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IN ALL ITS APPLICATIONS TO

PHARMACY, ARTS, AND MANUFACTURES.

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MDCCLXV.

## SCIENTIFIC AND ANALYTICAL CHEMISTRY.

*On the Presence of Didymium in Churchite,*  
by C. GREVILLE WILLIAMS, F.R.S.

In the course of some recent experiments upon the preparation of pure cerium, I found Gladstone's optical test always to reveal the presence of didymium in oxide of cerium, no matter how carefully prepared by any of the methods at present in use. It is also well known that the oxide of cerium, from all the minerals which have as yet been discovered, contains didymium and lanthanum. This made me desirous of ascertaining whether the new and highly interesting mineral described by Professor Church in the CHEMICAL NEWS for September 15, 1865 (and for which I venture to propose the name of churchite), contained cerium only, as, if so, it would be the only one known from which pure cerium compounds could be prepared. It is true that Church assumes in his notice that the oxide of cerium obtained by him consisted of the mixed earths; but as he does not state that he specially searched for the other metals, I presume he took it for granted that didymium and lanthanum were present in the oxide weighed by him. I, therefore, seized the first opportunity of optically examining a solution of the mixed cerium earths from churchite, the result being that the lines indicative of didymium showed themselves in the most distinct and beautiful manner.

The above experiment with the prism serves, therefore, to confirm the results of Professor Church's chemical analysis, and indicates the cerium earths in churchite to consist of the same mixture found in cerite, altanite, orthite, &c.

Churchite is so little known at present, and appears to be so excessively rare, that some time will probably elapse before enough will be obtained to enable the presence of lanthanum to be determined chemically.

*Revision of the Mineral Phosphates, by A. H. CHURCH, M.A. Oxon., Professor of Chemistry, Royal Agricultural College, Cirencester.*

## No. V.—URANITE.

(Continued from vol. x., page 291.)

THERE is no occasion to question the generally-received formula for uranite (the torberite of Brooke and Miller). Assuming the atomic weights of copper = 63·5, and that of uranium = 120, the expression for uranite is—



This, with the lower atomic weight, becomes in the mineralogical notation—



But there is one point connected with the chemistry, of this mineral which seems to demand inquiry. The existence of a lime-uranite has been well established; it is now usually distinguished as a good species, and termed autunite. In autunite, which is generally of a pure lemon or sulphur yellow colour, the oxide of copper of the green uranite has been entirely replaced by lime. But there exist numerous specimens of uranite which are exactly intermediate in colour between uranite and autunite; these have sometimes been classed with one species, sometimes with the other. From my experiments I believe one may be justified, where other characters are indeterminate, in classing all apple-green

and siskin-green uranites with the true copper uranite; I have not as yet met with any green autunite. The following analyses were made with a very pale Cornish specimen; the lime, it will be seen, is in very insignificant proportion; the presence of nearly 2 per cent. of  $\text{As}_2\text{O}_5$  replacing part of the  $\text{P}_2\text{O}_5$ , is, however, worthy of note—

	a	b
$\text{U}_2\text{O}_3$	. . .	61·00 per cent.
$\text{CuO}$	8·71	8·56 "
$\text{CaO}$	. . .	·62 "
$\text{P}_2\text{O}_5$	13·99	13·94 "
$\text{As}_2\text{O}_5$	. . .	1·96 "
$\text{H}_2\text{O}$	. . .	14·16 "
		100·24

The following are the percentages demanded by the formula before given:—

$\text{U}_2\text{O}_3$	. . .	61·18
$\text{CuO}$	. . .	8·44
$\text{P}_2\text{O}_5$	. . .	15·10
$\text{H}_2\text{O}$	. . .	15·28

These numbers closely accord with the experimental values previously recorded. The specimen analysed, though it might easily have been mistaken for autunite, contained the full percentage of  $\text{CuO}$  found in uranite. The arsenic acid has not, I believe, been previously observed in this mineral. The deficiency of water arose from the over-drying of the powdered substance. In vacuo over oil of vitriol it loses part of its water of crystallisation, and becomes yellow where a thin layer of the powdered mineral is exposed. In the ordinary air of a room it reassumes its natural tint, and regains part of the water lost.

## PHARMACY, TOXICOLOGY, &amp;c.

*Report on the Quantity of Alkaloid in various Specimens of Citrate of Iron and Quinine, by Mr. J. C. BRAITHWAITE.\**

In a former paper, I gave the results of my investigation as to the quantity of alkaloid contained in various specimens of this valuable medicine, and expressed my opinion that quinidine, if not cinchonine, would be found in more than one sample. This opinion has been confirmed by further investigation.

In sample No. 1, containing 1·504 per cent. of quinine (equal to 2·35 per cent. of the citrate), I found neither quinidine nor cinchonine, but the quantity experimented upon was very small.

No. 2, with 1·52 per cent. of quinine (equal to 2·375 per cent. of the citrate), contained neither quinidine nor cinchonine.

These two alkaloids were also absent in No. 3, containing 3·732 per cent. of quinine (equal to 5·831 per cent. of the citrate); in No. 4, containing 4·2 per cent. of quinine (equal to 6·437 per cent. of citrat); in No. 5, containing 4·76 per cent. of quinine (equal to 7·437 per cent. of citrate); and in No. 6, containing 6 per cent. of quinine (equal to 9·375 per cent. of citrate).

No. 7 contained 7·372 per cent. of alkaloid, which, if pure quinine, would represent 11·518 per cent. of the citrate. This sample, however, contained only a mere trace of quinine, the great proportion of alkaloid being quinidine, which crystallised out from the ethereal solution. I have reason to believe that cinchonine also occurs

\* Read at the meeting of the Pharmaceutical Conference.