

SHORT COMMUNICATIONS

Bolivarite restudied.

EXAMINATION of some amorphous aluminium phosphates led the author to check the physical and chemical properties of bolivarite. The mineral was originally described by L. Fernández Navarro and P. Castro Barea,¹ but no further complete study seems to have been undertaken. Bolivarite, to which the formula $\text{Al}_2(\text{PO}_4)(\text{OH})_3 \cdot \text{H}_2\text{O}$ had been assigned, was not unanimously considered as a really valid species and verification was deemed necessary.² In order to provide information that might be useful for discussion, the newly observed data are here published.

The present study has been made on the type material from Pontevedra, Spain, and the obtained results are compared with those earlier reported.

Optics

Very weakly birefringent.

A mosaic texture becomes easily visible with the gypsum plate.

$n = 1.506 \pm 0.001$.

Strongly fluorescent with bright green colour.

Cryptocrystalline, very weakly birefringent.¹

Isotropic.^{3,4}

$n = 1.493,^3 1.496.^4$

Strongly fluorescent with blue-green colour.⁵

X-rays

Amorphous.

Amorphous.³

Specific gravity

2.04 ± 0.01 (with Berman's micro-balance).

2.05.¹

Chemical composition

	%	Mol. ratios		% ¹	Mol. ratios
Al_2O_3	36.2	0.355	Al_2O_3	44.07	0.432
P_2O_5	24.9	0.175	P_2O_5	34.93	0.246
Loss on ignition ...	39.5*	2.192	H_2O	20.60	1.143
Total	100.6		Total	99.60	
H_2O at 110° C. after 88 hours	25.5				

* Taken as total H_2O .

It can be seen that the ratio $\text{Al}_2\text{O}_3:\text{P}_2\text{O}_5 = 2$ is confirmed. The agreement is even better in the new analysis. On the other hand, a serious discrepancy lies in the total water content. The loss of weight at 110° C. is even higher in the recent determination than the total water content

in the original description. One would rather expect that an amorphous mineral, stored in museum conditions, should eventually have lost humidity. An explanation may be that the original analysis was made on more or less dried material.

Referring to the new chemical data, bolivarite can now more satisfactorily be compared with the related amorphous aluminium phosphates, evansite and vashegyite, which, according to the recorded data in the literature, show, respectively, $H_2O \sim 40\%$, $Al_2O_3:P_2O_5$ 2.25 to 3.07, n 1.483 to 1.50, sp. gr. 1.82 to 2.13, and $H_2O \sim 40\%$, $Al_2O_3:P_2O_5$ 1.26 to 1.48, n 1.47 to 1.505, sp. gr. 1.96 to 2.0.

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¹ L. Fernández Navarro and P. Castro Barea, Bol. real Soc. Esp. Hist. Nat., 1921, vol. 21, p. 326.

² Dana's System of Mineralogy, 7th edn, 1951, vol. 2, p. 872.

³ R. L. Manly Jr., Amer. Min., 1950, vol. 35, p. 108.

⁴ E. S. Larsen and H. Berman, Bull. U.S. Geol. Surv., 1934, no. 848, p. 49.

⁵ W. L. Brown, Univ. Toronto Studies, Geol. Ser., 1933, no. 35, p. 19.

British gold from the Bouglise collection.

NATIVE gold from Cumberland is a rarity, although Calvert in 1853¹ mentions several localities where he collected specimens and makes particular reference to the Goldscoop (Goldscope) mine near Keswick, which was worked from very early times for copper that had a high gold and silver content. However it was not until 1956, when Mr. A. W. G. Kingsbury presented a specimen (B.M. 1956, 410) collected by himself from Grainsgill, that the British Museum possessed any Cumberland gold. Therefore it was with considerable interest that we heard of a specimen labelled 'Cumberland, England' in the collection of Harvard University.

The gold occurs in minute grains and crystals in a quartz gossan with caledonite, linarite, cerussite, and hemimorphite. This specimen (Harvard 100289) originally came from A. E. Foote of Philadelphia, Pennsylvania. It found its way into the collection of Georges de La Bouglise, a French mining engineer who specialized in collecting gold from every possible locality, many of which he had visited personally. In 1911 this collection was sold in Paris to an American mining pro-