TABLE III.

Bureau of Standards sample.	⁴ 8a—Bessemer, 0.1 C. Renewal.	⁴ 9a—Bessemer, 0.2 C. Renewal.	² 10a—Bessemer, 0.4 C. Renewal.	² 11—Basic open-hearth, 0.2 C.	⁴ 11a—Basic open-hearth, 0.2 C. Renewal.	⁴ 12a—Basic open-hearth, 0.4 C. Renewal.	² 13—Basic open-hearth, 0.6 C.	² 14—Basic open-hearth, 0.8 C.	² 15—Basic open-hearth, 0.1 C.	² 16—Basic open-hearth, 1.0 C.	² 18—Acid open-hearth, 0.1 C.	² 19—Acid open-hearth, 0.2 C.	² 20—Acid open-hearth, 0.4 C.	² 21—Acid open-hearth, 0.6 C.	² 22—Bessemer 0.6 C.	² 23—Bessemer 0.8 C.
Bismuthate.....	0.531	0.915	0.897	0.451	0.615	0.407	0.548	0.636	0.512	0.396	0.392	0.735	0.478	0.547	0.712	0.785
Persulphate colorimetric...	0.548	0.928	0.937	0.476	0.620	0.437	0.589	0.678	0.547	0.435	0.423	0.780	0.510	0.573	0.715	0.782
Lead peroxide colorimetric	...	...	0.950	0.520	...	...	0.620	0.670	0.530	0.460	0.425	0.770	0.500	0.560	...	...
Ford Williams.....	0.525	0.920	0.908	0.470	0.615	0.407	0.580	0.670	0.522	0.412	0.411	0.753	0.469	0.557	0.702	0.765
Gravimetric (Ford, etc.)...	0.535	0.915	0.905	0.452	0.627	0.420	0.555	0.636	...	0.399	...	...	...	0.562	0.700	0.765
Noyes.....	...	...	0.894	0.436	...	...	0.533	0.631	...	0.385	...	...	...	0.539	...	...
Volhard.....	0.530	0.890	...	...	...	0.430	...	...	...	...	...	...	...	...	0.706	0.775
General average.....	0.536	0.918	0.916	0.464	0.620	0.419	0.568	0.654	0.528	0.414	0.412	0.760	0.486	0.559	0.708	0.775
Colorimetric average.....	0.548	0.928	0.940	0.487	0.620	0.437	0.597	0.676	0.543	0.443	0.424	0.778	0.508	0.570	0.715	0.782
Per cent. above general average.....	2.2	1.1	2.6	5.0	0.0	4.3	5.1	3.4	2.8	7.0	2.9	2.4	4.5	2.0	1.0	0.9
Average excluding colorimetric.....	0.531	0.914	0.901	0.449	0.619	0.414	0.549	0.638	0.519	0.396	0.403	0.746	0.472	0.551	0.704	0.771
Per cent. below general average.....	0.9	0.4	1.6	3.2	0.1	1.2	3.3	2.4	1.7	4.3	2.2	1.8	2.9	1.4	0.6	0.5

NOTE.—The number of determinations involved is indicated in each case by a small superior numeral.

A. One discordant determination omitted.

BUREAU OF STANDARDS, WASHINGTON, D. C.

CORRECTION.

THE DETERMINATION OF MANGANESE BY THE SODIUM BISMUTHATE METHOD.

By PAUL H. M.-P. BRINTON.

Dr. W. F. Hillebrand has kindly called my attention to an arithmetical error in my article on this subject, which appeared in the April number of THIS JOURNAL. My error in taking the factor 0.16024 instead of 0.16397 for the ratio $5\text{Na}_2\text{C}_2\text{O}_4 : 2\text{Mn}$ is easily explained, though by no means excused, by a glance at a five-place table of logarithms. 2 Mn are equal to 109.86, and for this number I carelessly took 0.03084 as the mantissa, instead of 0.04084. This error in no way influences the correctness of my empirical factor 0.1656, though it may diminish the necessity for the use of an empirical factor. It should also be understood that this error in logarithm does not call into question the iron content of the Sibley ore, as might at first appear. The Sibley ore was first compared with sodium oxalate by a series of standardizations, both standards being correctly calculated to terms of iron. These were perfectly concordant, and then the work with the Sibley ore was discontinued. The comparison of the titer obtained by sodium oxalate and that by manganese sulphate was then taken up, and it was here that the error in computation was made.

April 24, 1911.

A CONTRIBUTION TO THE KNOWLEDGE REGARDING LOEW'S LIME-MAGNESIUM RATIO.

By ROBERT STEWART.

Received Feb. 3, 1911.

A knowledge of the beneficial action of lime on agricultural soils is almost as old as the practice of agriculture itself. Its benefits were known to the old Romans and to the early Japanese and Chinese. The results obtained, however, were not always uniform and seemed to vary with, among other things, the nature of the lime used. Lime which was made from magnesian limestone seemed to have detrimental effects. The presence of the magnesium in the limestone was regarded as exerting a detrimental influence. Why this should be so has been attributed to several different causes. Davy and others have attributed it to the relative slowness with which the caustic magnesia is converted into the carbonate by the absorption of the carbon dioxide of the air. Thus it is generally assumed by agricultural writers that the presence of magnesia, in excess, in the soil is detrimental to plant growth.

In 1901, Löew¹ advanced the hypothesis that when the lime and magnesia were present in the soil in a certain ratio the toxic action of magnesia is not manifested. May,² working under the direction of Löew, furnished experimental evidence of the truth of Löew's contention and advocated the optimum ratio of lime to magnesia of 5 : 4 on the basis of molecular weights, or 7 : 4 on the basis of actual weight.

¹ Bureau of Plant Industry, U. S. D. A., *Bull.* 1.

² *Ibid.*, 1, 52 (1901).