

1903

A New Deposit of Fuller's Earth

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The analyses recorded below were made by Mr. Saylor. The analysis of the Missouri river water was made from the clear water after the sediment had settled, and the sample was obtained at the combination bridge. It was, therefore, uncontaminated with Sioux City sewage. Both samples of water were obtained in November and December, 1904. The ice was from the crop of 1903.

	Sioux River Ice.	Missouri River.	Sioux River.
Total solids.....	127	493.5	642
Chlorides	7.14	14.49	7.46
Nitrogen as nitrates.....	.025	.857	1.57
Nitrogen as nitrites	None.	Trace.	None.
Nitrogen as free ammonia.....	.2196	.051	.293
Nitrogen as albuminoid ammonia.....	.153	.1407	.056
Oxygen consuming power.....	2.13	4.225	2.13

Other analyses of Sioux City waters have been made during the year but are not available for publication.

NOTE.—The analysis on page 123, vol. X, which is reported as manufactured ice, is Sioux river ice.

A NEW DEPOSIT OF FULLER'S EARTH.

BY ALFRED N. COOK.

A few months since a prospector brought me a specimen of earth of uncommon appearance from the Black Hills of South Dakota for analysis with the hope that it might be something of value. It proved to be Fuller's earth of exceptional quality and I considered the result of sufficient interest to be published. Below is given the result of the analysis of the specimen dried in the air for two years. Two other analyses from the literature available are given for the sake of comparison. The per

cents of the constituents of a theoretically chemically pure hydrated aluminum silicate with five molecules of water of crystallization are also given.

	South Dakota.	Reygate, England.	Quincy, Florida.	$Al_2[SiO_3]_2,$ $(SiO_2)_2,(OH)_2,$ $5H_2O.$
Silica (SiO ₂).....	51.28%	52.81%	62.82%	53.33%
Alumina (Al ₂ O ₃).....	20.43	6.92	10.35	22.67
Water (H ₂ O).....	20.81	14.27	7.72	24.00
Calcium oxide (CaO) .....	.87	7.40	2.43	.....
Magnesia (MgO).....	.40	2.27	3.12	.....
Ferric oxide (Fe ₂ O ₃).....	2.42	3.78	2.45	.....
Potassa (K ₂ O).....	1.89	.74	.74	.....
Soda (Na ₂ O).....	.54	.....	.20	.....
Sodium chloride (NaCl).....	.48	.....	.....	.....
Sulphuric oxide (SO ₃).....	.57	.....	.....	.....
Total	99.64%	.....	.....	100.00%

The iron must exist in the state of ferric oxide since it is all dissolved out by hydrochloric acid on digesting on a water bath for a few minutes. The constituents: magnesia, lime, soda and potassa must be in the form of silicate, except that which exists in the form of chloride and sulphate. When the silica combined with the magnesia, lime, etc., is subtracted from the total silica, the amount of alumina, water and the remaining silica is in fair accord with the formula, $Al_2O_3(SiO_2)_4, 3H_2O, 2H_2O$. How near this analysis accords with the formula is shown by the following table. The second column of figures gives the amount required by theory, using the amount of silica found as a basis for calculation.

	FOUND.	CALCULATED.
Silica (SiO).....	48.45	48.45
Alumina (Al ₂ O ₃).....	20.43	20.59
Water (H ₂ O).....	20.81	21.80

Two samples heated in the air both at 100° C. lost in weight corresponding to two molecules of water. It quickly disintegrates in water yielding a whitish emulsion and on

settling is very translucent. It adheres to the tongue and has a slightly styptic taste, probably due to a little dissolved alum as there are some alum springs near by. It has a slightly acid reaction to litmus. It absorbs the coloring matter from ink and removes the grease from cloth. I do not have access to a very large amount of mineralogical literature, but the analyses that have been found compare with it very unfavorably. I believe it must be one of the purest products known. The deposit is believed to be fairly extensive.