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A NEW MANGANESE MINERAL.

BY MALVERN W. ILES.

In describing this mineral I have thought best to use the same general scheme of arrangement as that adopted in Dana's Mineralogy.

1. *Crystalline form.* The mineral is composed of loosely-adhering, very friable, thick orthorhombic (?) prisms, which are frequently found terminating in truncated pyramids.

2. *Hardness, etc.* (a) The mineral has a hardness of 0.75 to 1.0.

(b) The Jolly spring balance was used to determine the density. Great care was taken to obtain a very pure specimen, and sufficiently large for accuracy. The mineral was weighed in clear petroleum the density of which was 0.7975. The specific gravity was found to be 2.1627.

(c) Lustre: slightly glimmering, resembling pure kaolin, and a number of white efflorescent salts.

(e) Color: pure milky white, but sometimes stained with sesquioxide of iron.

3. *Chemical composition.* The mineral is to be classed under the general division *Hydrous Sulphates*.

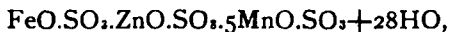
A. Elements in the protoxide state.

(e) Epsomite group, containing iron, zinc and manganese.

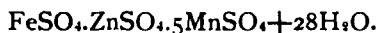
The mineral under consideration very closely resembles Fauserite, which is a sulphate of manganese and magnesium, containing 40 per cent. of water of crystallization whose formula is



The analyses of the manganese mineral under consideration lead to the formula



or, adopting the atomic weights now in use,



The results of a number of analyses are here given :

Residue, chiefly SiO ₂ .	ZnO.	FeO.	MnO.	HO.	SO ₂ .
0.54 per ct.	5.63 per ct.	4.12 per ct.	22.92 per ct.	29.88 per ct.	35.88 per ct.
0.75 "	6.23 "	3.73 "	21.78 "	32.54 "	35.84 "
0.60 "	..	4.18 "	21.92 "	29.94 "	35.93 "
..	..	4.55 "	22.06 "	31.44 "	36.20 "
..	..	..	..	32.14 "	36.11 "
..	..	..	..	32.78 "	35.77 "
..	..	..	..	31.82 "	35.85 "
..	..	..	..	30.58 "	..

Taking the average of all these results and correcting for the residue we have the figures given below. With them are also given the percentages required by the formula already stated :

	Average results, corrected for residue.		Calc. for formula ZnO.SO ₂ , FeO.SO ₂ .5MnO.SO ₂ +28HO.
FeO	4.18 per ct.	.	4.58 per ct.
ZnO	5.97 "	.	5.15 "
MnO	22.31 "	.	22.58 "
SO ₂	36.07 "	.	35.62 "
HO	31.60 "	.	32.06 "

The mineral has a bitter, astringent taste. It is very readily soluble even in cold water. The aqueous solution effervesces with sodium carbonate, and reddens blue litmus paper. Ammonium sulphocyanide does not give a test for sesquioxide of iron. Upon boiling the water solution, a very slight iron precipitate is formed.

Masses of the mineral, together with the gangue, were treated with pure distilled cold water, and, after digesting some minutes, the solution was filtered through double filter paper. The residue was then treated in a stream of water for a long time, thereby eliminating the lighter portions. The matrix was then dried and subjected to blow-pipe tests, which showed the presence of the sulphides of iron, lead and zinc. There were also detected manganese and some willemite. The gangue is a quartzose rock containing the above-named sulphides. On exposing the moist gangue, entirely freed from the soluble mineral, to the action of moisture and air, the mineral sulphides were found to become oxidized readily, giving strong reactions for sulphuric acid.

The filtrate was cautiously evaporated, a stream of hydrogen gas being passed through the liquid to prevent the oxidation of the

iron. Only by evaporating quite low were any crystals obtained, and then they were small unless great care was taken. I have succeeded in obtaining large, handsome crystals.

4. *Locality.* The mineral is found in Hall Valley, Park County, Colorado, upon the McDonnell mining property. This "claim" is near Middle Swan Creek, and 13 miles from Webster, situated on the Denver and Rio Grande R. R. The vein is located above timber line, the apex of location being in frozen snow. The gangue is over 300 feet wide, and shows upon the rocks this efflorescent salt. There is said to be a trace of gold and silver contained in the gangue for the above-mentioned entire distance. The gangue after being freed from the soluble mineral gave by fire assay at the office of the Grant Smelting Co. 9 ozs. silver per ton (2000 lbs.). In some places there is a pure streak of this mineral of 2 to 8 inches in width.

The McDonnell property has been developed by a tunnel 40 feet long, and has a shaft upon the claim 35 feet deep. During the excavations this mineral is brought to light. I am indebted to Mr. Frank Maloney for a description of the locality, etc.; also to Mr. Wm. R. Boggs, who gave me excellent samples for analysis. In conclusion, I will state that any parties may obtain samples for further scientific investigation by application to the writer. I have sent some of the best samples to Prof. Ira Remsen for more exact study and statements than I have made.

GRANT SMELTING CO., LEADVILLE, COLORADO.

ON THE SEPARATION AND DETERMINATION
OF POTASH AND SODA BY THE INDIRECT
METHOD IN PLANT ASHES, FERTILIZERS,
AND SIMILAR SUBSTANCES.

BY CLIFFORD RICHARDSON.

Collier has shown¹ that with mixtures of pure chlorides of potassium and sodium, the indirect method is capable of furnishing very accurate results; but, in attempting to apply it to the determination

¹Amer. Journal of Sci. 1864, 346.