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NOTES ON MINERALOGY.

No. III.

ON

SERPENTINES AND SOAPSTONES.

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THE following additional analyses of serpentines and soapstones may be considered of interest by some of your readers, particularly those relating to the serpentine porphyry of the Lizard, respecting which there has been some difference of opinion among mineralogists.

The serpentine porphyry of Cornwall consists of greenish crystals imbedded in a reddish paste; the green mineral has been pronounced diallage by Dr. Boase and Sir H. De la Beche, and the reddish paste considered by the same authorities as a species of felspar: both these opinions seem to me to be erroneous, as the porphyritic serpentine of Landewednack and Kynance Cove must be considered as composed altogether of serpentine. I have not found alumina in sensible quantity in the Cornish porphyry, and therefore its presence in the veins of steatite which intersect the serpentine porphyry is highly interesting. During a visit which I paid to this interesting locality in 1854, I ascertained the cause of the presence of alumina in the veins of soapstone. Both at Kynance Cove and Gue Grease, the serpentine porphyry is intersected by dykes of granite, and

the celebrated veins of soapstone lie spread out in sheets at the junction of the serpentine and granite; the soapstone must therefore be regarded as the result of the contact of these rocks at an elevated temperature; the serpentine supplying the magnesia; and the felspar of the granite, the alumina, necessary for the formation of the soapstone.

Analyses of Serpentine.

	No. 1.	No. 2.	No. 3.	No. 4.
Silica	38·29	40·12	42·88	41·24
Alumina	.....	trace		
Protoxide of iron	13·50	3·47	3·80	7·41
Magnesia	34·24	40·04	40·52	36·28
Water	12·09	13·36	12·64	14·16
Carbonic acid	.....	2·00	.....	
	98·12	98·99	99·84	99·09

No. 1. The red earthy, sometimes semi-crystalline base of the serpentine porphyry of Kynance Cove.

No. 2. Serpentine, carefully picked out from the verd antique of Ballinahinch, co. Galway. It is intimately mixed up with white crystalline marble, and is the result of metamorphic action. The carbonic acid present is due to small particles of limestone which could not be completely separated.

No. 3. Eruptive pale green (passing into gray) serpentine, containing abundance of magnetic iron oxide, from Zermat Thal, Switzerland.

No. 4. Dark green, glossy serpentine from Syria, precise locality unknown.

From the foregoing analyses we readily obtain the following atomic equivalents:—

Number of Atoms.

	Silica.	Protoxides.	Water.	Integers.
No. 1.	0·832	2·087	1·343	10 : 25·08 : 16·14
No. 2.	0·872	2·098	1·484	10 : 24·06 : 17·02
No. 3.	0·932	2·131	1·404	10 : 22·86 : 15·06
No. 4.	0·896	2·020	1·573	10 : 22·54 : 17·65

Notwithstanding the differences apparent in the foregoing results, they all approximate to the formula $5Si\,O^3$, $12MgO$, $8HO$, which gives for rational formula,—

$$5\{2MgO,\ SiO^3 + HO\} + \{2MgO,\ 3HO\}.$$

The following Table contains the analyses of two specimens of soapstone; the first taken from the vein at Kynance Cove, the second from the vein at Gue Grease.

Analyses of Soapstones.

	Kynance.	Gue Grease.
Silica	42·47	42·10
Alumina	6·65	7·67
Magnesia	28·83	30·57
Water	19·37	18·46
	97·32	98·80

These analyses furnish us with the following:—

Number of Atoms.

	Silica.	Alumina.	Magnesia.	Water.	Integers.
Kynance	0·923	0·129	1·441	2·152	6·4 : 0·9 : 10 : 14·9
Gue Grease	0·915	0·149	1·528	2·051	6· : 0·9 : 10 : 13·4

From this table we deduce the formula $6SiO^3$, Al^2O^3, $10MgO$, $14HO$, which gives as rational formula probably the following:—

$$5\{2MgO, SiO^3\} + \{Al^2O^3, SiO^3\} + 14HO.$$