Analysis of imported Bonedust.

Laboratory No.	District received from.	Moisture.	Organic Matter.	Silica.	Tricalcic Phosphate.	Calcic Carbonate.	Alkalies, &c.	Nitrogen.	Percentage of Nitrogen in Organic Matter.	Ratio of Tricalcic Phosphate to Organic Matter.	Money value per Ton. £ s. d.
382	Auckland	10·83	31·90	2·65	48·83	5·79		3·27	10·2	10–6·5	6 3 0
385	"	8·90	31·62	2·02	48·39	9·79		3·22	10·1	10–6·5	6 1 9
404	Waikato	7·15	24·65	7·00	48·83	9·77	2·66	3·15	12·7	10–5·0	6 1 9
447	Christchurch	6·35	29·33	4·40	53·19	4·57	2·16	3·43	11·6	10–5·5	6 12 9

Nos. 383 and 385 are Australian samples. Nos. 404 and 447 are from Calcutta.

The money values of the manures, of which analysis are given in this report, have been kindly fixed by Mr. W. E. Ivey, Director of the school.

Our New Zealand bonedust, as a whole, would be much improved if it contained less sand or silica. Of the thirty-three samples of which analysis are given, twenty-two, or 66 per cent., contain above 4 per cent. of sand, which is a liberal allowance to the manufacturers. In the worst samples, Nos. P2, 17, 387, 403, 452, 762, and 885, its presence to the extent indicated must be attributed to something more than carelessness in preparation, and can only be considered as wilful adulteration. Pure bonedust contains no silica, or at most a very minute trace, and its presence in the bonedust is due to contamination by earthy matter. Bones are often allowed to lie about in pig-yards and become covered with mud and dirt, and then, without cleaning, are ground-up and sold to the farmer. It is possible with ordinary care to prepare commercial bonedust so that it shall contain 1 per cent. of sand.

The ratio of phosphates to organic matter in pure bone is about 10 to 5, but in the samples referred to the relative proportion of organic matter is in many cases above this. This is due to the presence of animal matters, such as dried flesh and blood, hoof, horn, hair, &c., and the nitrogen present in these bodies compensates to some extent for the loss of nitrogen that may have taken place from the causes previously mentioned, such as steaming, fermentation, &c. The ratio between the phosphates and the organic matter is shown in the table of analyses. The results may be considered in the following way: If the ratio is much wider than 10 to 5, then extraneous organic matter is present, if much below this, then the organic must have been reduced by steaming or fermentation. That the excess of organic matter present is less rich in nitrogen than that contained in pure bone, is also shown by an examination of the columns giving the percentage of nitrogen in the organic matter present. The dry organic matter, or ossein of pure bone, after the removal of the bone, contains about 18 per cent. of nitrogen, and, although it is not to be expected that, in an article like commercial bonedust, this degree of purity will be reached, yet the results generally might be higher. No. G2, if we accept the silica, which is above what it should be, is a good typical bonedust in this respect, while in No. 387 we have a bonedust containing nearly one half its weight of organic matter, and this giving only 1·75 per cent of nitrogen, while, in addition to this, it is adulterated with 11 per cent. of sand.

The Royal Agricultural Society of England gives the following recommendations to the purchasers of manures: "(1.) Raw or green bones or bonedust should be purchased as 'pure' raw bones, guaranteed to contain 45 to 48 per cent. of tribasic phosphate of lime, and to yield not less than 4 per cent. of ammonia (= 33 per cent. of nitrogen). (2.) Boiled bones should be purchased as 'pure' boiled bones, guaranteed to contain from 55 to 60 per cent. of tribasic phosphate of lime and to yield not less than 1 per cent. of ammonia (= 0·82 of nitrogen)."

The Highland and Agricultural Society of Scotland gives as the range of phosphates in bone-meal (raw) 44 to 45 per cent. and from 4 to 5 per cent. of ammonia, and in steamed bones 56 to 65 of phosphates and from 1 to 2 per cent. of ammonia.

An American authority, Professor Johnston, considers that bones which contain less then 19 per cent. of phosphoric acid (= 41·47 per cent. of tribasic phosphate of lime) and more than 5 per cent. sand should be considered adulterated.

Phosphatic Guano.

Shipments of phosphatic guano frequently reach New Zealand from the Chesterfield and other islands, and appear to be much appreciated in some districts for turnip-growing, especially in Southland. These phosphatic guanos are formed from the deposits of sea-birds, the soluble constituents having been removed by rain. That from the Chesterfield Islands (Long Island, &c.) seems to be most in request, the other kinds being imported more for the manufacture of super-phosphate of lime.

Table II.—Analyses of Chesterfield Island Guano.

Laboratory No.	District received from.	Moisture.	Organic Matter.	Silica.	Tricalcic Phosphate.	Calcic Carbonate.	Alkalies, &c.	Nitrogen.	Money-value, per Ton. £ s. d.
63	Timaru	6·62	11·84	0·06	34·93	42·60	3·95	0·98	3 16 4
152	Invercargill	2·85	8·63	0·26	19·90	65·20	3·16	0·14	1 18 6
190	Christchurch	7·34	14·54	0·08	17·90	59·32	0·82	0·33	1 17 0
271	Dunedin	12·38	5·00	0·40	29·40	50·11	2·71	0·53	3 0 9
295	Auckland	7·31	8·75	0·34	27·86	43·67	2·07	0·10	3 11 0
352	Invercargill	4·30	11·88	0·22	27·50	51·55	4·55	0·47	2 16 6
390	Springston	4·25	8·51	0·36	15·58	68·56	2·74	0·28	1 12 3
391	Thornbury	4·12	8·68	0·14	28·56	56·80	1·70	0·49	2 18 9
890	Christchurch	14·20		0·18	34·70	50·80	0·12	0·56	3 10 10