

In the above table of analyses the phosphoric anhydride is given separately, and the proportion of tricalcic phosphate to which it is equivalent is given in the next column. This has been done as in some cases a portion of the phosphoric anhydride in these guanos is in the form of soluble phosphates of the alkalies, which gives it an increased value.

Superphosphate of Lime.

The chief objection to raw phosphates, such as bones, phosphatic guanos, &c., is that they require considerable time to decompose in the soil before they become available for the purposes of plant growth. In superphosphates this objection does not exist, since the phosphates have been rendered soluble by the use of sulphuric acid. The chemistry of the process may be expressed as the conversion of the insoluble tricalcic phosphate by the action of sulphuric acid into the soluble monocalcic phosphate and sulphate of calcium or gypsum. Superphosphate of lime is therefore essentially a mixture of monocalcic phosphate and calcium sulphate, together with any tricalcic phosphate that has not been so acted on by the sulphuric acid, and any organic matter, silica, &c., that may have been present in the raw phosphate. The quality of the resulting superphosphate will therefore mainly depend on the nature of the raw material from which it is made. Mineral phosphates that are rich in phosphoric acid will, if properly manufactured, produce high-class superphosphates, while substances poor in this constituent will produce superphosphates with a low percentage of monocalcic phosphate and a relatively high percentage of other substances which were either present in the original substance or which have been formed by the action of the sulphuric acid. For this reason it is not possible to manufacture high-class superphosphates from bones in good mechanical condition. In the first place, the proportion of tricalcic phosphate is not sufficient; and, secondly, if the whole of the phosphate were converted, there is not sufficient calcic sulphate formed to thoroughly dry the mixture. Calcic sulphate has an important influence in this respect on the mechanical condition of the manure. When first made superphosphates are of a pasty consistency, but the calcic sulphate unites chemically with the water in the same way that plaster of Paris (which is the same substance) sets to form a dry mass that is easily broken down to a fine powder.

Table V. gives the results obtained with imported superphosphates examined here, and Table VI. those of the New-Zealand-made article.

Table V.—Analyses of Imported Superphosphates.

Laboratory No.	Districts received from.	Moisture.	Organic Matters.	Silica.	Monocalcic Phosphate.	Equal to Soluble Phosphate.	Tricalcic Phosphate.	Fertic and Aluminic Phosphate.	Calcic Sulphate.	Alkalies, &c.	Nitrogen.	Money-value per Ton.
												£ s. d.
..	College farm ..	12.40	17.20	6.60	29.40	39.83	1.26	..	32.30	1.40	0.14	8 14 9
9	" ..	14.20	10.13	1.60	30.02	39.77	1.70	1.20	37.17	3.98	0.19	9 1 0
13	" ..	15.85	17.14	1.95	25.98	34.55	2.24	4.70	28.85	3.02	0.07	7 17 0
49	" ..	12.55	7.69	1.07	29.66	39.26	2.18	2.05	40.71	4.09	0.39	9 3 6
56	" ..	11.06	13.91	1.60	34.27	45.20	0.43	1.45	34.51	2.77	0.06	10 1 6
122	" ..	11.75	6.76	1.15	32.38	42.90	3.63	2.75	41.39	0.19	0.42	10 0 0
123	" ..	17.21	13.25	1.74	26.84	35.55	6.84	6.84	26.72	0.56	0.61	8 10 9
144	" ..	10.39	17.26	1.15	31.64	41.76	0.43	3.50	33.72	1.91	3.35	9 11 6
151	Invercargill ..	14.18	7.24	6.62	18.11	23.97	6.00	2.30	44.81	0.74	0.19	6 1 0
154	College farm ..	11.46	7.13	3.70	21.75	28.79	1.00	3.70	51.88	0.38	0.05	7 1 0
243	Christchurch ..	3.90	12.91	5.12	32.63	43.20	0.43	1.70	38.42	4.89	0.08	9 14 3
258	Auckland ..	15.67	6.21	2.30	24.73	32.76	Nil	5.40	45.59	0.10	0.42	7 19 0
399	Christchurch ..	12.90	4.10	2.74	23.40	30.88	1.31	6.30	47.38	1.87	0.05	7 10 0
405	" ..	12.30	4.82	3.02	23.07	30.56	3.49	5.90	47.42	0.48	0.05	7 8 3
453	Lincoln ..	13.70	5.83	5.30	21.09	27.92	Nil	3.20	49.46	1.42	0.19	6 16 6
578	Hororata ..	7.52	15.03	5.00	9.30	12.32	9.08	8.30	44.30	1.47	1.02	4 7 0
514	St Andrews ..	13.37	18.96	8.32	12.19	16.09	5.67	6.40	34.45	0.64	0.70	4 13 0
747	Christchurch ..	13.29		1.56	24.93	33.03	1.74	5.20	53.28		0.11	8 0 0
748	" ..	14.23		1.60	24.93	33.03	0.87	6.60	51.77		0.05	7 18
749	" ..	18.47		0.18	25.25	33.45	1.30	2.10	52.70		0.02	7 18 9
759	Rangitikei ..	27.92		6.60	18.36	24.32	4.36	4.00	36.96		0.81	6 7 6
765	Geraldine ..	8.84		6.28	25.91	34.33	7.41	4.98	46.58		0.08	8 5 3
767	Timaru ..	10.57		1.68	25.58	33.89	1.31	5.30	55.56		0.05	8 3 3
768	" ..	11.42		8.54	18.36	24.32	3.92	2.90	54.86		0.08	6 3 0
769	Temuka ..	14.86		6.48	24.92	33.02	3.05	4.00	46.69		0.08	7 17 0
Bone Superphosphates.												
11	College farm ..	13.75	18.02	9.55	17.13	22.78	2.62	3.50	34.47	0.96	0.72	6 1 6
400	Christchurch ..	12.35	23.75	8.50	16.15	21.31	3.93	3.00	31.18	1.14	1.12	6 2 0
750	" ..	34.75		5.74	15.41	20.41	1.74	4.30	38.06		1.48	6 1 0