Geological Survey, 1856 to 1860, by Dr. Robert Peter, Chemist of the Survey, and published in the first four chemical reports, have been tabulated and compared.

The total number of samples analyzed was 71 from 20 counties, as follows: Bath 3, Bullitt 2, Butler 2, Carter 3, Crittenden 2, Edmondson 1, Estill 4, Greenup 26, Hancock 1, Hopkins 2, Laurel 4, Lincoln 1, Montgomery 1, Morgan 1, Muhlenberg 7, Nelson 2, Owsley 2, Powell 1, Pulaski 2, Whitley 3.

The geological formations represented were mainly the Coal Measures and the Devonian, with some from the "Sub-Carboniferous" of Owen, or Mississippian, and the Silurian.

The kinds of ore were various, including kidney ore, oolitic ore, massive kinds, black band, block ore and two samples which would better have been classed as ferruginous limestones. Probably most of the block ores should not have been included because, in these, the proportion of ferric oxid often exceeds that of ferrous carbonate.

The whole tabulation would occupy too much space here. Inspection of it brings out the following facts:

	No.
Analyses tabulated.....	71
Per cent $MgCO_3$ exceeds per cent $CaCO_3$	57
Per cent $MgCO_3$ equals per cent $CaCO_3$	1
Per cent $MgCO_3$ is less than per cent $CaCO_3$	13
Per cent Insoluble matter exceeds 10 per cent.....	45
Per cent $CaCO_3$ exceeds 10 per cent.....	2

These last two, of course, are included in the thirteen which contain more $CaCO_3$ than $MgCO_3$. The large number containing more than 10 per cent insoluble matter shows that the collection includes many impure ores.

To gain a general idea of the composition of the samples in which the $MgCO_3$ predominated over the $CaCO_3$, the 57 analyses of this class have been averaged, giving the figures in the following table, which includes also the extreme range of each constituent, all stated as per cent of the ore, dried at 100° C.:

COMPOSITION OF 57 SAMPLES	Average	Highest	Lowest
Ferrous carbonate, $FeCO_3$	60.78	87.53	20.19
Ferric oxid, Fe_2O_3	8.09	51.31	Trace
Alumina, Al_2O_3	1.40	5.15	Trace
Calcium carbonate, $CaCO_3$	2.71	7.25	Trace
Magnesium carbonate, $MgCO_3$	5.92	13.99	0.83
Manganous carbonate, $MnCO_3$	1.57	5.03	0.12
Insoluble residue.....	16.36	40.88	4.87
Combined H_2O , bituminous matter and undetermined.....	3.17	...	...
Total.....	100.00		

It is seen that the proportion of magnesium carbonate is more than twice that of the calcium carbonate and that the proportion of manganous carbonate is the smaller of the three. Calculated to molecular proportions, the relation is 1 $MnCO_3$: 2 $CaCO_3$: 5.1 $MgCO_3$. It is presumably only an accident, however, in such a calculation as this, that the molecular ratios are almost exactly whole numbers. The ratio of calcium carbonate to magnesium carbonate is 1 $CaCO_3$ to 2.55 $MgCO_3$, which does not differ very far from the ratio found in the Stearns sample, *viz.*, 1 $CaCO_3$ to 2.66 $MgCO_3$.

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A NOTE ON THE UTILIZATION OF MUDS AND SCUMS FROM SUGAR REFINERIES

By R. F. GARDINER¹

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A description of the muds and scums in the sugar refining processes can be found in most works on industrial chemistry. Thorp says that "these muds have been thrown away." The possibility of their utilization is now being seriously considered by some sugar producers, as is shown by recent correspondence between this laboratory and a prominent American sugar producer, who says: "The mud was thrown away for quite a time and now we are trying some experiments in drying the same for the phosphoric acid content."

Sample I was analyzed by the author; the nitrogen determination was kindly made by Mr. T. C. Prescott, of the Bureau of Chemistry. The analysis of Sample II, by Plicque, is cited because it also shows a considerable amount of water.²

TABLE I—SHOWING COMPOSITION OF MUD FROM A SUGAR MILL

Percentages	I Gardiner	II Plicque
H_2O	67.32	52.70
Sugar.....	...	3.50
Nitrogenous matter.....	...	3.72
N.....	1.14	...
K_2O	Trace	...
P_2O_5	8.33	4.77
Lime, silica, iron, etc.....	...	26.07

In order to economically recover the valuable fertilizer elements, such as phosphoric acid and nitrogen, it will be necessary to find some satisfactory drying process, for which modern improvements in drying processes may offer ultimate success in the utilization of this potentially valuable fertilizer, now entirely lost.

BUREAU OF SOILS, DEPARTMENT OF AGRICULTURE
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THE EFFECT OF HIGH TEMPERATURE ON YEAST

By C. B. COCHRAN³ AND J. H. PERKINS⁴

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In the experiments recorded below, the yeast was added to 30 cc. of simple syrup in sterilized test tubes plugged with cotton, raised to the temperatures indicated and held there for the stated periods of time. The tubes were then placed in an incubator and kept at a temperature of about 31° C.

TUBE No.	TEMP. ° C.	RESULTING FERMENTATION	
		Fleischmann's (b)	Magic (b)
SP. GR. OF SYRUP, AND TIME	1 & 2 1 & 2 1 & 2	35 40 45	Prompt and vigorous
SP. GR., 1.125.....	1 & 2	55	
TIME, 5 min.....	1 2 1 & 2	68 68 85	None } Active after 2 days Slight None
SP. GR., 1.120.....	1, 2 & 3 1, 2 & 3	48 58	Prompt and vigorous
TIME, 30 min.....	1, 2 & 3 1 & 2 3	65 70 70	Slow None None
SP. GR., 1.125.....	1, 2 & 3	65	Slow
TIME, 30 min.....	1 & 2	70	None
SP. GR., 1.126(a)...	1, 2 & 3	68	None
TIME, 15 min.....	1, 2 & 3	72	None

(a) In these tests the heat was applied after leaving the yeast in the syrup for 24 hours at a temperature of about 12° C.

(b) To each 30 cc. of syrup, $\frac{1}{32}$ of a Fleischmann's or $\frac{1}{16}$ of a Magic yeast cake was added.

PHILADELPHIA

¹ Scientist in Soil Laboratory Investigations.

² "Handbook for Planters and Refiners," Lock and Newlands Bros 1888, p. 489.

³ Chemist for The Dairy and Food Department of Pennsylvania.

⁴ Chief Chemist for The Charles E. Hires Company.