

Our requirements with regard to manures are year by year increasing, and it is important that consideration should be given to the quality and composition of the manures available, since on this depends, not only their power to produce the desired results, but also their money value to the farmer.

The system of special manuring demands that the manure added to the soil should contain the food constituents most needed by the crop under cultivation, and if these are absent or present in a condition not suited to the requirements of the crop, then the full effect will not be produced, and loss may result. It might be well here, perhaps, to mention that experience and experiment have shown that under existing conditions grain crops and grasses are assisted most in their growth by nitrogen manures; that root-crops require soluble phosphates; and that leguminous plants, such as beans, peas, &c., are improved by potash manures. These facts should be borne in mind in the selection of manures for special crops. The influence of general manures, such as farmyard manure, on any given crop is largely due to the action in this way of one or two of its constituents, and not on the whole of the food constituents contained in the manure.

#### Bonedust.

The samples of bone received have mostly been in the form of bonedust, but few coarse samples having been sent. Nearly all were well ground and in good mechanical condition.

The manurial value of bones depends to a certain extent on the treatment they receive before reaching the farmer. In the natural condition bones contain about 33 per cent. of organic matter, and about 66 per cent. of mineral matter. With the exception of a little fat, the former consists of a nitrogenous substance, ossein, which contains about 18 per cent. of nitrogen. The mineral portion consists mainly of tribasic phosphate of lime, with small quantities of calcium carbonate and other salts. The fat present, by protecting the bone, retards its decomposition in the soil, and it is generally the custom of the manure manufacturers to boil or lightly steam the bones in order to remove the fat. When, however, the operation is carried too far the ossein is also more or less removed. Glue is generally prepared from bones in this way by subjecting them to a temperature of about 150° with steam under pressure. This treatment of course decreases their value by lowering the percentage of nitrogen. At the same time both boiling and steaming have a great influence on the mechanical condition of the bone, allowing it to be ground finer, and this admits of its better distribution through the soil, and consequently quicker action. Exposure to weather has somewhat the same effect as boiling and steaming, but requiring considerable time. A loss of nitrogen frequently results from the practice of heaping the bones together after boiling or steaming, by which fermentation is produced, and a considerable amount of nitrogen, in the form of ammonia, is disengaged. In all probability the bones are rendered still more friable by this treatment, but it is at the expense of the most valuable of its constituents, nitrogen.

Table I. gives the composition of the New Zealand prepared samples of bonedust that have been examined, together with that of a few imported samples.

Table I.—Analysis of Bonedust.

Laboratory No.	District received from,	Moisture.	Organic Matter	Silica.	Tribasic Phosphate.	Calcic Carbonate.	Alkalies, &c.	Nitrogen.	Percentage of Nitrogen in Organic Matter.	Ratio of Tribasic Phosphate to Organic Matter.	Money value per Ton.
P 2	College farm .. ..	7.62	33.60	12.70	40.75	5.45	0.60	3.61	10.7	10-8.2	£ s. d. 5 11 6
G 1	Christchurch .. ..	8.17	31.05	3.26	49.21	7.71	0.60	2.87	9.2	10-6.3	5 19 9
G 2	" .. ..	9.60	26.55	4.60	47.59	9.54	2.12	3.74	14.0	10-5.5	6 6 6
G 3	" .. ..	4.95	33.05	1.22	51.38	5.11	4.29	3.57	10.8	10-6.4	6 10 9
17	Leeston .. ..	4.00	33.48	17.72	38.55	5.40	0.85	2.23	6.8	10-8.6	4 13 6
26	Auckland .. ..	5.65	38.09	6.48	40.15	8.55	1.08	2.07	5.4	10-9.4	4 15 0
50	Belfast .. ..	6.75	35.65	6.46	41.26	8.56	1.32	2.57	7.2	10-8.6	5 2 0
120	" .. ..	5.25	35.19	6.43	46.67	3.30	3.16	2.57	7.3	10-7.5	5 12 0
146	" .. ..	6.44	33.36	6.23	44.61	3.07	1.29	2.52	6.5	10-8.5	5 7 6
255	Springston .. ..	8.00	33.80	9.34	42.70	4.00	2.16	4.27	12.6	10-7.9	6 1 9
350	Invercargill .. ..	6.75	32.63	2.70	47.00	7.80	3.12	3.38	10.3	10-6.9	6 0 9
351	" .. ..	9.15	35.36	2.08	43.55	5.72	4.14	3.92	11.0	10-8.1	5 19 9
387	Fairlie Creek .. ..	8.25	48.15	11.17	23.54	8.81	0.08	1.75	3.6	10-20.4	3 1 0
384	Auckland .. ..	9.15	33.75	3.58	46.87	5.98	0.67	2.17	6.4	10-7.2	5 8 6
395	Walton .. ..	8.62	34.43	3.50	42.27	8.88	2.30	3.08	8.9	10-8.1	5 19 0
396	" .. ..	8.05	32.30	5.45	49.05	3.86	1.29	3.36	10.4	10-6.5	6 4 3
403	Greendale .. ..	7.90	32.45	13.30	39.24	5.44	1.67	2.59	7.9	10-8.2	4 18 6
452	Methven .. ..	8.97	27.37	26.68	33.46	2.65	0.87	3.08	11.2	10-8.1	4 12 6
517	Piako .. ..	5.60	24.20	3.78	54.20	9.64	2.58	1.82	7.5	10-4.4	5 18 6
518	Waikato .. ..	8.05	24.29	9.58	49.10	8.30	0.68	2.80	11.5	10-4.9	5 18 9
634	Auckland .. ..	9.80	38.76	0.75	46.07	2.80	1.82	3.92	10.1	10-8.4	6 4 6
654	Invercargill .. ..	8.66	43.48	1.38	42.70	2.80	0.93	4.83	11.1	10-10.1	6 7 3
682	Timaru .. ..	39.22	1.38	52.32	7.08	3.29	10.4	10-6.0	6 9 8		
683	" .. ..	39.96	6.20	50.57	3.27	3.29	10.2	10-6.3	6 6 6		
685	Oamaru .. ..	52.04	5.28	29.90	12.78	4.48	10.1	10-14.0	5 0 0		
755	Christchurch .. ..	32.66	4.58	56.68	6.08	2.52	10.0	10-4.4	6 10 0		
756	Walton .. ..	45.88	4.96	40.98	8.18	3.36	8.7	10-9.3	5 9 6		
762	Terouka .. ..	30.46	21.42	35.20	12.92	2.73	11.9	10-6.4	4 12 6		
764	Christchurch .. ..	45.30	7.16	40.70	6.84	3.92	10.4	19-9.2	5 14 6		
827	Auckland .. ..	37.84	6.26	45.00	3.40	0.90	2.87	9.5	10-6.7	5 12 0	
829	Timaru .. ..	52.88	1.20	36.40	7.84	1.68	4.48	9.9	10-12.4	5 12 0	
832	Waikato .. ..	46.00	2.05	45.20	4.90	1.85	3.43	8.9	10-8.4	5 18 0	
885	Christchurch .. ..	43.52	12.68	35.30	6.00	2.50	4.06	11.3	10-10.1	5 6 0	