by its excess of phosphoric acid over the bases, in conjunction with almost total absence of water of chemical combination. This latter property separates it distinctly from the class of phosphates represented by the Mejillones and Raza deposits.