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Analyses of Commercial Fertilizers.

LEXINGTON, KENTUCKY,

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KENTUCKY
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KENTUCKY AGRICULTURAL EXPERIMENT STATION,
LEXINGTON, KY.

BULLETIN NO. 68.

ANALYSES OF COMMERCIAL FERTILIZERS.

For the more important principles on which the intelligent use of fertilizers depends, and for information in regard to the materials of which commercial fertilizers are made, we refer the reader to Bulletins Nos. 41, 46 and 51. This bulletin contains all the "official analyses" for the year 1897 up to the present date, with only such brief explanations as seem necessary for the right understanding of the figures.

Explanations in Regard to the Tables.

For convenience, the analyses in this bulletin are arranged in two tables:

Table I. contains ground bones, ammoniated bones, etc.

Table II., those fertilizers whose phosphatic materials have been acted upon by sulphuric acid in order to render the phosphoric acid in them more soluble.

The finer a bone is ground the more valuable it is. For this reason we divide ground bone into "fine bone" and "medium bone" and give the amount of phosphoric

acid in each separately in the tables. In computing the estimated value, the phosphoric acid in the "fine bone" is given a greater value than that in the "medium bone."

In Table II., the phosphoric acid is stated as "soluble," "reverted" and "insoluble" phosphoric acid, the sum of these representing the total amount of phosphoric acid in the fertilizer. The sum of the "soluble" and "reverted" is "available" phosphoric acid, or the phosphoric acid that is of immediate use to plants.

In this table is also given the nitrogen, as well as its "equivalent in ammonia," or, in other words, the greatest amount of ammonia which would be possible to be made from the nitrogen; also the amount of potash either in the form of sulphate or muriate or both. As sulphate of potash is somewhat more costly than muriate, it is thought best to give the form in which the potash is found in the fertilizers analyzed.

The "Estimated Value Per Ton."

The fertilizer law requires that the Director shall give, along with the analysis of each fertilizer, "the money value of such fertilizer computed from its composition, as he may determine." This is the "estimated value per ton" given in the last column of the tables.

The words of the law, "the money value of such fertilizer, computed from its composition" define as nearly as possible what these "estimated values" are intended to represent; that is, they are intended to show what the phosphoric acid, nitrogen and potash in a ton of each fertilizer is actually worth in dollars and cents. In other words, they are intended to show about how much the raw materials necessary to furnish the same quantity of "essential ingredients" as is found by the analysis would cost if purchased separately and then combined. It is important to note, however, that on account of the differences in the prices of the different materials which may be used to furnish phosphoric acid, nitrogen and potash, and differences in the price of the same material at different times, as well as differences in rates of freight to the different points in the state, it is practically impossible to make these "estimated values" represent exactly the money value of the fertilizers. At best they are only relatively correct.

In order to calculate these values from the analyses, the Director assigns each year a certain price per pound for each of the "essential ingredients" of fertilizers. These prices are based upon the New York prices of the principal materials of which fertilizers are made and include an allowance for freight from New York and for cost of mixing and loss in handling.

The framers of the fertilizer law evidently intended these estimated values to be an index that would show at a glance whether the purchaser was getting the worth of his money, and in a general way they do serve this purpose. Thus, when the "estimated value per ton" is very much below the price at which a ton of the fertilizer is sold, it shows that the purchaser at this price is paying high for the plant food it contains. But the estimated value alone is not a sufficient guide in purchasing fertilizers; it is necessary to consider the analysis also.

Importance of the Analyses

In purchasing fertilizers it is of the first importance to consider the analyses, either in the tables of the bulletin or on the tags which should always be found attached to each sack; for by the analysis only can we tell whether we are getting, in the fertilizer, the plant food that we want to supply to our crop. If we were selecting a fertilizer for corn, for instance, to be used on a soil that was rich in phosphates but deficient in potash, we certainly would not buy a so-called "Corn Grower" that contained no potash, even if it was offered at a price much lower than the "estimated value."

Let us illustrate this farther by example: Suppose that a farmer, desiring to purchase a fertilizer for his corn crop, is offered by his merchant either of two "corn growers" at \$25 per ton. The price, fortunately, does not help him to decide in this case. Next he looks at the tags attached to the sacks, and finds that the Director has estimated

the value of each fertilizer at \$25.20 per ton. He next looks at the analyses and finds that fertilizer No. 1 contains :

Soluble Phosphoric Acid,	}	.....12.0 per cent.
Reverted " "		
Potash		None.
Nitrogen		2.4 per cent.

And Fertilizer No. 2 contains :

Soluble Phosphoric Acid,	}	..... 6.0 per cent.
Reverted " "		
Nitrogen		2.4 per cent.
Potash, from muriate		7.0 per cent.

He is now able to judge which of the two fertilizers to purchase. If his soil needs phosphoric acid, he will quickly decide on No. 1, for he will get twice as much for the same money, while did he purchase No. 2 he would get only half as much phosphoric acid which he needs and would be paying for potash which he does not need. But if he is in doubt whether his land needs one or all the elements of a fertilizer, or if he knows that his land needs potash, he will be wise in purchasing No. 2. For should his soil need potash, or all three of the essential elements to produce a large corn crop, and should he purchase No. 1, it is doubtful whether he would receive any benefit from it.

Values Used.

The values for the "essential ingredients" in 1897 are as follows :

Soluble and reverted phosphoric acid in mixed fertilizers, 7 cents; in plain acid and unacidulated phosphates, 5 cents per pound.

Insoluble phosphoric acid in mixed fertilizers, 2½ cents; in plain acid phosphates, nothing; in Orchilla guano, 3 cents; in other unacidulated phosphates, 2 cents per pound.

*Phosphoric acid in fine bone, 4 cents; in medium bone, 3 cents per pound.

Nitrogen in all fertilizers, 17½ cents per pound.

Potash in all fertilizers, from sulphate, 7 cents; from muriate, 6 cents per pound.

*Fine Bone is all that passes through a sieve with meshes 1-25 inch square. Medium bone passes through a sieve with meshes 1-6 inch square, but does not include fine bone.

TABLE I.—Raw Bone Manures.

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	POUNDS IN THE HUNDRED.					Estimated Value Per Ton.	
			In Fine Bone	In Medium Bone.	Total.	Equivalent to Bone Phosphate.	Nitrogen.		Equivalent to Ammonia.
3660	The Armour Fertilizer Works, Chicago, Ill.	Bone Meal	21.45	3.21	24.66	53.87	3.41	4.14	\$31 03
3661	Same	Raw Bone Meal	14.52	11.04	25.56	55.82	3.84	4.66	31 68
3734	Globe Fertilizer Co., Louisville, Ky.	Globe Bone Meal	16.18	8.33	24.51	53.53	3.59	4.36	30 51
3652	W. A. Guenther & Sons, Owensboro, Ky.	Bone Meal	21.46	3.23	24.69	53.92	3.33	4.04	30 77
3781	J. B. Jones, Louisville, Ky.	Raw Bone Meal	13.58	8.32	21.90	47.83	3.53	4.29	28 21
3798	Same	Ammoniated Bone	11.57	1.58	13.15	28.72	2.66	3.23	19 52
3635	The Jones Fertilizing Co., Cincinnati, O.	Pure Raw Bone Meal	4.23	21.43	25.66	56.05	3.91	4.75	29 93
3636	Same	Fine Ground Bone	18.25	6.75	25.00	54.59	3.48	4.22	30 83
3638	Same	Ammoniated Bone Meal	16.30	1.28	17.58	38.39	4.83	5.86	30 72

TABLE I.—Raw Bone Manures (Concluded).

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	POUNDS IN THE HUNDRED.						Estimated Value Per Ton.
			PHOSPHORIC ACID.			Equivalent to Bone Phosphate.	Nitrogen.	Equivalent to Ammonia.	
			In Fine Bone	In Medium Bone	Total.				
3740	Michigan Carbon Works, Detroit, Mich.....	Desiccated Bone.....	25.54	6.19	31.73	69.29	1.50	1.82	\$29 39
3672	North-Western Fertilizing Co., Chicago, Ill.....	Horse Shoe Brand Fine Raw Bone.....	17.99	4.96	22.95	50.12	3.89	4.72	30 99
3679	Same.....	H. S. B. Pure Ground Bone.....	17.30	2.61	19.91	43.47	3.35	4.07	27 14
3719	Swift & Company, Chicago, Ill....	Pure Raw Bone Meal.....	18.95	6.25	25.20	55.04	4.27	5.18	33 86
3720	Same.....	Ground Steamed Bone.....	25.30	2.20	27.50	60.07	2.65	3.22	30 84
3721	Same.....	Bone Tankage.....	16.98	2.03	19.01	41.52	4.96	6.02	32 16
3722	Same.....	Bone and Potash.....	24.15	1.54	25.69	56.10	2.46	2.99	32 85*
3723	Same.....	Bone Tankage and Potash.....	15.42	1.93	17.35	37.89	4.83	5.86	34 40†

*Potash from sulphate 2.87 per cent.

†Potash from sulphate 2.85 per cent.

TABLE II.—Complete Fertilizers, Superphosphates, Etc.

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	POUNDS IN THE HUNDRED.										Estimated Value Per Ton.		
			PHOSPHORIC ACID.			Nitrogen.	Equivalent to Ammonia.	POTASH.		From Sulphate.	From Muriate.				
			Soluble.	Reverted.	Insoluble.										
3821	A. D. Adair & McCarty Bros., Atlanta, Ga	Farish Furman Formula	10.67	1.99	2.87	.....	.....	.....	.....	.....	.....	.....	.....	3.07	\$22 59
3659	The Armour Fertilizer Works, Chicago, Ill	White Burley and Black Tobacco	2.29	6.48	3.45	3.12	3.79	4.93	.....	.....	.....	.....	.....	.....	31 83
3662	Same	Acidulated Bone Meal	5.01	10.66	6.18	2.63	3.19	.....	.....	.....	.....	.....	.....	.....	34 24
3664	Same	Grain Grower	5.53	3.87	0.87	1.79	2.17	.....	.....	.....	.....	.....	.....	1.83	22 07
3665	Same	Bone, Blood and Potash	6.12	3.63	1.38	4.94	6.00	7.73	.....	.....	.....	.....	.....	.....	42 45
3726	Same	Ammoniated Bone with Potash	5.13	4.24	3.24	3.32	4.03	2.50	.....	.....	.....	.....	.....	.....	29 86
3799	Geo. S. Bartlett, Cincinnati, Ohio	Indian Brand Ohio Valley Phosphate	7.28	3.42	3.51	2.02	2.45	.....	.....	.....	.....	.....	.....	.....	26 21
3810	The Cleveland Dryer Com- pany, Cleveland, O	Indian Brand Gilead Phos- phate.* Buckeye Ammoniated Bone Superphosphate	7.02	3.06	3.47	2.91	3.53	.....	.....	.....	.....	.....	.....	0.51	26 65

*This sample was withdrawn by the manufacturer on account of an error at factory in mixing and will be replaced by another, the analysis of which will appear in next fertilizer bulletin.

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3728	Same	Currie's Golden Leaf Tobacco Grower	7.37	2.37	1.47	1.18	1.43	3.68	23 66
3729	Same	Currie's Soluble Bone	7.04	1.72	0.83	0.91	1.10	2.83	19 83
3772	Same	Same	8.07	3.78	1.54	0.72	0.87	2.91	.....	23 95
3730	Same	Currie's Butchertown Raw Bone Meal	5.27	5.74	4.41	0.95	1.15	1.25	.....	22 70
3731	Same	Currie's Wheat Special	9.19	3.17	1.87	.....	.....	.....	.....	12 36
3732	Same	Currie's Climax Tobacco Grower	7.09	1.84	0.75	0.89	1.08	2.81	.....	19 93
3691	Globe Fertilizer Co., Louisville, Ky.	Globe Potato Grower	6.73	1.54	1.52	3.95	4.80	4.57	.....	32 57
3692	Same	Globe Soluble Vegetable Manure	7.96	1.36	0.84	3.41	4.14	3.65	.....	30 52
3693	Same	Kentucky Standard Tobacco Grower	7.97	1.34	0.90	3.43	4.16	3.62	.....	30 56
3694	Same	Big Four Tobacco Grower	7.88	1.25	1.07	2.25	2.73	2.77	.....	25 08
3695	Same	Eagle Corn and Wheat Grower	8.17	1.67	1.39	2.34	2.84	2.74	.....	26 51
3697	Same	Globe Bone Dust	8.71	2.35	1.84	1.35	1.64	0.48	.....	21 80
3698	Same	Globe Bone and Potash	11.42	1.85	1.07	0.38	0.46	1.35	.....	22 34
3699	Same	Globe Wheat Grower	8.16	1.70	1.23	2.31	2.80	2.63	.....	26 19
3700	Same	Golden Harvest Bone Meal	7.65	2.70	2.97	3.11	3.78	0.46	.....	27 51
3735	Same	Progress Corn and Wheat Grower	8.65	1.03	0.90	2.15	2.61	1.62	.....	23 80
3689	J. B. Jones, Louisville, Ky.	Tobacco and Potato Grower	3.22	3.48	2.05	3.02	3.67	8.23	.....	32 50

TABLE II.—Complete Fertilizers, Superphosphates, Etc (Concluded).

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	POUNDS IN THE HUNDRED										Estimated Value Per Ton.
			PHOSPHORIC ACID.			Nitrogen.	Equivalent to Ammonia.	POTASH.		From Sulphate.	From Muriate.	Estimated Value Per Ton.	
			Soluble.	Reverted.	Insoluble.								
3687	North-Western Fertilizing Co., Chicago, Ill	H. S. B. Acidulated Bone.....	8.35	2.95	2.29	0.85	1.03	.....	.....	.....	\$19 95
3688	Same	H. S. B. Bone and Potash.....	8.48	2.57	3.79	0.46	0.56	.....	.....	.....	20 42
3785	Read Fertilizer Co., Charles- ton, S. C.....	Blood and Bone Fertilizer No. 1.....	5.82	2.70	2.55	1.96	2.38	.....	.....	2.45	23 01
3809	Same	Alkaline Bone.....	7.42	2.91	2.34	.....	.....	.....	.....	2.27	18 35
	The J. & F. Schroth Packing Co., Cincinnati, O.....	Corn and Wheat Grower.*											
	Same	Queen City Phosphate.*											
	Same	Schroth's Special.*											
3764	Wm. Skene & Co., Louis- ville, Ky.....	Skene's Complete Plant Food	2.87	4.08	1.39	4.18	5.07	.....	.....	15.01	46 07
3765	Same	Skene's Louisville Super- phosphate.....	3.66	6.02	1.62	1.10	1.34	.....	.....	5.52	25 94
3826	T. J. Smith, Spurlington, Ky.	Smith's Bone, Potash and Plant Food.....	5.51	3.76	4.85	2.30	2.79	.....	.....	1.00	28 24

3724	Swift & Co., Chicago, Ill.	Superphosphate.....	1.92	6.77	9.07	2.37	2.88	2.74	.....	28 85
3822	Same	Swift's Special Pure Tobacco Grower .....	.....	6.37	8.78	3.22	3.91	4.81	.....	31 31
3705	S. W. Travers & Co., Rich- mond, Va.	Capital Dissolved S. C. Bone Travers Dissolved Bone Phosphate	9.03	4.16	0.82	.....	.....	.....	.....	13 19
3706	Same	Capital Bone-Potash Com- pound	11.00	2.97	0.61	.....	.....	.....	.....	13 97
3707	Same	.....	7.80	3.25	0.46	.....	.....	.....	1.62	17 64
3708	Same	Champion Corn Grower	6.60	2.83	0.87	0.84	1.02	.....	2.96	20 13
3709	Same	Capital Tobacco Fertilizer...	2.84	2.69	1.71	4.89	5.94	10.25	.....	40 07
3710	Same	National Tobacco Fertilizer...	6.87	2.18	1.98	1.95	2.37	.....	4.29	25 64
3711	Same	Beef, Blood and Bone Fer- tilizer	6.14	1.53	1.14	2.27	2.76	.....	1.74	21 35
3712	Same	National Wheat and Grass Grower	6.15	1.59	1.16	2.28	2.77	.....	1.69	21 43
3713	Same	Orchilla Guano.....	.....	5.20	10.16	.....	.....	.....	.....	11 30

* This sample was withdrawn by the manufacturer on account of an error at factory in mixing and will be replaced by another, the analysis of which will appear in next fertilizer bulletin.

M. A. SCOVELL, Director.
A. M. PETER.
H. E. CURTIS.

MAY 15th, 1897.