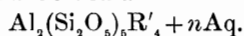


SiO ₂	65.67
Al ₂ O ₃	13.48
Fe ₂ O ₃	1.51
MnO	tr.
BaO	.32
CaO	2.41
MgO	.31
K ₂ O	2.42
Na ₂ O	1.52
SO ₃	.28
P ₂ O ₅	tr.
H ₂ O	12.27
	100.19

APPENDIX.—*Note on the Constitution of Ptilolite and Mordenite*; by F. W. CLARKE.

THE data given in the foregoing paper by Cross and Eakins, especially as regards the dehydration of ptilolite, lead to quite simple formulæ for the three minerals under discussion. The moment that we recognize the fact that part of the water in each mineral may be basic, the apparent anomalies disappear; and the compounds reduce at once to similar salts of the acid H₂Si₂O₅, which acid is well known in the species petalite and milarite. Both ptilolite and mordenite become simply representable by the general formula



the only serious uncertainties being in respect to the hydration.

In brief, the following salts appear to be represented in the three minerals, commingled in simple ratios:

1. $\text{Al}_2(\text{Si}_2\text{O}_5)_3\text{CaH}_2 \cdot 3 \text{ aq.}$
2. $\text{Al}_2(\text{Si}_2\text{O}_5)_3\text{CaH}_2 \cdot 6 \text{ aq.}$
3. $\text{Al}_2(\text{Si}_2\text{O}_5)_3\text{K}_2\text{H}_2 \cdot 6 \text{ aq.}$
4. $\text{Al}_2(\text{Si}_2\text{O}_5)_3\text{Na}_2\text{H}_2 \cdot 6 \text{ aq.}$

Three of these are entirely alike in type: but the first, containing only half the normal quantity of crystalline water, is assumed in order to account for the low hydration of the original, Green Mt. ptilolite. Upon this basis the three minerals investigated may be assigned the following theoretical compositions:

Ptilolite, Green Mt.,	molecules 1 and 3,	in ratio of 3 : 2
" Silver Cliff	" 2 " 4,	" " 1 : 1
Mordenite,	" 2, 3, 4,	" " 1 : 1 : 1

Reducing soda to potash in the Green Mt. ptilolite, and potash to its equivalent of soda in the Silver Cliff minerals, and recalculating to 100 per cent, we get a fair comparison between the actual analyses and theory.

	Ptilolite.			
	Green Mt.		Silver Cliff.	
	Found.	Calc.	Found.	Calc.
SiO ₂	70.15	69.22	68.45	67.64
Al ₂ O ₃	11.86	11.77	11.55	11.50
CaO	3.86	3.88	3.35	3.16
K ₂ O	3.98	4.34	----	----
Na ₂ O	----	----	3.09	3.49
H ₂ O	10.15	10.79	13.56	14.21
	100.00	100.00	100.00	100.00

In mordenite, reducing Fe₂O₃ to Al₂O₃ and MgO to CaO, the comparison comes out as follows:

	Found.	Calc.
SiO ₂	66.88	66.77
Al ₂ O ₃	11.62	11.35
CaO	2.17	2.07
K ₂ O	3.62	3.49
Na ₂ O	2.29	2.30
H ₂ O	13.42	14.02
	100.00	100.00

Considering the scarcity of material, and the difficulties attending its purification, these agreements are in the main satisfactory. In the water determinations, however, there is an uncertainty. In the theoretical composition assigned to the Silver Cliff ptilolite, one seventh of the water, a trifle under two per cent, is basic. But 3.10 per cent were found to be stable at 300°. What weight can be assigned to this discrepancy is not yet determinable, but it can hardly be regarded as an insuperable objection to the proposed formulæ. The general character of the salts, their essential types, seems to be fairly well established.