

ART. XXIV.—*On the identity of Scovillite with Rhabdophane;*
by GEO. J. BRUSH and SAMUEL L. PENFIELD.

LAST spring we described a hydrous phosphate of the cerium and yttrium earths from Salisbury, Conn., as a new mineral, giving it the name Scovillite.* Our attention has recently been called to the close resemblance of this mineral with rhabdophane, a mineral from Cornwall in England, originally described by W. G. Lettsom,† as essentially a phosphate of didymium and other cerium earths and supposed to be analogous to monazite in composition. A further investigation of rhabdophane by E. Bertrand‡ gave the composition as an *anhydrous* phosphate of cerium and yttrium earths closely related to phosphocerite and cryptolite. A more recent investigation by W. N. Hartley,§ however, proves the mineral to be a *hydrous* phosphate of these earths, of essentially the same composition as scovillite. Professor Hartley's analyses were published in advance of ours and we greatly regret his paper was not seen by us prior to the announcement of our results. Taken in connection with the description of the physical characters given by Lettsom, these analyses leave no doubt as to the essential identity of the two minerals, although there are variations in the relative amount of the constituent isomorphous earths. The American mineral contains no cerium oxide, and has a larger percentage of yttrium earths.

Our mineral contained 3.59 per cent of carbonic acid, which we stated might be considered as due to admixture with lanthanite $R_2(CO_3)_3 \cdot 9H_2O$, or possibly it might be an undescribed carbonate of the composition $R_2(CO_3)_3 \cdot 3H_2O$. In the former case the remaining scovillite would have the composition $R_2(PO_4)_2 \cdot H_2O$, in the latter it would be $R_2(PO_4)_2 \cdot 2H_2O$. The English rhabdophane is shown by Hartley to be free from carbonic acid, and the composition is $R_2(PO_4)_2 \cdot 2H_2O$, consequently we must conclude that the American mineral (scovillite) is associated with a carbonate of the composition $R_2(CO_3)_3 \cdot 3H_2O$. Assuming this to be true we have present in the analysis we have given 14.11 per cent of this carbonate with 85.72 per cent of $R_2(PO_4)_2 \cdot 2H_2O$. If we may calculate the theoretical composition of this phosphate, assuming the relation of the yttrium to the cerium earths to be 1:4, we have P_2O_5 28.40, $(Y, Er)_2O_3$ 11.12, $(La, Di)_2O_3$ 53.28 H_2O 7.20 = 100. This is in close cor-

* This Journal, III, xxv, 459, June, 1883.

† Comptes Rendus, April 22, 1878. Communicated to the Academy by M. Lecoq de Boisbaudran.

‡ Bulletin de la Société Minéralogique, iii, 61.

§ Journal of Chemical Society, May, 1882, p. 210.

respondence with the results found by Hartley and ourselves, which calculated for comparison up to 100, are as follows :

	Rhabdophane.*	Scovillite.	Theory.
P_2O_5 .	26.26	29.10	28.40
(Y, E) $_2O_3$ }	65.75	9.93	11.12
(La, Di) $_2O_3$ }		53.82	53.28
Fe_2O_3 ,		.29	
H_2O ,	7.99	6.86	7.20
	100.00	100.00	100.00

Of the Cornish mineral it is stated that only four specimens are known, and these are from old collections made in Cornwall prior to 1820. It is a very interesting circumstance that this rare hydrous phosphate should be found in this country, although here also only a few specimens have thus far been obtained.