

sequence of these circumstances must be the re-production of common phosphate of lime in the very body of the soil itself.

By applying superphosphate of lime to a soil, therefore we reproduce a substance (common phosphate of lime) for the decomposition of which we have gone through all the trouble of the manufacture of the superphosphate; but we reproduce it in such a state of *fineness* and uniformity of *distribution*, as cannot be effected by any mechanical means. A fineness and distribution of a solid substance as are here effected, can *quasi* be considered a state of solution; it is certainly a fact that the substance in this condition cannot exercise any notable resistance to the solvent power of water, especially not, if the water is impregnated with carbonic acid, or ammoniacal salts, as is the case in nature;—it will become dissolved and thus rendered assimilable.

For ready reference I will here repeat that for every 100 lbs. of bones, 29 lbs. of sulphuric acid should be used in order to secure the desired reaction; with regard to its manufacture and the necessary precautions to be taken thereby, I will refer to my third Report, where I have treated on this subject in detail.

Within the last year there have come two articles of superphosphate under my notice; the one manufactured by B. M. Rhodes of Baltimore, (No. 1,) the other by Allen & Needless of Philadelphia, (No. 2,) both being well compounded, and if *made in accordance with the samples* submitted for analysis, and so *guaranteed* to the purchaser, will be of great agricultural value.

	No. 1.	No. 2.
Bi-phosphate of lime (soluble).....	24.56	23.36
containing of lime.....	7.00	6.66
"    " phosphoric acid.....	17.56	16.70
Phosphate of lime (undecomp. bone-earth).....	2.69	—
containing of lime.....	1.47	—
"    " phosphoric acid.....	1.22	—
Hydrated sulphate of lime (plaster of Paris).....	58.80	34.85
containing of lime.....	19.19	11.37
"    " sulphuric acid.....	27.33	16.20
"    " water.....	12.28	7.28
Sulphate of ammonia.....	—	5.77
containing of sulphuric acid.....	—	3.50
"    " ammonia.....	—	2.27
Sulphates of soda and magnesia.....	—	10.81
containing of sulphuric acid.....	—	6.08
Sand and peroxyd of iron, organic matter and moisture.....	13.95	25.21
capable of producing of ammonia.....	—	1.47
	100.	100.