KENTUCKY

AGRICULTURAL EXPERIMENT STATION

OF THE

STATE COLLEGE OF KENTUCKY.

BULLETIN NO. 79,

COMMERCIAL FERTILIZERS.

LEXINGTON, KENTUCKY.
December, 1898.
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KENTUCKY

Agricultural Experiment Station.

NOTICE.

The Bulletins of the Station will be mailed free to any citizen of Kentucky who sends his name and address to the Station for that purpose.

Correspondents will please notify the Director of changes in their post-office address, or of any failure to receive the Bulletins.

ADDRESS:
KENTUCKY AGRICULTURAL EXPERIMENT STATION,
LEXINGTON, KY.

158.

BULLETIN NO. 79,

Commercial Fertilizers.

It will be noticed that the analyses of fertilizers in this bulletin are collected in two tables: Table I comprises those entered for sale under the old law, and Table II, those under the new law.

The "official analysis" under the old law was the analysis of the sample sent to the Station by the manufacturer under affidavit that it was a fair and true sample of the brand which the manufacturer desired to sell in this State. The analysis on the tags furnished by the Station, under the old law, was the "official analysis."

Under the new law, the manufacturer guarantees, under affidavit, the analysis as found on the tags furnished by the Station. This analysis is the *minimum* "guaranteed analysis" of the manufacturer.

GUARANTEED AND ACTUAL COMPOSITION.

A detailed examination of Table I, shows that out of forty-nine samples taken from goods sold in the State, twenty of them fall materially below the samples sent here by the manufacturers to represent them, while four samples are above such guarantee. Of the remaining twenty-five samples, nine are above the official samples and sixteen are below them, but the differences are not such as require comment, and in none of these is the difference in value as much as $2 per ton.

The four brands which were above the official samples are:

4339—Farmers Compound Fertilizer, manufactured by the Greer Machinery Co , Knoxville, Tenn. The sample collected showed 2.46 per cent. more available phosphoric acid, and the estimated value was $3.27 more than that shown on the official tag.

4971—Bone Meal, manufactured by the Louisville Fertilizer Works, Louisville, Ky. The sample collected showed 1.21 per cent. more total phosphoric acid, 0.84 per cent more nitrogen, and an estimated value of $2.47 more than that found on the official tag.

4968—Ox Alkaline Bone, manufactured by the Tennessee Chemical Co., Nashville, Tenn. The sample collected contained 1.38 per cent more available and 6.22 per cent. more total phosphoric acid, giving a valuation $3.29 more than the official analysis, but contained 0.89 per cent. less potash than the official analysis. This shows bad mixing, and it is a question whether the persons purchasing this fertilizer on the official tag analysis were getting more than they really bargained for or not. Those farmers applying it to soils needing phosphoric acid received more than they bargained for, while those applying it to soils needing potash, and not phosphoric acid, received less than they should have had.

4416—Champion Corn Grower, manufactured by S. W. Travers & Co., Richmond, Va. The sample collected contained 0.42 per cent. more available and 0.70 per cent. more total phosphoric acid and 0.52 per cent. more nitrogen, and the estimated value was $2.35 more than shown by the official analysis.

The 20 samples that fall much below the official samples are given in the following table, and the percentage each fertilizer falls below in phosphoric acid, nitrogen and potash, and the amount it falls below in value, is there shown.

Fertilizers Falling Below the Official Samples.

Station Number.	Name of Fertilizer.	Manufacturer.	Pounds per Hundred Less Than on Tag.				Less in Estimated Value.
			Phosphoric Acid		Nitrogen.	Potash.	
			Available	Total.			
4978	Grain Grower	Armour Fertilizer Works	1.07	0.15	0.42	0.42	$2.67
4876	Square Bone	Cleveland Dryer Co	2.64	4.94	1.01	.....	8.39
4894	Currie's Raw Bone Meal	The Currie Fertilizer Co	.....	2.04	0.56	.....	2.75
4939	Currie's Fine Ground Raw Bone Meal	Same	.....	2.92	0.92	.....	5.49
4846	Fine Ground Bone	The Jones Fertilizing Co	.....	1.77	0.46	.....	2.83
4845	Ammoniated Bone Meal	Same	.....	12.26	0.98	.....	12.67
4847	"	"	.....	13.10	0.57	.....	11.90
4956	"	"	.....	9.19	*1.47	.....	1.79
4977	"	"	.....	2.36	.....	.....	1.70
4848	Jones Reliable	"	2.27	3.22	0.70	*.54	5.19

*Above the Official Analysis.

Fertilizers Falling Below the Official Samples.—Continued.

Station Number.	Name of Fertilizer.	Manufacturer.	Pounds per Hundred Less Than on Tag.				Less in Estimated Value.
			Phosphoric Acid		Nitrogen,	Potash.	
			Available.	Total.			
4877	Bone and Potash.....	The Jones Fertilizing Co.....	2.18	2.65	*.56	0.33	$ 1.78
4878	Miami Valley Phosphate	Same	5.26	8.75	1.60	*.24	14.39
4957	"	"	.....	1.24	0.40	0.67	2.94
4317	Potato and Tobacco Grower...	Louisville Fertilizer Works....	0.65	1.48	0.56	*1 04	1.82
4970	"	Same	*2.30	*3.89	1 27	1.82	2.98
4941	Homestead Corn and Wheat Grower	Michigan Carbon Works.....	0.14	0.15	0 37	1.22	2.97
4942	Red Line Complete Manure ..	Same	0.36	1.83	0.18	0 38	2.33
4893	H. S. B. Raw Bone and Phosphate Mixture	North-Western Fertilizing Co	*.87	*.39	0.95	0.18	2.61
4415	Capital Tobacco Fertilizer	S. W. Travers & Co.....	*1.18	*1 48	0.19	1.79	1.20
4429	"	Same	*1.70	*2 06	0.44	2.20	1.81

*Above the official analyses.

Under the old law the manufacturer was required to send a sample of each fertilizer to the Station at the beginning of the year, and this sample represented all of a fertilizer made under that brand during the year. As it often happens that the manufacturer makes new mixtures of his various brands from time to time during the year, depending upon the quantity sold, it is nearly impossible to send a single sample, the analysis of which will represent exactly the composition of the various mixtures of a brand during the year. But by analyzing each of the ingredients of a fertilizer every time a new mixture is made, and by carefully mixing, the manufacturer should be able to keep this variation in composition within reasonable limits.

If a fertilizer were found to be not more than one per cent. in phosphoric acid, one-half per cent. in potash, or three-tenths per cent. in nitrogen, or $2.00 in estimated value below the official analysis, it might be considered up to standard under the old law as, from what has been said above, some allowance should be made for variation in different samples of the same fertilizer, especially when such samples are taken from different bulks, made at different times. When the variations are more in any fertilizer than those given above, such fertilizer must be condemned as not coming up to the official analysis. In cases Nos. 4978, 4957, 4317, 4970, 4941 and 4893, in the table above, the variations may be laid to careless or bad mixing. When the discrepancies are as great as in samples Nos. 4876, 4939, 4845, 4847, 4956, 4848 and 4878, ignorance or gross carelessness in the manufacture of the fertilizer must be charged against the manufacturer. From what information we have of each of these cases, we are of the opinion that in every one the manufacturer supposed he was supplying a fertilizer fully up to

guarantee, and the bad results came from the use of tankage or other ingredients of irregular composition in the fertilizer, under the supposition that these ingredients did not vary in composition,without determining by analysis the amount of phosphoric acid, nitrogen and potash they really contained. But such a plea cannot be considered an excuse, and it gives very little comfort to the farmer who buys such a fertilizer to know that, although fraud was not intended, nevertheless he received only a portion of what he purchased under the supposition that he was receiving the whole.

The results of the analyses of the samples taken in open market show conclusively the importance of inspection of fertilizers at the time of purchase, under regulations laid down in Section 8 of the fertilizer law. As to how to take samples and proper form of certificate to send with them, see page 170, of this bulletin.

In Table II may be found the analyses of fertilizers coming under the new law. As stated before, under our present law, the manufacturer guarantees the amount of phosphoric acid, nitrogen and potash which his fertilizer will contain, and it is the *minimum* guarantee of the manufacturer that is printed on the official tags. As the manufacturer guarantees that the fertilizer *will not fall below* the figures given, he should make his mixtures in such proportions that the percentages of the phosphoric acid, nitrogen and potash should be a little above the minimum guarantee. Under the present law, therefore, the phosphoric acid, nitrogen and potash in a fertilizer should not fall below the analysis on the official tag, but the law allows a margin of one-fourth of one per cent. to cover unavoidable differences in sampling. If it were possible to get an absolutely true sample of a fertilizer for analysis, the percentages of the different ingredients of a fertilizer should not fall even as much as one-fourth

per cent. below the guarantee. A small variation, however, is to be expected, from the fact that most commercial fertilizers are mixtures of various materials, and however well mixed, it is impossible to make them of perfectly uniform composition. When a fertilizer falls even slightly more than ¼ per cent. below the guarantee in one ingredient, but is enough over the guarantee in one or both of the other ingredients to compensate in value, such fertilizer should be considered up to guarantee.

In Table II the following fertilizers are so much below guarantee that attention is hereby called to them.

4510---Currie's Fine Ground Raw Bone Meal, manufactured by The Currie Fertilizer Co., Louisville, Ky.; below guarantee in phosphoric acid 4.27 per cent., nitrogen 0.36 per cent., in estimated value $4.60.

4314—Anchor Brand Complete Fertilizer, manufactured by A. B. Mayer Manufacturing Co., St. Louis, Mo.: below in potash 1.89 per cent., in estimated value $1.26; above in available phosphoric acid 0.80 per cent.

4305—Bone Tankage and Potash, manufactured by Swift & Co., Chicago, Ill.; below guarantee in potash 1.30 per cent., in total phosphoric acid 0.52 per cent; above in nitrogen 0.48 per cent.

The following table gives the fertilizers much above guarantee, and the percentages of phosphoric acid, nitrogen and potash above guarantee, and the value above the estimated value. We have included here only those in which the relative commercial value per ton was two dollars or more above that calculated from the guaranteed minimum analysis.

Fertilizers Running above Guarantee.

Station Number.	Name of Fertilizer.	Manufacturer.	Pounds Per Hundred More Than Guaranteed.				Relative Value Above Guarantee.
			Phosphoric Acid		Nitrogen.	Potash.	
			Available.	Total.			
4358	Bone Blood and Potash.	Armour Fertilizer Works	1.08	0.99	0.41	0.36	$3.40
4995	Invincible Bone Meal.	A. Button & Son		*.25	0.81		2.64
4625	Crocker's Universal Grain Grower	Crocker Fertilizer and Chemical Company	0.64	1.43	0.48	0.65	3.76
4357	Currie's Tobacco and Potato Grower	The Currie Fertilizer Co.	1.40	4.03	*.67	3.49	5.83
4508	Currie's Butchertown Raw Bone Meal	Same.	0.72	2.94	1.47	*.41	6.70
4511	Currie's Wheat Grower	"	1.14	0.99	0.04	0.49	2.36
4353	No. 2 Potato, Corn and Tobacco Grower	Dunn & Backer	1.61	0.32	0.62	1.64	5.75
4355	No. 8 Grower	Same.		*.21	0.85		2.82
4293	Farish Furman Formula	Furman Farm Imp. Co	2.16	3.20		0.37	3.98

4659	Globe Bone Meal	Globe Fertilizer Co	.....	6.56	0.21	.....	5.35
4497	Champion Raw Bone Meal	R. H. Hoskins	.....	1.46	0.97	.....	4.57
4506	Lake Erie Fish Guano	Jarecki Chemical Co	0.72	1.24	0.02	0.65	2.02
4278	Corn and Wheat Grower	Louisville Fertilizer Works	1.57	.....	0.35	*.16	4.11
4524	Soluble Bone and Potash	Same.	1.01	2.17	0.54	*.36	3.38
4578	Jarves Drill Phosphate	Michigan Carbon Works	0.52	0.67	0.62	0.10	2.95
4307	Acid Phosphate	National Fertilizer Co	2.97	.....	.....	.....	2.97
4308	Acid Phosphate with Potash	Same.	1.14	.....	.....	3.19	5.78
4309	Tobacco Grower	"	3.33	.....	*.59	*.57	3.51
4310	Tobacco Fertilizer	"	1.24	.....	*.09	0.43	3.55
4311	Bone Meal	"	.....	1.77	1.54	.....	6.81
4312	Corn Grower	"	2.86	.....	* 33	*.32	3.36
4588	Wheat Grower	"	1.43	.....	0.16	0.37	3.71
4810	Sadler's Formula	"	1.97	.....	.....	*.03	4.48
4590	National Dissolved Bone	"	1.00	.....	0.08	0.67	3.10
4591	Pure Bone Meal	"	.....	2.49	1.40	.....	6.75

Fertilizers Running Above Guarantee.—Continued.

Station Number.	Name of Fertilizer.	Manufacturer.	Pounds Per Hundred More Than Guaranteed.				Relative Value Above Guarantee.
			Phosphoric Acid		Nitrogen.	Potash.	
			Available.	Total.			
4505	Read's High Grade Special Potash Mixture.	Read Fertilizer Co.	1.65	2.57	.....	0.48	$3.35
4580	Read's Wheat Grower.	Same.	*.38	1.41	0.44	0.32	2.29
4318	Schroth's Special	J. & F. Schroth Packing Co.	0.87	1.82	0.45	0.28	3.61
4319	Corn and Wheat Grower.	Same.	*.39	0.23	0.61	1.01	3.11
4500	Greer's Compound Fertilizer	Southern Fertilizer Co.	2.93	3.32	.....	0.21	4.55
4515	Pure Ground Bone	Standard Guano and Chemical Manufacturing Co.	.....	3.85	0.95	.....	6.12
4304	Bone and Potash 3 per cent.	Swift & Co.	.....	0.52	0.68	0.49	3.48
4445	Ox Ammoniated Bone	Tennessee Chemical Co.	0.62	2.15	0.32	0.54	3.41
4660	Bone Meal	Same.	.....	4.56	*.36	.....	2.32

*Less than Guaranteed.

In the following tables are published the analyses of all fertilizers entered by manufacturers in 1898 not already published in Bulletin 75, and also analyses of samples collected by deputy inspectors or sent by farmers. Most of the inspectors and farmers' samples were of brands entered under the old law. The reason for this is that the new law went into effect after most of the fertilizers had been entered under the old law. The analyses of brands entered under the old law are given in Table I; those entered under the new law, in Table II, together with the manufacturer's guaranteed minimum analyses for comparison.

In the future it will be our policy to analyze samples of every brand of fertilizer licensed in the State, taken from goods actually on sale, and samples sent by manufacturers will be analyzed only in cases where we are unable to get samples from goods in the State, or for some other special reason.

FERTILIZER LAW.

The law regulating the sale of fertilizers has been published in Bulletin 75, copies of which will be furnished on application, but we desire again to call attention to some of its provisions which most concern purchasers of fertilizers.

FREE ANALYSES FOR FARMERS. The law provides for free analyses to be made at the Station for the benefit of purchasers in order to see that the goods sold are up to the guarantee of their manufacturers. Any purchaser of a fertilizer, *who is not an agent or dealer*, may take a sample of the same, under proper regulations, and have it analyzed at the Station free, and such purchaser shall not be required to give the name of the fertilizer or of the person from whom it was bought until after the analysis has been made and reported, but after the purchaser has received the report of analysis he must give the Director all information about the fertilizer that may be required for publication in the Station bulletins or for prosecution of the case if it appear that the law has been violated. It is desirable that the farmers of the State take advantage of this privilege as much as possible, and it is recommended that in every large purchase a sample be taken for analysis.

FORM OF CERTIFICATE. The following is the proper form of certificate to accompany samples for free analysis. The words in italics are supposed to have been written in the blanks of one of our printed forms by the sender of the sample and give an idea of how these blanks should be filled. Any one intending to send a sample for free analysis can get these blank certificates by sending to the Station.

CERTIFICATE FOR FREE ANALYSIS.

Smithville, Ky., June 1, 1898.

M. A. SCOVELL, Director, Lexington, Ky.:

This is to certify that I am not a dealer in, or agent for the sale of, any fertilizer, and that the fertilizer, a sample of which I have sent by express to you for free analysis, was purchased by me for my own use and not for sale.

I further certify that the sample was taken at the time of purchase from at least 10 per cent. of the sacks or other packages comprising the whole lot purchased, and that it was taken as provided in Section 8 of the fertilizer law, in the following described manner, to wit: *I opened four sacks of the fertilizer and took two shovels full from each and mixed them all together thoroughly on a clean floor and immediately filled a quart jar with the mixed fertilizer and labeled it "No 1 from John Smith, Smithville, Ky."*

Upon the receipt of the analysis from you, I agree to furnish you with a tag taken from one of the sacks sampled, the name and address of the firm or agent of whom the fertilizer was purchased and the amount purchased.

(Signature) *John Smith,*

(P. O Address) *Smithville, Ky.*

Signature of Witnesses:

Sam Jones.

Will Brown.

IMPORTANT TO CAREFULLY SAMPLE. It is very important that samples for analysis be carefully taken in such a way as to be sure that they fairly represent the fertilizer purchased, and we request that any one intending to have an analysis made will read Section 8 of the law very carefully before taking the sample. To avoid the charge of unfairness in sampling, the law provides that the person or agent who sold the fertilizer be present when the sample is taken, but if this is not possible or convenient, the

sample may be taken in presence of two disinterested witnesses. It is required that the sample be taken from at least a tenth of the whole number of sacks purchased, but the more sacks sampled the better, and it is always best to take the sample from at least two or three sacks. A quantity should be taken from each of the sacks selected to be opened, and all mixed together in one pile, and a quart jar filled from the mixture. The jar should be sealed and marked with the name and address of the sender in such a way that there can be no mistake about the identity of the sample, and forwarded at once to the Director of the Station. The Station will furnish blank forms for the certificate, which is to go with the sample, but if there is not time to write for them, it may be made out after the form printed herewith. (See page 170.) All such samples must be taken at, or soon after, the time of purchasing the fertilizer, as it is not intended that a fertilizer be kept for months, possibly subject to change from exposure, and then be submitted to analysis.

SECTION PROVIDING FOR FREE ANALYSIS. We print, also, the section of the Fertilizer Law relative to the taking of samples for free analysis, and we invite particular attention to it:

SEC. 8. Any person not a dealer in, or agent for the sale of, any fertilizer who may purchase any commercial fertilizer in this State for his own use and not for sale, may take a sample of the same for analysis, which analysis shall be made by the said Experiment Station free of charge. Such sample for free analysis shall be taken by the purchaser in the presence of the person, company or agent selling the fertilizer, from at least ten (10) per cent. of the sacks or other packages comprising the whole lot purchased, and shall be thoroughly mixed and at least one pound of the material after mixing must be put into a jar or can, securely sealed and marked in such a way as to surely identify the sample and show by whom it was sent, without giving the name of the fertilizer or the person from whom it was purchased, and must be forwarded to the Director of the Kentucky Agricultural Experiment Station, Lexington, Ky. The purchaser shall also send with the sample a certificate signed by himself and witness, or by two witnesses, stating that the sender has purchased the fertilizer for his own use and not for sale, and that the sample was taken in the manner prescribed in this Section. Provided, however, that if the person, company or agent shall refuse to witness the taking of the sample, then the sample may be taken at the time of the purchase in the manner already described in

the presence of two witnesses who shall certify to the manner of taking the sample. The purchaser shall preserve the official label from one of the bags or other packages sampled to be sent to the Director after having received the report of analysis of the sample, and at the same time he shall furnish to the Director the name and address of the firm of whom the fertilizer was purhased and the amount purchased; and any person having sent a sample for free analysis, under the provisions of this section, who shall, after having received the report of analysis of the same, refuse to furnish the required information, shall thereafter forfeit the privilege of free analysis of fertilizers under this section. But if any sample shall have been submitted for free analysis without all the requirements of this section having been complied with, the Director shall inquire into the case and may accept the sample for free analysis if he believe that it is a fair sample of the fertilizer as it was delivered to the purchaser.

THE PROPER SELECTION OF FERTILIZERS.

In regard to the proper selection of fertilizers we can only say briefly that their profitable use will depend upon a knowledge of the needs of the particular soil to which they are to be applied, and the requirements of the crop to be grown. The latter knowledge has been gained once for all for most farm crops by a scientific study of these crops, but the needs of the soil must in most cases be learned by the farmer himself, either from systematic field experiments, or by observation and experience. If it is necessary for a farmer to use commercial fertilizers, and he is working upon a kind of soil that has not already been tested, we believe it will pay him to learn its needs by carrying out systematic experiments with fertilizers. The experiments made at the Station amply illustrate this. It would be very unprofitable to buy phosphates for use on soil like that of the Station farm, but potash salts could be profitably used there with most crops. This is because the soil is already rich in phosphates. But if it were deficient in phosphates, as is the case with many soils in this State,

it would be unprofitable to use potash salts alone, and one would have to supply phosphates. It is therefore necessary in purchasing a commercial fertilizer to consider, first, what our soil needs for the crop to be raised, and then to look for that fertilizer containing most of those substances, in an available form, as shown by its chemical analysis and guaranteed by the manufacturer, at the least cost. It is well to bear in mind also, that nitrogen compounds are the most expensive constituents of commercial fertilizers, and if we can keep up our nitrogen supply by means of clover, cow peas, or other leguminous plants, or by barnyard manure, and purchase only such phosphates and potash as may be needed, we will have accomplished a great saving.

THE TABLES.

In Table I we have followed the plan used in former bulletins of giving first the tag analysis or "official" analysis of each brand in bold faced type and just under it the analysis of samples of the same brand collected at various places.

In Table II are given in bold faced type the guaranteed analyses of all brands entered in 1898 under the new law, and just under this the analysis of the samples of the same brands sent by the manufacturer and also the analysis of any samples sent in by farmers and inspectors

In both Tables the names of manufacturers are arranged in alphabetical order.

VALUES USED.

In calculating the "estimated value per ton" or "relative commercial value,' the same values were used as in bulletin 75, 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.

DESCRIPTION OF SAMPLES IN TABLE I.

THE ARMOUR FERTILIZER WORKS, CHICAGO, ILL.

No. 4972—Bone Meal, collected by deputy inspector from stock of B. B. Smith, Guthrie, Ky. Tags corresponded to No. 4160.

No. 4978—Grain Grower, collected by deputy inspector from stock of Chas. Ratliffe, Princeton, Ky. Tags corresponded to No. 4163.

THE CLEVELAND DRYER CO., CLEVELAND, O.

No. 4876—Square Bone, sent by P. K. Patterson, Melrose, Ky. Tag sent corresponded to No. 4245.

CROCKER FERTILIZER & CHEMICAL CO., BUFFALO, N. Y.

No. 4414—Crocker's Kentucky Tobacco Fertilizer, collected by deputy inspector from stock of Fullenweider & Son, Shelbyville, Ky. Tags corresponded to No. 3238.

*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.

THE CURRIE FERTILIZER CO., LOUISVILLE, KY.

No. 4894—Currie's Raw Bone Meal, collected by deputy inspector from stock of L. S. Brough, Bowling Green, Ky. Tags corresponded to No. 3913.

No. 4895—Currie's Soluble Bone, collected by deputy inspector from stock of L. S. Brough, Bowling Green, Ky. Tags corresponded to No. 3772.

No. 4939—Currie's Fine Ground Raw Bone Meal, collected by deputy inspector from stock of L. S. Brough, Bowling Green, Ky. Tags corresponded to No. 3912.

No. 4940—Currie's Climax Tobacco and Potato Grower collected by deputy inspector from stock of Tandy & Young, Hopkinsville, Ky. Tags corresponded to No. 4266.

No. 4973—Same brand, sent by J. W. Riley, Newstead, Ky. Tag sent corresponded to No. 4266.

EMPIRE CARBON WORKS, ST. LOUIS, MO.

No. 4996—Empire Pure Raw Bone Meal, collected by deputy inspector from stock of A. Button & Son, Louisville, Ky. Tags corresponded to No. 3960.

GLOBE FERTILIZER CO., LOUISVILLE, KY.

No. 4417—Globe Special Tobacco Grower, collected by deputy inspector from stock of Hall & Son, Shelbyville, Ky. Tags corresponded to No. 4183.

No. 4944—Big Four Tobacco Grower, collected by deputy inspector from stock of Porter & Ellis, Bowling Green, Ky. Tags corresponded to No. 4187.

No. 4959—Eagle Corn and Wheat Grower, collected by deputy inspector from stock of Elrod & McQuery, Somerset, Ky. Tags corresponded to No. 4188.

No. 4960—Progress Corn and Wheat Grower, collected by deputy inspector from stock of Elrod & McQuery, Somerset, Ky. Tags corresponded to No. 4230.

GREER MACHINERY CO., KNOXVILLE, TENN.

No. 4339—Farmers' Compound Fertilizer, sent by J. L. Yaden, London, Ky. Tag sent corresponded to No. 4211.

J. B. JONES, LOUISVILLE, KY.

No. 4592—Raw Bone Meal, sent by D. M. Crum, Beard, Ky. Tag sent corresponded to No. 4212.

THE JONES FERTILIZING CO., CINCINNATI, O.

No. 4844—Fine Ground Bone, sent by T. J. Stuart, Glendale, Ky. Tag sent corresponded to No. 4123.

No. 4846—Same brand, collected by deputy inspector from stock of A. S. White, Hopkinsville, Ky. Tags corresponded to No. 4123.

No. 4845—Ammoniated Bone Meal, sent by T. J. Stuart, Glendale, Ky. Tag sent corresponded to No. 4124.

No. 4847—Same brand, collected by deputy inspector from stock of A. S. White, Hopkinsville, Ky. Tags corresponded to No. 4124.

No. 4956—Same brand, collected by deputy inspector from stock of E. R. Sparks, Nicholasville, Ky. Tags corresponded to No. 4124.

No. 4977—Same brand, sent by S. H. Bland, Glendale, Ky. Tag sent corresponded to No. 4124.

No. 4848—Jones' Reliable, collected by deputy inspector from stock of A. S. White, Hopkinsville, Ky. Tags corresponded to No. 2422.

No. 4877—Bone and Potash, collected by deputy inspector from stock of A. S. White, Hopkinsville, Ky. Tags corresponded to No. 4127.

No. 4878—Miami Valley Phosphate, collected by deputy inspector from stock of A. S. White, Hopkinsville, Ky. Tags corresponded to No. 4201.

No. 4957—Same brand, collected by deputy inspector from stock of E. R. Sparks, Nicholasville, Ky. Tags corresponded to No. 4201.

THE LOUISVILLE FERTILIZER WORKS, LOUISVILLE, KY.

No. 4317—Potato and Tobacco Grower, sent by J. C. Catlett, Elmo, Ky. Tag sent corresponded to No. 4158.

No. 4970—Same brand, collected by deputy inspector from stock of W. T. Kirkman, Elkton, Ky. Tags corresponded to No. 4158.

No. 4971—Bone Meal, collected by deputy inspector from stock of W. T. Kirkman, Elkton, Ky. Tags corresponded to No. 3917.

MICHIGAN CARBON WORKS, DETROIT, MICH.

No. 4890—Homestead Corn and Wheat Grower, sent by L. D. Stringer, Pulaski, Ky. Tag sent corresponded to No. 4274.

No. 4958—Same brand, collected by deputy inspector from stock of J. H. Thurman, Somerset, Ky. Tags corresponded to No. 4274.

No. 4941—Same brand, collected by deputy inspector from stock of G. H. Bransford, Fulton, Ky. Tags corresponded to No. 4221.

No. 4942—Red Line Complete Manure, collected by deputy inspector from stock of J. H. Thurman, Somerset, Ky. Tags corresponded to No. 4228.

NORTH-WESTERN FERTILIZING CO., CHICAGO, ILL.

No. 4724—Horse Shoe Brand Acidulated Bone, sent by George Gray, Harned, Ky. Tag sent corresponded to No. 4169.

No. 4879—H. S. B. Fine Raw Bone, collected by deputy inspector from stock of Forbes & Bro., Hopkinsville, Ky. Tags corresponded to No. 4165.

No. 4891—Same brand etc., from stock of Miller & Wells, Elkton, Ky. Tags corresponded to No. 4165.

No. 4881 H. S. B. Ky. Tobacco Grower, collected by deputy inspector from stock of R. G. Terrell, Paducah, Ky. Tags corresponded to No. 4167.

No. 4892—H. S. B. Bone and Potash, collected by deputy inspector from stock of Miller & Wells, Elkton, Ky. Tags corresponded to No. 4170.

No. 4893—H. S. B. Raw Bone and Phosphate Mixture, collected by deputy inspector from stock of Miller & Wells, Elkton, Ky. Tags corresponded to No. 4178.

READ FERTILIZER CO., CHARLESTON, S. C.

No. 4361—Read's High Grade Tobacco Grower, sent by J. C. Alexander, Bowling Green, Ky. Tag sent corresponded to No. 4283.

No. 4993—Same brand, collected by deputy inspector from stock of J. W. Bearce, Bowling Green, Ky. Tags corresponded to No. 4283.

TENNESSEE CHEMICAL CO., NASHVILLE, TENN.

No. 4961—Ox Bone with Ammonia and Potash, collected by deputy inspector from stock of McElrath & Sexton, Murray, Ky Tags corresponded to No. 4154.

No. 4968—Ox Alkaline Bone, collected by deputy inspector from stock of McElrath & Sexton, Murray, Ky. Tags corresponded to No. 4216.

S. W. TRAVERS & CO., RICHMOND, VA.

No. 4415—Capital Tobacco Fertilizer, collected by deputy inspector from one-half sack in the hands of B. F. Bryant, Shelbyville, Ky. There being no tag on this half sack, the analysis is compared with the official for 1898, No. 4146.

No. 4429—Same brand, sent by Capt. Thomas Todd, Shelbyville, Ky. Sample taken from part of sack remaining from half a ton purchased from B. F. Bryant. Mr. Bryant purchased a ton of this fertilizer and these two samples, Nos. 4415 and 4429 are both from this lot.

No. 4416—Champion Corn Grower, collected by deputy inspector from stock of B. F. Bryant, Shelbyville, Ky. Tags corresponded to No. 3224.

No. 4447—National Tobacco Fertilizer, collected by deputy inspector from stock of R. C. King, Carlisle, Ky. Tags corresponded to No 2811.

No. 4991—Beef, Blood and Bone Fertilizer, collected by deputy inspector from stock of Eldred & Co., Princeton, Ky. Tags corresponded to No. 4148.

No. 4992—Capital Bone Potash Compound, collected by deputy inspector from stock of Eldred & Co., Princeton, Ky. Tags corresponded to No. 4144.

TABLE I.

NAME OF BRAND.	SAMPLE.	Station Number.	POUNDS IN THE HUNDRED. Phosphoric Acid. In Fine Bone.	In Medium Bone.	Available.	Insoluble.	Total.	Nitrogen.	Equivalent to Ammonia.	Potash. From Muriate.	From Sulphate.	Estimated Value Per Ton.
Bone Meal.	*Official*, 1898	**4160**	**20.95**	**4.51**	.....	.....	**25.46**	**3.36**	**4.08**	.....	.....	**$31.23**
	Guthrie	4972	21.45	5.57	.....	.....	27.02	2.76	3.35	.....	.....	30.16
Grain Grower.	*Official*, 1898	**4163**	.....	.....	**9.64**	**2.96**	**12.60**	**2.24**	**2.72**	**2.14**	.....	**25.39**
	Princeton	4978	.....	.....	8.57	3.88	12.45	1.82	2.21	.....	1.72	22.72
Square Bone.	*Official*, 1898	**4245**	.....	.....	**13.45**	**9.45**	**22.90**	**2.59**	**3.14**	.....	.....	**32.63**
	Melrose	4876	.....	.....	10.81	7.15	17.96	1.58	1.92	.....	.....	24.24
Crocker's Kentucky Tobacco Fertilizer.	*Official*, 1896	**3238**	.....	.....	**10.63**	**2.66**	**13.29**	**2.23**	**2.71**	**3.49**	.....	**28.21**
	Shelbyville	4414	.....	.....	10.22	2.19	12.41	2.27	2.76	3.83	.....	27.96
Currie's Raw Bone Meal.	*Official*, 1897	**3913**	**10.98**	**11.43**	.....	.....	**22.41**	**3.94**	**4.78**	.....	.....	**29.43**
	Bowling Green	4894	13.14	7.23	.....	.....	20.37	3.38	4.10	.....	.....	26.68

Currie's Soluble Bone	*Official*, 1897	3772	.....	.....	11.85	1.54	13 39	0.72	0 87	.....	2.91	23.95
	Bowling Green	4895	.....	.....	10.92	3.24	14.16	0.80	0.97	.....	2.42	23.10
Currie's Fine Ground Raw Bone Meal.	*Official*, 1897	3912	21.09	2.50	.....	.....	23.59	2.15	2.61	.....	.....	25 90
	Bowling Green	4939	18.46	2.21	..	....	20.67	1.23	1.49	.....	.....	20.41
Currie's Climax Tobacco and Potato Grower.	*Official*, 1898	4266	.....	.....	11.32	3.16	14.48	0.52	0.63	.....	1.40	21.21
	Hopkinsville	4940	.....	.....	11.28	4.20	15.48	0.47	0.57	....	1.48	21.61
	Newstead	4973	.....	.....	11.40	3.91	15.31	0.56	0.68	.....	1.70	22.26
Empire Pure Raw Bone Meal.	*Official*, 1897	3960	22.06	.....	....	.....	22.06	3.85	4 67	.. .	.....	31.13
	Louisville	4996	22.00	.....	.....	....	22.00	3.86	4.69	....	.....	31.11
Globe Special Tobacco Grower.	*Official*, 1898	4183	.....	.....	10.08	0.78	10.86	2.78	3.37	.....	10.65	39.14
	Shelbyville	4417	.....	.....	9.33	0.99	10.32	2.54	3.08	....	12.22	39.56
Big Four Tobacco Grower.	*Official*, 1898	4187	.....	.....	9.19	0.74	9.93	2.23	2.71	.....	3 13	25.43
	Bowling Green	4944	.....	.....	9.32	1.30	10.62	2.26	2.74	.....	2.85	25.60
Eagle Corn and Wheat Grower.	*Official*, 1898	4188	.....	.....	10.09	1.27	11.36	2.40	2.91	...	2 09	26.10
	Somerset	4959	.....	.....	10.86	1.00	11.86	1.99	2.42	2.25	.....	25.37
Progress Corn and Wheat Grower.	*Official*, 1898	4230	.....	....	9.54	1.51	11.05	2 01	2.44	.....	1 32	23.01
	Somerset	4960	.....	.....	9.63	1.15	10.78	2.04	2.48	.....	0.83	22.36

TABLE I.—Continued.

NAME OF BRAND.	SAMPLE.	Station Number.	POUNDS IN THE HUNDRED.									Estimated Value per Ton.
			Phosphoric Acid.					Nitrogen.	Equivalent to Ammonia.	Potash.		
			In Fine Bone.	In Medium Bone.	Available.	Insoluble.	Total.			From Muriate.	From Sulphate.	
Farmers' Compound Fertilizer.	*Official*, 1898	4211	.....	.....	12.28	1.51	13.79	.....	.....	2.10	.....	$20.47
	London	4339	.....	.....	14.74	1.05	15.79	.....	.....	2.14	.....	23.74
Raw Bone Meal.	*Official*, 1898	4212	12.27	8.63	.....	.....	20.90	4.29	5.21	....	.....	30.02
	Beard	4592	12.31	9.18	.....	.....	21.49	3.70	4.49	.....	.....	28.31
Fine Ground Bone.	*Official*, 1898	4123	16.20	6.42	.....	.....	22.62	3.60	4.37	.....	.....	29.41
	Glendale	4844	13.60	10.78	.....	.....	24.38	3.45	4.19	.....	.....	29.43
	Hopkinsville	4846	15.39	5.46	.....	.....	20.85	3.14	3.81	.....	.....	26.58
Ammoniated Bone Meal.	*Official*, 1898	4124	18.89	4.04	.....	...	22.93	3.46	4.20	....	....	29.64
	Glendale	4845	9.41	1.26	.....	.....	10.67	2.48	3.01	.....	....	16.97
	Hopkinsville	4847	8.63	1.20	.....	.....	9.83	2.89	3.51	.....	.....	17.74

	Nicholasville	4956	11.72	2.02	.....	.....	13.74	4.93	5.99	.....	.....		27.85
	Glendale	4977	17.44	3.13	.....	.....	20.57	3.46	4.20	.....	.....		27.94
Jones Reliable.	*Official*, 1894	2422	.....	.....	5 97	2.79	8.76	2.52	3.06	0.77	0.96		20.84
	Hopkinsville	4848	.....	.....	3.70	1.84	5.54	1.82	2.21	.....	2.27		15.65
Bone and Potash.	*Official*, 1898	4127	.....	.....	6.35	2.84	9.19	1.50	1.82	.....	4.85		22.35
	Hopkinsville	4877	.....	.....	4.17	2.37	6.54	2 06	2.50	...	4.52		20.57
Miami Valley Phosphate.	*Official*, 1898	4201	.....	.....	9 77	5 17	14.94	3.44	4 18	.....	3.47		33.17
	Hopkinsville	4878	.....	.....	4.51	1.68	6.19	1.84	2.23	.....	3.71		18.78
	Nicholasville	4957	.....	.....	9.79	3.91	13.70	3.04	3.69	.....	2.80		30.23
Potato and Tobacco Grower.	*Official*, 1898	4158	.....	.....	10 13	3.58	13 71	2.53	3 07	.....	3.23		29 35
	Elmo	4317	.....	.....	9.48	2.75	12.23	1.97	2.39	.....	4.27		27.53
	Elkton	4970	....	.....	12.43	5.17	17.60	1.26	1.53	...	1.41		26.37
Bone Meal.	*Official*, 1897	3917	16.41	1.70	.....	.....	18.11	3.01	3.65	.....	.....		24.69
	Elkton	4971	10.45	8.87	.....	.....	19.32	3.85	4.67	.....	...		27.16
Homestead Corn and Wheat Grower.	*Official*, 1898	4274	.....	.....	10.44	0.72	11.16	2.33	2.83	1 94	.....		25.47
	Pulaski	4890	.....	.....	9.68	0.75	10.43	2.17	2.63	2.06	.....		24.00
	Somerset	4958	.....	.....	9.95	0.83	10.78	2.33	2.83	1.87	.....		24.75

TABLE I—Continued

NAME OF BRAND.	SAMPLE.	Station Number.	POUNDS IN THE HUNDRED. Phosphoric Acid. In Fine Bone.	In Medium Bone.	Available.	Insoluble.	Total.	Nitrogen.	Equivalent to Ammonia.	Potash. From Muriate.	From Sulphate.	Estimated Value per Ton.
Homestead Corn and Wheat Grower.	*Official*, 1898	**4221**	.....	.....	**10.35**	**1.29**	**11.64**	**2.54**	**3.08**	**3.29**	.....	**$27.98**
	Fulton	4941	.....	.....	10.21	1.28	11.49	2.17	2.63	2.07	.....	25.01
Red Line Complete Manure.	*Official*, 1898	**4228**	.....	.....	**9.12**	**2.62**	**11.74**	**1.26**	**1.53**	**2.08**	.....	**20.99**
	Somerset	4942	.....	.....	8.76	1.15	9.91	1.08	1.31	1.70	.....	18.66
H. S. B. Acidulated Bone.	*Official*, 1898	**4169**	....	....	**9.76**	**3.01**	**12.77**	**1.38**	**1.68**	....	.....	**20 00**
	Harned	4724	.....	.....	9.42	3.94	13.36	1.52	1.85	....	.....	20.48
H. S. B. Fine Raw Bone.	*Official*, 1898	**4165**	**14.75**	**9.04**	.....	.....	**23.79**	**4.03**	**4.89**	.....	.....	**31.33**
	Hopkinsville	4879	16.82	5.26	.....	.....	22.08	4.00	4.86	.....	.....	30.62
	Elkton	4891	17.31	6.31	.....	.....	23.62	3.59	4.36	.....	.....	30.21
H. S. B. Ky. Tobacco Grower.	*Official*, 1898	**4167**	.....	.....	**6.72**	**1.66**	**8.38**	**2.58**	**3.13**	.....	**2.01**	**22.08**
	Paducah	4881	.....	.....	6.97	1.64	8.61	2.35	2.85	.....	2.92	22 90

H. S. B. Bone and Potash.	*Official*, 1898.....	4170	.....	.....	11.17	2.85	14.02	0.61	0.74	.....	1.12	20.78
	Elkton.....	4892	.....	.....	9.11	3.59	12.70	1.29	1.57	.....	1.15	20.68
H. S. B. Raw Bone and Phosphate Mixture.	*Official*, 1898	4178	.....	.....	9.46	5.94	15.40	3.51	4.26	.....	0.74	29.54
	Elkton.....	4893	.....	.....	10.33	5.46	15.79	2.56	3.11	.....	0.56	26.93
Read's High Grade Tobacco Grower.	*Official*, 1898.....	4283	.....	.....	8.47	2.24	10.71	1.76	2.14	4.47	.....	24.50
	Bowling Green....	4361	.....	.....	6.25	2.85	9.10	2.17	2.63	5.01	.....	23.79
	Bowling Green.....	4993	.....	.....	7.21	3.34	10.55	1.89	2.29	4.43	.....	23.70
Ox Bone With Ammonia and Potash.	*Official*, 1898.....	4154	.....	.....	10.72	2.11	12.83	0.93	1.13	1.13	.....	20.69
	Murray.....	4961	.....	.....	9.70	4.90	14.60	1.16	1.41	1.65	.....	22.07
Ox Alkaline Bone.	*Official*, 1898.....	4216	.....	.....	10.63	1.24	11.87	.....	.....	2.27	.....	18.22
	Murray.....	4968	....	.....	12.01	6.08	18.09	.....	.....	1.38	....	21.51
Capital Tobacco Fertilizer.	*Official*, 1898.....	4146	.....	....	6.65	1.52	8.17	3.98	4.83	3.88	0.93	29.96
	Shelbyville.	4415	.....	.....	7.83	1.82	9.65	3 79	4.60	3.02	....	28.76
	Shelbyville.....	4429	.....	.....	8 35	1.88	10.23	3.54	4.30	2 61	.....	28.15

TABLE 1—Continued.

NAME OF BRAND.	SAMPLE.	Station Number.	POUNDS IN THE HUNDRED.										
			Phosphoric Acid.					Nitrogen.	Equivalent to Ammonia.	Potash.		Estimated Value per Ton.
			In Fine Bone.	In Medium Bone.	Available.	Insoluble.	Total.			From Muriate	From Sulphate.	
Champion Corn Grower.	*Official*, 1896	3224	.....	.....	9.01	1.34	10.35	1.01	1.23	2.12	.....	$19.36
	Shelbyville	4416	.....	.....	9.43	1.62	11.05	1.53	1.86	1.95	.....	21.71
National Tobacco Fertilizer.	*Official*, 1895	2811	.....	.....	7.69	1.69	9.38	1.89	2.29	3.98	.....	23.02
	Carlisle	4447	.....	.....	8.38	0.72	9.10	1.64	1.99	3.80	.....	22.39
Beef, Blood and Bone Fertilizer.	*Official*, 1898	4148	.....	.....	8.17	4.43	12.60	1.91	2.32	2.17	.....	22.95
	Princeton	4991	.....	.....	8.32	3.76	12.08	1.70	2.06	2.20	.....	22.12
Capital Bone Potash Compound.	*Official*, 1898	4144	.....	.....	9.64	1.80	11.44	.....	.....	1.70	.....	16.44
	Princeton	4992	.....	.....	9.31	1.70	11.01	.....	.....	2.50	.....	16.88

DESCRIPTION OF SAMPLES IN TABLE II.

A. Button & Son, Louisville, Ky.

No. 4995—Invincible Bone Meal, collected by deputy inspector from stock of A. Button & Son, Louisville, Ky.

The Louisville Fertilizer Works, Louisville, Ky.

No. 4782—Bone Meal, sent by E. B. Oglesby, Cloverport, Ky.

Meridian Fertilizer Factory, Meridian, Miss.

No. 4994—Meridian Home Mixture, collected by deputy inspector from stock of W. J. Goodwin, Somerset, Ky

National Fertilizer Co., Nashville, Tenn.

No. 4810—Sadler's Formula, sent by F. L. Ellis & Co., Hopkinsville, Ky.

Swift & Co., Chicago, Ill.

No. 4831—Raw Bone Meal, sent by John E. Daily, Caneyville, Ky.

Tennessee Chemical Co., Nashville, Tenn.

No. 4969—Ox Alkaline Bone, collected by deputy inspector from stock of J. W. Bearce & Co. Bowling Green, Ky.

All analyses in Table II marked "Found" compared with the "guaranteed" analyses in bold face type, are of the samples furnished by manufacturers when entering their goods for sale.

TABLE II.

Station Number.	Name and Address of Manufacturer.	Name of Brand.	Analysis.
	A. D. Adair & McCarty Bros., Atlanta, Ga.	See Furman Farm Improvement Company.....	
4358	The Armour Fertilizer Works, Chicago, Ill.	Bone, Blood and Potash	Guaranteed Found....
4571 4995	A. Button & Son, Louisville, Ky.	Invincible Bone Meal.....	Guaranteed Found..... Louisville..
	Wm. Casler, Louisville, Ky.	See R. H. Hoskins.....	
4443	Continental Fertilizer Co., Nashville, Tenn.	Bear Wheat Grower.....	Guaranteed Found.....
4444	Same.	Bear Dissolved Bone.....	Guaranteed Found.....
4625	Crocker Fertilizer and Chemical Co., Buffalo, N. Y.	Crocker's Universal Grain Grower.....	Guaranteed Found.....
4357	The Currie Fertilizer. Co., Louisville, Ky.	Currie's Tobacco and Potato Grower.....	Guaranteed Found.....
4508	Same.	Currie's Butchertown Raw Bone Meal.....	Guaranteed Found....
4509	Same.	Currie's Raw Bone Meal.....	Guaranteed Found.....
4510	Same.	Currie's Fine Ground Raw Bone Meal.....	Guaranteed Found....
4511	Same.	Currie's Wheat Grower.....	Guaranteed Found.....
4353	Dunn & Backer, Troy, Ind.	No. 2 Potato, Corn and Tobacco Grower.....	Guaranteed Found ....

Pounds in the Hundred.												
Phosphoric Acid.							Nitrogen.	Equivalent to Ammonia.	Potash.		Relative Value Per Ton.	Station Number.
In Fine Bone.	In Medium Bone.	Soluble.	Reverted.	Available.	Insoluble.	Total.			From Muriate.	From Sulphate		
.....	.....	6.00	2.00	8.00	.....	10.00	4.11	5.00	.....	7.00	$36.39	4358
.....	.....	.....	.....	9.08	1.91	10.99	4.52	5.49	.....	7.36	39.79	
.....	.....	.....	.....	.....	.....	22.00	3.30	4.00	.....	.....	29.15	4571
22.18	.....	.....	.....	.....	.....	22.18	3.82	4.64	.....	.....	31.11	
21.75	.....	.....	.....	.....	.....	21.75	4.11	4.99	.....	.....	31.79	4995
.....	.....	9.00	2.00	11.00	.....	12.00	.....	.....	2.00	.....	18.30	4443
.....	.....	.....	.....	10.62	2.67	13.29	.....	.....	2.21	.....	18.86	
.....	.....	8.00	6.00	14.00	.....	15.00	.....	.....	.....	.....	14.00	4444
.....	.....	.....	.....	13.79	2.53	16.32	.....	.....	.....	.....	13.79	
.....	.....	6.00	1.00	7.00	.....	8.00	0.82	1.00	2.70	.....	16.41	4625
.....	.....	.....	.....	7.64	1.79	9.43	1.30	1.58	3.35	....	20.17	
.....	.....	.....	.....	7.00	.....	8.00	2.06	2.50	.....	8.00	28.71	4357
.....	.....	.....	.....	8.40	3.63	12.03	1.39	1.69	.....	11.49	34.54	
.....	.....	5.00	5.25	10.25	.....	15.00	0.82	1.00	.....	1.25	21.35	4508
.....	.....	.....	.....	10.97	6.97	17.94	2.29	2.78	.....	0.84	28.05	
.....	.....	.....	.....	.....	.....	22.00	3.71	4.50	.....	.....	27.48	4509
6.74	16.34	.....	.....	.....	.....	23.08	3.81	4.63	.....	.....	28.53	
.....	.....	.....	.....	.....	.....	23.00	1.65	2.00	.....	.....	23.76	4510
17.04	1.69	.....	.....	.....	.....	18.73	1.29	1.57	.....	.....	19.16	
.....	.....	8.50	2.50	11.00	.....	14.00	0.41	0.50	.....	1.25	20.09	4511
.....	.....	.....	.....	12.14	2.85	14.99	0.45	0.55	.....	1.74	22.45	
.....	.....	.....	.....	7.00	.....	10.00	1.65	2.00	3.00	.....	20.68	4353
.....	.....	.....	.....	8.61	1.71	10.32	2.27	2.76	4.64	.....	26.43	

TABLE II.—Continued.

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	ANALYSIS.
4354	Dunn & Backer, Troy, Ind....	No. 3 Tobacco &c Grower....	Guaranteed Found.....
4355	Same.	No. 8 Grower, Raw Bone and Tankage Mixture.....	Guaranteed Found.....
4356	Same.	No. 9 Grower, Pure Raw Bone Meal.....	Guaranteed Found.....
4292	Furman Farm Improvement Co., Atlanta, Ga.	Furman Soluble Bone With Ammonia and Potash...	Guaranteed Found.....
4293	Same.	Farish Furman Formula.....	Guaranteed Found.....
4341	Same.	Furman High Grade Fertilizer	Guaranteed Found.....
4659	Globe Fertilizer Co., Louisville, Ky.	Globe Bone Meal.....	Guaranteed Found.....
	Greer Machinery Co., Knoxville, Tenn.	See Southern Fertilizer Co.....	
4497	R. H. Hoskins, Louisville, Ky.	Champion Raw Bone Meal....	Guaranteed Found.....
4506	The Jarecki Chemical Co., Sandusky, O.	Lake Erie Fish Guano.....	Guaranteed Found.....
4278	The Louisville Fertilizer Works, Louisville, Ky.	Corn and Wheat Grower.....	Guaranteed Found.....
4494 4782	Same.	Bone Meal.	Guaranteed Found..... Cloverport.
4524	Same.	Soluble Bone and Potash.....	Guaranteed Found.....

POUNDS IN THE HUNDRED.

Phosphoric Acid.							Nitrogen.	Equivalent to Ammonia.	Potash.		Relative Value Per Ton.	Station Number.
In Fine Bone.	In Medium Bone.	Soluble.	Reverted.	Available.	Insoluble.	Total.			From Muriate.	From Sulphate		
.....	.....	.....	.....	**8.00**	.....	**11.00**	**2.47**	**3.00**	**5.00**	....	$ **27.35**	4354
.....	.....	.....	.....	7.90	2.21	10.11	2.73	3.31	6.15	.....	29.11	
.....	.....	.....	.....	.....	.....	**15.00**	**3.30**	**4.00**	.....	.....	**22.76**	4355
10.89	3.90	.....	.....	.....	.....	14.79	4.15	5.04	.....	.....	25.58	
.....	.....	.....	.....	.....	.....	**25.00**	**3.71**	**4.50**	.....	.....	**31.06**	4356
15.47	9.68	.....	.....	.....	.....	25.15	3.88	4.71	.....	.....	31.77	
.....	.....	.....	.....	**10.00**	**2.00**	**12.00**	**0.82**	**1.00**	**2.00**	.....	**20.27**	4292
.....	.....	.....	.....	9.78	3.84	13.62	0.95	1.15	1.63	.....	20.90	
.....	.....	.....	.....	**10.00**	**2.00**	**12.00**	.....	.....	**2.00**	.....	**17.40**	4293
.....	.....	.....	.....	12.16	3.04	15.20	.....	.....	2.37	.....	21.38	
.....	.....	**6.00**	**3.00**	**9.00**	.....	**11.00**	**1.65**	**2.00**	**2.00**	.....	**21.78**	4341
.....	.....	.....	.....	8.11	2.89	11.00	2.16	2.62	2.54	.....	23.41	
.....	.....	.....	.....	.....	.....	**20.00**	**3.30**	**4.00**	.....	.....	**25.61**	4659
13.68	12.88	.....	.....	.....	.....	26.56	3.51	4.26	.....	.....	30.96	
.....	.....	.....	.....	.....	.....	**22.00**	**3.30**	**4.00**	.....	.....	**29.15**	4497
23.46	.....	....	.....	.....	.....	23.46	4.27	5.18	.....	.....	33.72	
.....	.....	**8.00**	**2.00**	**10.00**	.....	**12.00**	**1.65**	**2.00**	**0.50**	**0.50**	**22.08**	4506
.....	.....	.....	.....	10.72	2.52	13.24	1.67	2.03	1.65	.....	24.10	
.....	.....	.....	.....	**10.00**	.....	.....	**0.21**	**0.25**	.....	**0.25**	**15.09**	4278
.....	.....	.....	.....	11.57	1.82	13.39	0.56	0.68	.....	0.09	19.20	
.....	.....	.....	.....	.....	.....	**18.00**	**1.65**	**2.00**	.....	.....	**24.48**	4494
.....	.....	.....	.....	12.35	8.30	20.65	1.78	2.16	.....	.....	27.67	
.....	.....	.....	.....	11.56	5.90	17.46	1.68	2.04	....	.....	25.01	4782
.....	.....	.....	.....	**8.00**	.....	**10.00**	**0.82**	**1.00**	.....	**1.50**	**17.17**	4524
.....	.....	.....	.....	9.01	3.16	12.17	1.36	1.65	.....	1.14	20.55	

TABLE II—Continued.

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	ANALYSIS.
4314	A. B. Mayer Manufacturing Co., St. Louis, Mo.....	Anchor Brand Complete Fertilizer.....	Guaranteed Found.....
4315	Same.	Anchor Brand Corn and Wheat Grower.....	Guaranteed Found.....
4316	Same.	Anchor Brand Pure Bone Meal.....	Guaranteed Found.....
4543 4994	Meridian Fertilizer Factory, Meridian, Miss.....	Meridian Home Mixture.....	Guaranteed Found..... Somerset...
4544	Same.	Meridian Corn and Wheat Grower.....	Guaranteed Found.....
4578	Michigan Carbon Works, Detroit, Mich.....	Jarves Drill Phosphate.....	Guaranteed Found.....
4307	National Fertilizer Co., Nashville, Tenn.....	Acid Phosphate.....	Guaranteed Found....
4308	Same.	Acid Phosphate with Potash (Sadler's Formula.)	Guaranteed Found.....
4309	Same.	Tobacco Grower.....	Guaranteed Found.....
4310	Same.	Tobacco Fertilizer.....	Guaranteed Found....
4311	Same.	Bone Meal.....	Guaranteed Found....
4312	Same.	Corn Grower.....	Guaranteed Found.....
4588	Same.	Wheat Grower.....	Guaranteed Found.....

Pounds in the Hundred.													
Phosphoric Acid.							Nitrogen.	Equivalent to Ammonia.	Potash.		Relative Value Per Ton.	Station Number.
In Fine Bone.	In Medium Bone.	Soluble.	Reverted.	Available.	Insoluble.	Total.			From Muriate.	From Sulphate		
.....	.....	**4.00**	**4.00**	**8.00**	.....	**12.00**	**2.88**	**3.50**	.....	**3.75**	$ **28.53**	4314
.....	.....	.....	.....	8.80	3.89	12.69	2.97	3.61	.....	1.86	27.27	
.....	.....	**4.00**	**5.00**	**9.00**	.....	**12.00**	**3.30**	**4.00**	.....	**2.50**	**29.15**	4315
.....	.....	.....	.....	9.46	4.06	13.52	2.76	3.35	.....	2.25	28.08	
.....	.....	.....	.....	.....	.....	**22.00**	**3.71**	**4.50**	.....	.....	**29.21**	4316
14.85	6.77	.....	.....	.....	.....	21.62	3.76	4.56	.....	.....	29.10	
.....	.....	**8.00**	**2.00**	**10.00**	.....	**11.00**	**2.47**	**3.00**	**2.50**	.....	**26.15**	4543
.....	....	.....	.....	9.66	0.63	10.29	2.57	3.12	2.73	.....	26.12	
.....	.....	.....	.....	10.09	0.82	10.91	2.37	2.88	2.59	....	25.95	4994
.....	.....	**8.00**	**2.00**	**10.00**	.....	**11.00**	**2.47**	**3.00**	**2.50**	.....	**26.15**	4544
.....	.....	.....	.....	9.48	0.79	10.27	2.49	3.02	2.65	....	25.57	
.....	.....	.....	.....	**8.00**	.....	**10.00**	**1.03**	**1.25**	.....	**0.75**	**16.86**	4578
.....	.....	.....	.....	8.52	2.15	10.67	1.65	2.00	0.85	.....	19.81	
.....	....	.....	.....	**15.00**	.....	.....	.....	.....	.....	.....	**15.00**	4307
....	.....	....	.....	17.97	1.19	19.16	.....	.....	.....	.....	17.97	
.....	.....	.....	.....	**12.00**	.....	.....	.....	.....	**2.00**	.....	**19.20**	4308
.....	.....	.....	.....	13.14	0.70	13.84	.....	.....	5.19	.....	24.98	
.....	.....	.....	.....	**10.00**	.....	.....	**1.65**	**2.00**	**2.00**	.....	**22.18**	4309
.....	.....	.....	.....	13.33	3.20	16.53	1.06	1.29	1.43	.....	25.69	
.....	.....	.....	.....	**10.00**	.....	.....	**2.06**	**2.50**	**3.00**	.....	**24.81**	4310
.....	.....	.....	.....	11.24	3.20	14.44	1.97	2.39	3.43	.....	28.36	
.....	.....	....	.....	.....	.....	**20.00**	**2.47**	**3.00**	.....	.....	**24.65**	4311
21.77	.....	.....	.....	.....	.....	21.77	4.01	4.87	.....	.....	31.46	
.....	.....	.....	.....	**12.00**	.....	.....	**0.82**	**1.00**	**1.00**	.....	**20.87**	4312
.....	.....	.....	.....	14.86	1.77	16.63	0.49	0.59	0.68	.....	24.23	
.....	.....	.....	.....	**10.00**	.....	.....	**1.65**	**2.00**	**2.00**	.....	**22.18**	4588
.....	.....	.....	.....	11.43	1.41	12.84	1.81	2.20	2.37	.....	25.89	

TABLE II—Continued.

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	ANALYSIS.
4589	National Fertilizer Company, Nashville, Tenn.....	Sadler's Formula....	Guaranteed
			Found.....
4810			Hopkinsville ....
4590	Same.	National Dissolved Bone.....	Guaranteed
			Found.....
4591	Same.	Pure Bone Meal	Guaranteed
			Found.....
4507	The E. Rauh & Sons Fertilizer Co., Indianapolis, Ind.	Pure Raw Bone.....	Guaranteed
			Found.....
4503	Read Fertilizer Co., Charleston, S. C.	Farmers Special Manure.....	Guaranteed
			Found.....
4504	Same.	X X X Dissolved Bone.....	Guaranteed
			Found.....
4505	Same.	Read's High Grade Special Potash Mixture.....	Guaranteed
			Found.....
4580	Same.	Read's Wheat Grower.....	Guaranteed
			Found .....
4726	Same.	Matchless Acid Phosphate....	Guaranteed
			Found.....
4318	The J. & F. Schroth Packing Co., Cincinnati, O.	Schroth's Special.....	Guaranteed
			Found.....
4319	Same.	Corn & Wheat Grower.....	Guaranteed
			Found.....
4672	J. F. & W. H. Singer, Nashville, Tenn.	Standard Bone Meal	Guaranteed
			Found.....
4673	Same.	Singer's No. 2 Wheat Grower..	Guaranteed
			Found.....

Pounds in the Hundred.												
Phosphoric Acid.							Nitrogen.	Equivalent to Ammonia.	Potash.		Relative Value Per Ton.	Station Number.
In Fine Bone.	In Medium Bone.	Soluble.	Reverted.	Available.	Insoluble.	Total.			From Muriate.	From Sulphate		
.....	....	.....	....	**12.00**	....	.....	.....	.....	**2.00**	.....	**$19.20**	4589
.....	.....	.....	.....	14.39	0.35	14.74	....	....	1.92	.....	22.63	
.....	.....	.....	.....	13.97	3.51	17.48	....	.....	1.97	.....	23.68	4810
.....	.....	....	.....	**12.00**	.....	.....	**0.82**	**1.00**	**1.00**	.....	**20.87**	4590
.....	.....	.....	.....	13.00	1.23	14.23	0.90	1.09	1.67	.....	23.97	
.....	.....	.....	.....	....	.....	**20.00**	**2.47**	**3.00**	.....	.....	**23.46**	4591
15.83	6.66	.....	.....	.....	.....	22.49	3.87	4.70	.....	.....	30.21	
.....	.....	.....	....	.....	.....	**22.00**	**4.00**	**4.86**	.....	.....	**30.44**	4507
18.14	6.47	.....	.....	.....	.....	24.61	3.19	3.87	.....	.....	29.56	
.....	.....	.....	.....	**10.00**	.....	**11.00**	**0.82**	**1.00**	**3.00**	.....	**20.97**	4503
.....	.....	.. ..	.....	9.63	2.38	12.01	0.99	1.20	3.31	.....	22.11	
.....	.....	.....	.....	**13.00**	.....	**14.00**	.....	....	....	.....	**13.00**	4504
.....	.....	.....	.....	12.92	2.42	15.34	.....	.....	.....	.....	12.92	
.....	.....	.....	.....	**10.00**	.....	**11.00**	.....	.....	**4.00**	.....	**19.30**	4505
.....	.....	....	.....	11.65	1.92	13.57	.....	.....	4.48	.....	22.65	
.....	.....	.....	.....	**10.00**	.....	**11.00**	**1.65**	**2.00**	**2.00**	.....	**22.68**	4580
.....	.....	.....	.....	9.62	2.79	12.41	2.09	2.54	2.32	.....	24.97	
.....	.....	.....	.....	**12.00**	....	**14.00**	.....	.....	.....	.....	**12.00**	4726
.....	.....	.....	.....	13.97	3.15	17.12	.....	.....	.....	.....	13.97	
.....	.....	.....	.....	**7.00**	.....	**10.00**	**1.65**	**2.00**	**1.00**	.....	**18.28**	4318
.....	.....	.....	.....	7.87	3.95	11.82	2.10	2.55	1.28	.....	21.89	
.....	....	.....	.....	**9.00**	.....	**12.00**	**3.30**	**4.00**	**4.00**	....	**30.45**	4319
.....	.....	.....	.....	8.61	3.62	12.23	3.91	4.75	5.01	.....	33.56	
.....	.....	.....	.....	.....	.....	**21.00**	**3.00**	**3.64**	.....	.....	**25.86**	4672
18.53	9.67	.. ...	....	.....	.....	28.20	2.00	2.43	.....	.....	27.62	
.....	.....	.....	.....	**6.00**	.....	**20.00**	**2.00**	**2.43**	.....	**2.00**	**25.20**	4673
.....	.....	.....	.....	6.36	16.21	22.57	1.77	2.15	.....	1.83	25.77	

TABLE II—Continued.

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	ANALYSIS.
4500	Southern Fertilizer Co., Rome, Ga.	Greer's Compound Fertilizer...	Guaranteed
			Found.....
4515	Standard Guano & Chemical Mfg. Co., New Orleans, La.	Pure Ground Bone.....	Guaranteed
			Found.....
4303	Swift & Company, Chicago, Ill.	Ground Steamed Bone.....	Guaranteed
			Found.....
4304	Same.	Bone and Potash 3 per cent...	Guaranteed
			Found.....
4305	Same.	Bone Tankage and Potash 3 per cent...	Guaranteed
			Found.....
4306	Same.	Potato and Tobacco Grower	Guaranteed
			Found.....
4379	Same.	Raw Bone Meal.....	Guaranteed
			Found.....
4831			Caneyville.
4380	Same.	Bone Tankage.....	Guaranteed
			Found.....
4381	Same.	Superphosphate	Guaranteed
			Found.....
4445	Tennessee Chemical Company Nashville, Tenn.	Ox Ammoniated Bone.....	Guaranteed
			Found.....
4446	Same.	Ox Alkaline Bone.....	Guaranteed
			Found ....
4969			Bowling Green....
4660	Same.	Bone Meal.....	Guaranteed
			Found.....

December 31st, 1898. M. A. Scovell, Director.

Pounds in the Hundred.											Relative Value Per Ton.	Station Number.
Phosphoric Acid.									Potash.			
In Fine Bone.	In Medium Bone.	Soluble.	Reverted.	Available.	Insoluble.	Total.	Nitrogen.	Equivalent to Ammonia.	From Muriate.	From Sulphate		
.....	.....	**9.00**	**3.00**	**12.00**	.....	**14.00**	.....	.....	**2.00**	....	**$20.20**	4500
.....	.....	.....	.....	14.93	2.39	17.32	....	.....	2.21	.....	24.75	
.....	.....	.....	....	.....	.....	**20.00**	**3.09**	**3.75**	.....	.....	**25.35**	4515
15.10	8.75	.....	.....	.....	.....	23.85	4.04	4.90	.....	.....	31.47	
.....	....	.....	.....	.....	.....	**23.75**	**3.28**	**4.00**	.....	.....	**30.07**	4303
24.18	2.25	.....	.....	.....	....	26.43	2.95	3.58	.....	.....	31.02	
.....	.....	.....	.....	.....	....	**24.50**	**2.05**	**2.50**	.....	**3.00**	**30.59**	4304
23.02	2.00	.....	.....	.....	.....	25.02	2.73	3.31	.....	3.49	34.07	
.....	.....	....	.....	.....	.....	**17.00**	**4.92**	**6.00**	.....	**3.00**	**34.56**	4305
14.24	2.24	.....	.....	.....	.....	16.48	5.40	6.56	.....	1.70	34.01	
.....	.....	**8.00**	**2.00**	**10.00**	.....	**12.00**	**3.28**	**4.00**	.....	**5.00**	**33.48**	4306
.....	.....	.....	.....	9.41	3.26	12.67	3.23	3.92	.....	4.84	32.89	
.....	.....	.....	.....	.....	.....	**23.00**	**3.70**	**4.50**	.....	.....	**30.08**	4379
18.15	6.92	.....	.....	....	.....	25.07	3.90	4.73	.....	.....	32.32	
14.47	10.48	.....	.....	.....	.....	24.95	4.03	4.89	.....	.....	31.98	4831
.....	.....	.....	.....	.....	.....	**17.00**	**4.92**	**6.00**	.....	.....	**30.38**	4380
15.69	2.37	.....	.....	.....	.....	18.06	5.17	6.28	.....	.....	32.07	
.....	.....	**6.00**	**2.00**	**8.00**	.....	**10.00**	**2.46**	**3.00**	.....	**2.00**	**23.61**	4381
.....	.....	.....	.....	9.31	2.78	12.09	2.64	3.20	.....	1.42	25.65	
.....	.....	**6.00**	**4.00**	**10.00**	.....	**11.00**	**1.65**	**2.00**	**2.00**	.....	**22.68**	4445
.....	.....	.....	.....	10.62	2.53	13.15	1.97	2.39	2.54	.....	26.09	
.....	....	**9.00**	**3.00**	**12.00**	.....	**13.00**	.....	....	**2.00**	.....	**19.70**	4446
.....	.....	.....	.....	10.74	2.67	13.41	.....	.....	2.58	....	19.48	
.....	.....	.....	.....	13.01	1.55	14.56	.....	.....	1.96	....	21.34	4969
.....	.....	.....	.....	.....	.....	**23.00**	**2.47**	**3.00**	.....	.....	**26.74**	4660
25.69	1.87	.....	.....	.....	.....	27.56	2.11	2.56	.....	.....	29.06	

A. M. Peter, H. E. Curtis, Chemists.