

The 'baddelyite from Alnö'—an error.

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IN most mineralogical text-books the nepheline-syenite area of Alnö, on the east coast of Sweden, is given as one of the few localities of the rare mineral baddelyite, ZrO_2 . This information is based on a communication by E. Hussak,¹ who claimed to have discovered the mineral in jacupirangitic varieties of the Alnö nepheline-syenites.

The present writer, being engaged with a petrological and mineralogical revision of the Alnö occurrence, earlier described by A. G. Högbom² in his classic memoir of 1895, has in vain looked for the presence of baddelyite. Hussak claimed to have isolated by means of Klein's solution 0.38 gram of pure baddelyite from 100 grams of rock, as well as to have obtained characteristic ZrO_2 crystals in a borax bead test. Repeated isolation tests with Clerici's solution on samples from various localities within the Alnö area, however, furnished nothing but residues of melanitic garnet.

If a percentage of close to 0.4 ZrO_2 were really present in the rock, the prominent Swedish chemists Sahlbom, Blix, and Berggren, collaborating with the present writer, could hardly have failed to detect it. Numerous analyses and spectrograms of the jacupirangitic rocks of Alnö have been executed without disclosing even traces of ZrO_2 . On the whole, zirconium has been found to be an extremely rare element in the nepheline-syenites of the region. After having examined hundreds of thin sections the present writer, therefore, has come to the conclusion that the mineral baddelyite probably does not exist at Alnö, and certainly not in the mineral paragenesis, claimed by Hussak, whose assertion to the contrary must be founded on error.

As a reasonable explanation of his mistake may be suggested the confusion with anisotropic, highly titaniferous melanite. This latter mineral occurs interstitially within the fabric of the jacupirangitic differentiates of Alnö; the typical garnet crystal-form being suppressed or distorted. Besides, the garnet is occasionally found to be zonal in a way that may easily be mistaken for the twinning on (100) or (110) of baddelyite.

¹ E. Hussak, *Neues Jahrb. Min.*, 1898, vol. ii, pp. 228–229.

² A. G. Högbom, *Geol. För. Förh. Stockholm*, 1895, vol. 17, pp. 100–158, 214–248.

The optical characteristic values of the highest birefringent melanite were determined by the present writer and are given below in comparison with those of baddelyite, as recorded by Larsen.

	Anomalously birefringent Alnö melanite.		Baddelyite.	
2V (Na) ...	24°-33° (negative)		2V ...	30° (negative)
β	1.91-1.98		β ...	2.19
$\gamma-\alpha$ (Na)...	0.042-0.056		$\gamma-\alpha$...	0.070

This striking agreement between the optical values may have led Hussak to his erroneous conclusion, especially as he carried out his investigations on a few samples of dunitic jacupirangite, supplied by Högbom, without being familiar with the aspect of birefringent 'dodecahedral' melanite, generally occurring in most other types of Alnö nepheline-syenites. A check by the present writer on Högbom's original material, still preserved, failed to disclose the presence of any baddelyite. Hussak may also have been influenced by the suggestive similarity in the mineral paragenesis of the basic varieties of the Brazilian and the Alnö jacupirangites.

Hussak's measurement of crystal angles corresponding with those of baddelyite is puzzling, as also is his statement of an 'oil-green to reddish-brown' pleochroism. The former may be due to a mix-up with Brazilian crystals in his laboratory; and the latter suggests a confusion with titaniferous pyroxene. On the other hand, there is a slight possibility of the samples, sent by Högbom, being exceptional boulders picked up along the Alnö shore and derived from another alkalic locality. Such an occurrence has recently been discovered by the present writer about 18 miles north of Alnö, where it lies submerged. The adjoining shores of the Baltic are littered with carbonatitic boulders.

However this may be, the present writer can but conclude that the present references in the mineralogical text-books to Alnö as a locality for baddelyite are erroneous.