XXXII.—*Notes on a Cornish Mineral of the Atacamite Group.*

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The atacamite from Copiapo, Chili, has invariably, according to Field, the composition represented by the expression—

$$CuCl_2.3CuH_2O_2.aq.$$

In a paper on the cupric oxychlorides of Cornwall, lately published in the "Journal of the Chemical Society," I have shown that the atacamite lately detected in Great Britain, has exactly the same composition, but that it is sometimes accompanied by an uncrystallized blue oxychloride which gives on analysis numbers leading to the formula—

$$CuCl_2.4CuH_2O_2.4\ aq.$$

Mr. Talling has directed my attention to another copper mineral. The quantity as yet found of the last-named substance is small, and my examination of it has been but imperfect. I have, how-

ever, obtained evidence more than sufficient to prove it distinct from the ordinary atacamite. Berthier's atacamite from Tocopilla, Cobija, in Bolivia, the variety *C* of Rammelsberg if the specimen analysed were really pure, may be identical with the present mineral. I give below a condensed account of the composition, &c., of this cupric oxychloride, the third member of the atacamite group occurring in Cornwall.

Botallackite. Usually in thin crusts of minute interlacing crystals closely investing killas. Density near 3·6. Lustre, various. Colour, pale mountain-green. Streak, white. Translucent under the microscope. Composition, $CuCl_2 . 3CuH_2 . O_2 3aq$. The numbers demanded by this formula and those furnished by analysis are :—

Theory ..	Cl 14·76 ..	CuO 66·11 ..	H_2O 22·45	= 103·32
Experiment	Cl 14·51 ..	CuO 66·25 ..	H_2O 22·60	= 103·36

Before the blowpipe and with acids and ammonia, botallackite behaves like atacamite.

Botallackite occurs in a part of the Botallack mine, where an infiltration of sea-water occurs ; it is associated with atacamite and tallingite. It seems sufficiently definite to require a name, whether it be ranked as a species, a sub-species, or a variety only.

In the paper before referred to I mentioned the probable existence of a cupric oxychloride (of a darker blue colour), more basic than tallingite. I have obtained fresh supplies of the mineral, and the analyses gave the following numbers :—

·349	gramme of substance	gave	·1205	grm. AgCl
·593	,,	,,	·211	,,
·593	,,	,,	·4	,, CuO
·349	,,	,,	·234	,, ,,
·593	,,	,,	·1575	,, H_2O

The mean percentages deduced from these numbers and compared with those demanded by the formula $CuCl_2.6CuH_2O_2.6aq$. are as follows :—

	Experiment.	Theory.
CuO	67·25	67·25
Cl	8·73	8·58
H_2O	26·56	26·13

But as other analyses gave numbers less accordant with the above

formula, I am not inclined to acknowledge without hesitation the existence of another blue oxychloride.

The native oxychlorides of copper may be divided into two groups, as shewn in the annexed list :—

GREEN OXYCHLORIDES.

Atacamite Group.

Atacamite		$CuCl_2.3CuH_2O_2.aq$
,,	var. *A* of Ramm^s	$CuCl_2.3CuH_2O_2$
,,	var. Botallackite	$CuCl_2.3CuH_2O_2.3aq.$

BLUE OXYCHLORIDES.

Tallingite Group.

Tallingite		$CuCl_2.4CuH_2O_2.4Aq.$
,,	var.?	$CuCl_2.6CuH_2O_2.6aq.$

How far these minerals are transitional states of others—whether in fact they are all perfect or *mature* minerals—synthetical experiments may aid in determining. The action, for example, of sea-water or, better, of a 10 per cent. solution of NaCl, on chessylite, or malachite, promises interesting results.