

IV.—*Additional Note on Penwithite.*

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SINCE my former communication to the Mineralogical Society* I have been endeavouring to obtain a sufficient quantity of the pure mineral therein described to complete my analyses. Plenty of what certain dealers have been selling as Penwithite is obtainable from the rubbish heaps at Wheal Owles, but this is mostly dark-brown—nearly or quite opaque, pitch-like in appearance, and of very variable composition—the silica alone varying from 22 up to 57 p. c., and the sp. gr. often being as high as 3·4.

The true mineral is sometimes attached to masses of such material—it is highly vitreous and transparent, from dark amber to reddish-brown in colour, H. 3·5 and *sp. gr. only* 2·49—a remarkable circumstance considering the large amount of manganous oxide present. Its other properties are as stated in my former note ; for convenience I reproduce the particulars here. It is brittle, has a highly conchoidal fracture ; heated in matrass gives off water, but is otherwise unchanged ; strongly heated in platinum forceps fuses slightly on edges ; when digested in coarse powder in hydrochloric acid oxide of manganese is dissolved out and the silica which remains is perfectly colourless.

The mean of three more or less complete and fairly concordant analyses, each, however, performed on less than $\frac{1}{2}$ a gram of the mineral, is as follows :—

Water	21·80 p. c.
Silica	36·40
Oxide of manganese	37·62
Manganic anhydride	tr. †
Oxide of iron	2·52
Uranium peroxide	·30
Copper	tr.
		98·64

Reckoning the iron and uranium as manganese, this answers very closely to the formula $Mn Si O_3 + 2 H_2O$, which requires the following proportions :—

MnO	42·5
Si O ₂	35·9
H ₂ O	21·5
		99·9

* *Min. Mag.*, Vol. II, p. 91.

† The powdered mineral when warmed with solution of potash communicates a green tinge from the formation of manganate.

The chemical composition of this mineral places it near Dana's Neotokite (var. Wittingite)* from Bredvik, which was analysed by Nordenskjöld, but the manganese in this latter is in the form of sesquioxide, while in Penwithite it is a protoxide. Moreover, the physical properties are greatly different.

Neotokite is said to be formed by the alteration of Rhodonite, but this does not appear to be the case with Penwithite. On the contrary, it is in some specimens accompanied by entirely unaltered Rhodocrosite, a mineral much more readily altered than Rhodonite: it seems to have been formed like opal by the deposition of a gelatinous siliceous solution in cavities of pre-existing rocks, and several varieties of opal have in fact been found at Wheal Owles, some of them slightly tinged with manganese oxide.

* Dana, Syst. Min., 1875, p. 491 anal 8.