

KENTUCKY  
AGRICULTURAL EXPERIMENT STATION

OF THE

STATE COLLEGE OF KENTUCKY.

BULLETIN No. 52.

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**COMMERCIAL FERTILIZERS.**

- I. Official Analyses.
- II. Analyses of Farmers' Samples and Samples Collected by Deputy Inspectors.

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LEXINGTON, KENTUCKY.

DECEMBER, 1894.

# KENTUCKY Agricultural Experiment Station.

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KENTUCKY AGRICULTURAL EXPERIMENT STATION,  
LEXINGTON, KY.

## BULLETIN No. 52.

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# COMMERCIAL FERTILIZERS.

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### INTRODUCTION.

BY THE DIRECTOR.

This bulletin should be carefully read by every farmer who uses commercial fertilizers. It is divided into two parts.

The first part gives the analysis and valuation of each sample of fertilizer furnished us by the *manufacturers*, since the publication of bulletin No. 51. In this first part and in bulletin No. 51 may be found the analysis and valuation of every official sample furnished us by the manufacturers this year. The samples sent in by the manufacturers we call "Official" samples, because the law requires that they be sent here for analysis, and to distinguish them from samples which may be sent here by farmers, or from those taken, under authority of the law, by the Director or deputies. The analysis of an official sample is called in this bulletin an "Official analysis."

In the second part may be found the analyses and valuations of 87 fertilizers from samples sent us by farmers and taken by Deputy Inspectors, together with the official analyses and valuations of the same fertilizers for the purpose of comparison. The one set shows the valuation and analysis of the fertilizers the farmers actually bought, or fertilizers actually on sale; the other, the analyses and valuations of the samples that the manufacturers stated under oath were fair and true samples of the fertilizers they were offering for sale in the State. By this means we have the best possible check on the claims of the manufacturers.

The results of our analyses of these 87 samples, to-

gether with the corresponding "Official analyses" and valuations are compiled on pages 107 to 117.

It is believed that the tables deserve careful study by all interested in the consumption of fertilizers. Some suggestions as to how to study them are therefore given.

In the first place it is suggested to carefully read over the explanations of the tables on page 106. Next refer to the tables and select any brand for study that may be of interest. Take for example the first one in the table on page 107. Under "Name" in the first column, we find "Furman High Grade Guano;" this is the name under which the brand of fertilizer is sold. In the next column under "Where Sampled" we find in the upper line "Official, 1892," and in the lower line, "Cave Spring." This indicates that the fertilizer sampled at Cave Spring, had "1892" tags on it, the sample therefore should be compared with the official sample of 1892. In the next column is given the station number. On the lower line, corresponding to Cave Spring, in the preceding column, is found "2483," By the use of this number we may find a description of the sample on the pages just preceding these tables. Referring to these descriptions we find No. 2483 on page 100 and that the sample was sent by C. S. Page, Cave Spring, Ky., that it was manufactured by the Furman Farm Improvement Company, A. D. Adair & McCarty Bros., Atlanta, Ga., being General Agents, etc Referring again to the table, and under the columns "Pounds in the Hundred," we find that the two samples contain of phosphoric acid as follows: Available; official, 9.85 per cent., Cave Spring Sample, 10.72 per cent., or nearly one pound in the hundred more than the official; of insoluble; official 1.75 per cent., the other 0.4 per cent., a difference of 1.35 per cent. in favor of the official; and of total 11.6 per cent. and 11.12 per cent respectively—making a difference in favor of the official sample of 0.48 per cent. Under "Nitrogen" we find the official sample

to contain 2.66 per cent., while the other contains only 1.55 per cent., a difference of over one pound in every hundred of the fertilizer. Under "Potash," we find that neither sample contains any sulphate of potash, but that the official sample contains 3.30 per cent. potash in the form of muriate and the Cave Spring sample only one per cent., a difference of 2.30 pounds in the hundred.

Referring to the last column "Estimated value per ton" we find that the official sample is valued at \$32.09 per ton; the other at only \$25.76, a difference of \$6.33. It is not claimed that the fertilizer represented by the official sample is worth just \$32.09 per ton in the markets, no more, no less, but it is maintained that if the plant food in the official fertilizer is worth \$32.09 then the plant food in the other is worth only \$25.76 in the ton of fertilizer.

#### **Impossibility of Making Fertilizers of Uniform Composition.**

It will be noticed in our example that the variation between the two samples, of \$6.33 is against the purchaser. Such a variation should not happen. A small variation however is to be expected from the fact that commercial fertilizers are mixtures of various materials, and however well mixed, it is impossible to make them of uniform composition. To illustrate, suppose that a farmer desired to mix 200 lbs. of salt with 1800 lbs. of dirt. Let him put the dirt on a floor and, putting the salt in, shovel and re-shovel the whole pile over, again and again, then let him carefully examine different portions of the pile and he in all probability would find more salt in one portion of the pile than another. If he remix the pile and continued to do so until he can distinguish no difference as to the amount of salt in different portions of the soil, by the eye, let him take, say, a pound sample from some part of the pile, and then another equal portion from a different place in the pile and have the two samples analyzed; he would

find one contains more salt than the other. Why? Because the small quantity of salt had not been thoroughly mixed with the large amount of dirt. The same difficulty is experienced in mixing the different ingredients of fertilizers, and obtaining a fertilizer of uniform composition. For example, suppose a manufacturer desires to make a fertilizer containing certain amounts of nitrogen and phosphoric acid, and 5 per cent. of potash. He could take 200 lbs. of muriate of potash and mix it with 1800 pounds of the other ingredients containing the desired quantity of phosphoric acid and nitrogen. If the muriate of potash contained just 50 per cent. of potash, and the 200 pounds were so thoroughly mixed that the mixture was uniform, each one hundred pounds of the fertilizer would contain exactly 5 lbs. of potash. Even though the manufacturer has the advantage over the farmer, as he mixes by machinery, and thus obtains a more uniform mixture, yet it is true that no two sacks of the fertilizer will contain exactly the same amount of potash. For the same reason the phosphoric acid and the nitrogen, or ammonia may vary.

From what has been said above, it is seen that fertilizer manufacturers cannot send a sample here as the "official sample" which will always contain exactly the same amount of potash, nitrogen or phosphoric acid as the goods they sell. In comparing, therefore, the samples taken by farmers or inspectors with the official samples, we must make allowances for variations which occur in mixing the fertilizers and sampling them. This variation, however, should not be great, and there is no reason why the samples taken of the goods actually on sale should not be as often above the official sample as below it.

#### **How Much Variation is Allowable?**

Samples of a well-made mixed fertilizer should not vary from each other more than  $\frac{1}{2}$  per cent. in total phosphoric acid or potash, nor more than  $\frac{1}{4}$  per cent. in

nitrogen, and the estimated value should not vary more than two dollars.

It is claimed by some manufacturers that where tankage is used to furnish phosphoric acid and nitrogen, the above limits are too narrow; that, as tankage is the dried and ground meat, entrails and other refuse of the slaughter-house, it necessarily varies in composition from time to time, and far beyond the limits set forth above; and that consequently a given brand of fertilizer, composed to a large extent of tankage, would likewise vary from time to time to a considerable extent.

But the farmer in turn has the right to claim, and justly, that he purchases fertilizers for the "plant food" they contain and not for the tankage etc., and that if the ingredients of fertilizers vary so much in "plant food" the manufacturer should ascertain this fact before mixing and put the amounts of ingredients in the fertilizer in such proportion that the required plant food shall not vary to exceed the limit above stated.

With these preliminary remarks we are now ready to discuss the results obtained.

Of the eighty-seven fertilizers analyzed, thirty-nine fell below the valuation of the official samples, and forty-seven exceeded the official samples in valuation, while one could not be compared because we did not know what year's analysis it should be compared with, as the sender failed to give us this information.

The average valuation of these fertilizers was 57 cents less than the average of the official samples. Twenty-three samples fell below the valuation of the official samples by more than two dollars per ton.

Here follow the names of these fertilizers, together with the names of the manufacturers:

Below  
Official  
Valuation.

ADAIR & McCARTY BROS.	
Furman High Grade Guano.....	\$ 6 33
Furman High Grade Fertilizer, Oak Grove Sam- ple.....	2 94
Furman High Grade Fertilizer, Henderson sam- ple.....	3 41
Buffalo Bone Fertilizer.....	2 23
Furman Soluble Bone with Ammonia and Potash	4 20
CLEVELAND DRYER CO.	
White Burley Tobacco Fertilizer.....	2 20
Square Bone, Bowling Green sample.....	3 06
Square Bone, Leitchfield sample.....	4 60
Buckeye Phosphate, Bowling Green sample.....	5 99
Buckeye Phosphate, Glasgow.....	3 09
CURRIE FERTILIZER CO.	
Currie's Tobacco Grower... ..	2 08
GLOBE FERTILIZER CO.	
Big Four Tobacco Grower, Pine Grove sample...	4 06
J. B. JONES.	
Pure Ammoniated Bone Meal.....	6 31
LOUDENBACK FERTILIZER CO.	
Urbana Prize Tobacco Grower, Bowling Green sample.....	12 90
Urbana Prize Tobacco Grower, Hopkinsville...	13 07
Urbana Prize Tobacco Grower, Franklin sample	14 21
Urbana Prize Tobacco Grower, Leitchfield sample	14 07
Urbana Superphosphate and Potash .....	9 78
Urbana Ammoniated Dissolved Bone.....	3 08
Urbana Sweepstakes Bone Phosphate.....	12 00
Urbana Bone Meal.....	5 52
MICHIGAN CARBON WORKS.	
Homestead Potato Grower.....	8 63
NORTH-WESTERN FERTILIZING CO.	
Horse Shoe Brand Tobacco Grower.....	4 13



The following valued higher than the corresponding  
 "Official samples:"

	Above Official Valuation.
<b>A. D. ADAIR &amp; McCARTY BROS.</b>	
Furman High Grade Fertilizer, sampled at Cas- ky, Ky.....	\$ 0 15
<b>CINCINNATI DESICCATING CO.</b>	
Kentucky and Tennessee Tobacco Grower.....	1 10
Gilead Phosphate, sampled at Glendale, Ky.....	0 48
Ohio Valley Phosphate.....	3 38
Tobacco and Potato Fertilizer, sampled at Madi- sonville, Ky.....	2 18
Phoenix Phosphate, sampled at Madisonville, Ky	1 19
Same, sampled at Glendale, Ky.....	1 02
Same, sampled at Glasgow, Ky.....	1 90
<b>THE CLEVELAND DRYER CO.</b>	
XXX Phosphate.....	3 19
<b>THE CROCKER FERTILIZER &amp; CHEMICAL CO.</b>	
Crocker's Kentucky Tobacco Fertilizer, sampled at Shelby City.....	1 57
Same, sampled at Glasgow Junction.....	0 92
Crocker's Ammoniated Practical Superphos- phate .....	0 70
<b>GLOBE FERTILIZER CO.</b>	
Kentucky Standard Tobacco Grower.....	0 13
Globe Bone Dust.....	1 18
Progress Phosphate.....	0 64
<b>GOULDING FERTILIZER CO.</b>	
Goulding's Bone Compound.....	2 59
<b>J. B. JONES.</b>	
Bromophyte.....	9 18
Pure Raw Bone Meal.....	0 14

Above  
Official  
Valuation.

## THE JONES FERTILIZING CO.

Pure Raw Bone Meal, sampled at Elizabeth- town, Ky.....	3 32
Same, sampled at Hodgenville, Ky.....	2 66
Ammoniated Bone Meal.....	1 04

## THE LOUDENBACK FERTILIZER CO.

Urbana Prize Tobacco Grower, sampled at Har- dinsburg .....	8 06
Urbana Superphosphate and Potash, sampled at Hardinsburg .....	4 90
Urbana Ammoniated Dissolved Bone, sampled at Hardinsburg .....	1 89

## A. B. MAYER MANUFACTURING CO.

Anchor Brand Complete Fertilizer .....	5 31
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## MICHIGAN CARBON WORKS.

Jarves' Drill Phosphate .....	0 88
Homestead Tobacco Grower, sampled at Glas- gow, Ky.....	0 52
Same, sampled at Hopkinsville.....	0 03

## NATIONAL FERTILIZER CO.

Tennessee Guano.....	1 95
National Dissolved Bone, sampled at Elizabeth- town .....	0 02
Same, sampled at Hodgenville .....	1 11
Tobacco Grower, sampled at Hodgenville .....	5 12
Same, sampled at Bowling Green .....	5 82
Same, sampled at Hopkinsville .....	2 63

## NOLTE &amp; DOLCH FERTILIZER CO.

Pure Raw Bone Meal .....	0 62
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## NORTH-WESTERN FERTILIZING CO.

H. S. B. Superphosphate and Raw Bone Mixture	3 74
Ky-Ana Phosphate, sampled at South Car- rollton, Ky.....	6 16
Same, sampled at Adairville .....	2 54

	Above Official Valuation.
H. S. B. Tobacco Grower, sampled at Hopkinsville .....	6 08
H. S. B. Challenge Corn Grower, sampled at Elkton, Ky.....	0 77
Same, sampled at Russellville, Ky.....	0 80
H. S. B. Kentucky Corn and Tobacco Grower, sampled at Hopkinsville, Ky.....	0 56
Same, sampled at Allensville, Ky.....	3 44
Same, sampled at Franklin, Ky.....	0 39
 JOHN S. REESE & CO.	
Crown Bone Phosphate and Potash.....	0 84
 J. F. & W. H. SINGER.	
Standard Raw Bone Meal .....	1 26
 STANDARD GUANO & CHEMICAL MFG. CO.	
Pure Ground Bone.....	3 19

From the above it will be seen that three firms furnished the greater portion of the fertilizers which fell below the limit of two dollars less in valuation than the official samples.

Adair & McCarty Bros. claim that in 1893 a mistake was made at the factory in sending a carload of the Furman High Grade Guano or Fertilizer, to Hopkinsville, Ky. They also sent a second sample here, stating that the first sample was a higher grade than they would thereafter send out; but even then the goods fell below the official as shown by the tags on the goods. Furthermore, it appears from the result of our analyses and as shown above, that other of their brands fell short as well as the Furman High Grade Guano.

Loudenback Fertilizer Co., of Urbana, O., put forth the claim that the goods which they shipped in early Spring into some parts of Kentucky failed to come up to their expectations in the percentages of potash, nitrogen and

phosphoric acid, because the materials of which they made the fertilizers did not contain the quantity of these ingredients which were claimed, and on this account they failed to come up to the official samples sent here which were made prior to their shipments. Upon being notified of the discrepancy between the official sample and a sample of "Urbana Prize Tobacco Grower" taken from a carload lot in Bowling Green they withdrew this carload from the state. At the time, however, they did not notify this office that shipments made to other parts of the state, at or about the same time, were inferior to the official samples on file here.

They claim, however, that they took particular pains to notify all of their agents that a mistake had been made, and for them to explain the matter to purchasers. This firm should have at once withdrawn their official samples which did not represent their goods, and substituted others that were fair and true samples of their fertilizers on sale in the State, and have destroyed all tags based upon the first official samples and replaced them with others representing the second official samples; then no explanation would have been necessary.

Later shipments of fertilizers by this firm, as sampled at Hardinsburg, show them to have a valuation much above the official samples here.

The other manufacturers who appear in the list as having samples below the standard, have only one each. As most of these firms have many brands on sale in the state, and sell large quantities of fertilizers that come up to the official samples, or are in many cases above them in value, the appearance of a single sample in this list is in all probability the result of a mistake or a blunder, in putting a particular fertilizer in wrong sacks, or getting wrong official tags on the sacks.

Examining them we find:—The Currie Fertilizer Co., has one sample which fell just below the limit of \$2, viz.:

Currie's Tobacco Grower. Referring to the analysis, we find the cause in the potash. In the official sample, page III, No. 2333, we find 9.59 per cent. of potash, and in the sample of the same from Hodgenville, same page, No. 2541, tagged with an 1894 label, 7.72 per cent. potash. Furthermore the potash in the official sample is in the form of sulphate, while it is in the form of muriate in the other sample. Probably a mistake in sacking, as other fertilizers are up to official samples.

The sample of Big Four Tobacco Grower, manufactured by the Globe Fertilizer Co., taken at Vine Grove, fell short  $\frac{3}{4}$  of a per cent. in nitrogen and  $\frac{1}{2}$  per cent. in potash from the official sample. Furthermore, the official sample contained some of the nitrogen in the form of nitrates, while the Vine Grove sample did not. A sample of the same goods taken at Gordonsville was all right, showing evidently some blunder in labeling the sacks of the Vine Grove sample. No official tags were found on this fertilizer when the sample was taken at Vine Grove; a plain violation of the law.

J. B. Jones' Pure Ammoniated Bone Meal, as found at Leitchfield, was altogether a different fertilizer from the official sample on file here. The official sample contains 17.27 per cent. total phosphoric acid, while the sample taken at Leitchfield contains only 7.57 per cent.—a difference of nearly 10 per cent.—the result, undoubtedly, of using tankage without first analyzing it.

The analysis of the Michigan Carbon Works' Homestead Potato Grower, as sampled at Elizabethtown, would indicate that a mistake had been made in labeling it. It is probably Corn and Wheat Grower. All of their samples taken, with the exception of this sample, showed a valuation above the official samples.

As shown in the tables all of the Northwestern Fertilizing Co's., samples, with the exception of the sample of the "Tobacco Grower" taken at Adairville, proved

upon analysis to be equal, if not superior, to the official samples.

It should not be understood from what has been said, that the fertilizers which fall below the standard of the official analysis, are altogether worthless; they no doubt would produce good results where fertilizers of their make-up are needed, but it is maintained that they would be still more valuable if they came up to the standard. If a farmer pays for plant-food he should get all, within the limits of error in mixing etc., that is represented to be in the fertilizer, and it is better that he should buy on the basis of the analysis as found on the official tag than any other way.

To this end the following suggestions are made:

1. To purchase with a guarantee that the fertilizer is as represented by the official tag attached.
2. Take a sample immediately, especially if purchasing in large quantities, and send it to the Director for analysis, to see whether the fertilizer is as represented by the seller.
3. To have nothing to do with fertilizers which are not labeled with a tag bearing an analysis, and certified to and signed by the Director. Manufacturers of genuine goods are always willing to comply with a law which protects them as well as the purchasers, and their goods will be found labeled as required by law. It is generally those who offer adulterated or inferior goods that do not desire the quality of their goods to be known.

In order to obtain a fair sample for analysis the following directions should be followed.

#### HOW TO TAKE SAMPLES..

- a. If possible, let the agent or dealer from whom the fertilizer is purchased, or his representative, be present when the sample is taken, so that the claim of unfairness may not afterwards be raised.
- b. Select at least two average sacks of the fertilizer, preserving the labels to send with the sample. Open these sacks and mix well together the contents of each, down to one-half its depth, emptying out upon a clean floor, if necessary, and crushing any soft, moist lumps in order to facilitate mixture, but leaving hard, dry lumps unbroken, so that the sample shall exhibit the texture and mechanical condition of the fertilizer. In a large lot at least one sack in every twenty should be taken.
- c. Take out five equal cupsful from different parts of the mixed

portions of each package. Pour them all one over another, upon a paper or clean floor; intermix again thoroughly, but quickly, to avoid loss or gain of moisture; fill a can or jar from this mixture; enclose a tag from one of the sacks; seal; label plainly, giving also name of sender.

d. Prepare and send with the sample a certificate signed by the purchaser and attested by at least one witness, stating that the affiant is an agriculturist and purchaser of the fertilizer and that the sample has been taken in the manner prescribed, for the purpose of free analysis under the law.

Send the sample by express, charges prepaid, to

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

Blank certificates will be furnished on application. They read as follows:

FARMER'S CERTIFICATE.

(Date).....

I certify that the fertilizer, a sample of which I have taken in accordance with the directions printed on the back of this certificate, for the purpose of free analysis under Sec. 7 of the fertilizer law, was purchased by me for my own use and not for sale.

I further certify that the sample was taken from..... sacks out of the whole lot of.....sacks in the presence of the undersigned witnesses, and labeled as follows:.....

..... and sent by express to M. A. Scovell, Director, Lexington, Ky.

And I further certify that the fertilizer, when this sample was taken, was in the same condition as when I purchased it and had not been exposed to the weather.

(Signature).....

(P. O. Address).....

Signature of Witnesses:

.....  
.....

## I. OFFICIAL ANALYSES.

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Since the publication of Bulletin No. 51, the following analyses have been made for manufacturers in compliance with the fertilizer law, and these fertilizers are now legally on sale in the State, in addition to those given in the bulletin referred to above. The analytical work was for the most part done by Mr. Henry E. Curtis.

On January 1, 1894, the following values for the "essential ingredients" were adopted, viz: "Soluble" and "reverted" phosphoric acid, 8 cents; "insoluble"  $2\frac{1}{2}$  cents; nitrogen, 20 cents; potash from muriate, 6 cents; from sulphate,  $7\frac{1}{2}$  cents; phosphoric acid in "fine bone,"  $4\frac{1}{2}$  cents, and in "medium bone," 4 cents per pound. For other particulars see Bulletin No. 51.



Commercial Fertilizers.

TABLE I.—Raw Bone Manures.

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.				
2595	Thompson & Edwards Fertilizer Co., Chicago, Ill. ....	Pure Fine Ground Bone .....	23.78	3.55	27.33	59.68	2.10	2.55	\$32.64
2596	P. B. Mathiason & Co., St. Louis, Mo. ....	Increscent Brand Pure Raw Bone Meal .....	21.37	2.32	23.69	51.74	3.66	4.44	35.73
2599	National Fertilizer Co., Nashville Tenn. ....	Bone Meal .....	24.05	.....	24.05	52.53	3.69	4.48	36.41
2601	J. F. & W. H. Singer, Nashville, Tenn. ....	Standard Raw Bone Meal .....	10.86	10.03	20.89	45.63	3.90	4.73	33.39

TABLE II.—Complete Fertilizers, Superphosphates &c.

Station Number.	NAME AND ADDRESS OF MANUFACTURER.	NAME OF BRAND.	POUNDS IN THE HUNDRED.							Estimated Value per Ton.	
			Phosphoric Acid.			Equivalent to Ammonia.	Potash.		From Sulphate.		From Muriate.
			Soluble.	Reverted.	Insoluble.		Nitrogen.				
2588	Globe Fertilizer Co., Louisville, Ky.....	Globe Bone Dust.....	7.69	0.94	3.19	1.09	1.32	1.14	.....	\$21.48	
2590	Mobile Phosphate and Chemical Mfg. Co., Mobile Ala...	Mobile Standard Guano....	9.35	1.07	2.07	1.77	2.15	.....	1.80	26.95	
2591	Same .....	I. X L. Acid Phosphate....	14.81	1.23	2.64	.....	.....	.....	.....	26.98	
2592	Globe Fertilizer Co., Louisville, Ky.....	Golden Harvest Bone Meal	8.12	2.96	5.08	1.83	2.22	.....	.....	27.59	
2597	The Currie Fertilizer Co., Louisville, Ky.....	Currie's Kentucky Phosphate .....	5.87	3.07	2.11	0.77	0.93	1.06	.....	20.03	
2598	Same .....	Currie's Black Diamond Phosphate.....	6.95	3.30	1.29	0.55	0.67	1.80	.....	21.95	
2778	National Fertilizer Co., Nashville, Tenn .....	Acid Phosphate.....	16.99	1.49	0.33	.....	.....	.....	.....	29.73	

## II.—ANALYSES OF FARMERS' SAMPLES AND SAMPLES COLLECTED BY DEPUTY INSPECTORS.

The law regulating the sale of commercial fertilizers in this State provides (Sec. 7) that: "Any agriculturist, a purchaser of any commercial fertilizer in this State, may take a sample of the same, under the rules and regulations of the Director of the said Experiment Station, and forward the same to the Experiment Station for analysis, which analysis shall be made free of charge." In the same section the Director is authorized, "In person or by deputy, to take samples for analysis from any lot or package of any commercial fertilizer which may be in the possession of any dealer in this State."

Under the first provision a number of samples have been sent in by farmers from time to time.

Acting under the second provision, the Director has, at various times, authorized the collection of samples for analysis from stock in the hands of dealers. Last spring Dr. V. M. Metcalfe was so deputized, and collected samples in the western and south-western parts of the State from March 31 to April 14. He was instructed to sample as many different brands as possible, but at the same time to avoid causing unnecessary inconvenience to dealers in so doing. In the latter part of October, Mr. Henry E. Curtis was also deputized, and collected samples at Hardinsburg.

In this bulletin will be found the results of the analyses of the samples obtained. Those collected by Messrs. Metcalfe and Curtis are indicated as having been collected by a deputy inspector; in all other cases the name of the person who sent the sample is given. The analytical work was done by Mr. H. E. Curtis, assisted by Mr. B. C. Keiser.

Here follows, first, a brief description of each sam-

ple; and, second, the analyses in tabular form. For convenience of reference the "Station number" of each sample is given, and all brands of the same manufacturer are arranged together. The names of the manufacturers are placed in alphabetical order in the description of the samples, and following each manufacturer's name are the brands of his make that were analyzed.

In some cases the same brand was obtained of different year's manufacture. In such cases it is important to compare with the official analysis of the proper year, because these analyses are not always the same each year, and the values of the "essential ingredients" are changed from time to time. This is the reason why tags must be sent with each sample for analysis.

#### Description of Samples.

- A. D. ADAIR & McCARTY BROS., Atlanta, Ga., general agents for the Furman Farm Improvement Co.
- No. 2483. Furman High Grade Guano, sent by C. S. Page, Cave Spring, Ky. The analysis on the tag sent corresponded to No. 1869. The sample contained a number of small clods of soil and some dry droppings of fowls or pigeons, as well as a few fragments of tobacco leaves.
- No. 2489. Furman High Grade Fertilizer, sent by P. C. Sallee, Oak Grove, Ky. The analysis on the tag sent corresponded to No. 2257.
- No. 2493. Same as No. 2489, received later.
- No. 2515. Furman High Grade Fertilizer, sampled by deputy inspector from stock of Hancock & Co., Casky, Ky. Tag sent corresponded to No. 2257.
- No. 2516. Same brand, &c., from stock of Banks Hardware Co., Henderson, Ky. Tag sent corresponded to No. 2257.
- No. 2517. Buffalo Bone Fertilizer, sampled, &c., from stock of Banks Hardware Co., Henderson, Ky. Tag sent corresponded to No. 2217.
- No. 2518. Same brand, &c., from stock of Hancock & Co., Casky, Ky. Tag sent corresponded to No. 2217.
- No. 2519. Furman Soluble Bone with Ammonia and Potash, sampled, &c., from stock of Hancock & Co., Casky, Ky. Tag sent corresponded to No. 2258.

- No. 2520. Farish Furman Formula, sampled, &c., from stock of Hancock & Co., Casky, Ky. Tag sent corresponded to No. 2259.
- No. 2348. Sample sent by R. G. Hopkins, Pembroke, Ky. No tag sent with the sample. Mr. H. said the tags had been destroyed and that "the goods was manufactured by McCarty Bros., Atlanta, Ga. \* \* \* It had no beneficial effects for me." As Mr. Hopkins failed to send a tag, we do not know what year's analysis this should correspond to.

THE CINCINNATI DESICCATING CO., Cincinnati, O.

- No. 2565. Fine Ground Bone, sampled by Deputy Inspector from stock of Moore & Barker, Adairville, Ky. Tag sent corresponded to No. 2278.
- No. 2566. Kentucky & Tennessee Tobacco Grower, sampled etc. from stock of Depp & Terhune, Glasgow, Ky. Tag sent corresponded to No. 2113.
- No. 2567. Gilead Phosphate, sampled etc. from stock of Walker & Redman, Glendale, Ky. Tag sent corresponded to No. 1906.
- No. 2568. Same brand &c., from stock of Moore & Barker, Adairville. Tag sent corresponded to No. 1906.
- No. 2569. Ohio Valley Phosphate, sampled &c. from same. Tag sent corresponded to No. 2196.
- No. 2570. Tobacco and Potato Fertilizer, sampled &c. from same. Tag sent corresponded to No. 2198.
- No. 2571. Same brand &c., from stock of L. L. Lapp & Co., Madisonville, Ky. Tag sent corresponded to No. 2198.
- No. 2572. Phoenix Phosphate, sampled &c. from same. Tag sent corresponded to No. 2197.
- No. 2573. Same brand, sampled &c. from stock of Walker & Redman, Glendale, Ky. Tag sent corresponded to No. 2197.
- No. 2574. Same brand &c., from stock of Depp & Terhune, Glasgow, Ky. Tag sent corresponded to No. 2197.

THE CLEVELAND DRYER CO., Cleveland, O.

- No. 2551. White Burley Tobacco Fertilizer, sampled by Deputy Inspector from stock of N. F. Hill, Bowling Green, Ky. Tag sent corresponded to No. 2187.
- No. 2552. Square Bone, sampled &c. from same. Tag sent corresponded to No. 1588.
- No. 2553. Same brand &c., from stock of A. S. Gardner, Leitchfield, Ky. Tag sent corresponded to No. 2191.
- No. 2554. Buckeye Phosphate, sampled &c. from stock of N. F. Hill, Bowling Green, Ky. Tag sent corresponded to No. 344.
- No. 2555. Same brand &c., from stock of Wood & Mueller, Glasgow, Ky. Tag sent corresponded to No. 2183.

No. 2556. Ammoniated Dissolved Bone, sampled &c. from stock of Taylor & Co., Beaver Dam, Ky. Tag sent corresponded to No. 2190.

No. 2557. XXX Phosphate, sampled &c. from stock of Kefauver & Durbin, Big Clifty, Ky. No tags on the goods. This lot of goods was shipped into the state by mistake, but the company sent sample for official analysis immediately upon being notified. The analysis is No 2438.

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

No. 2491. Crocker's Kentucky Tobacco Fertilizer, sent by W. E. Grubbs, Shelby City, Ky. Tag sent corresponded to No. 2354.

No. 2550. Same brand, sampled by Deputy Inspector, from stock of W. L. Hazlitt, Glasgow Junction, Ky. Tag sent corresponded to No. 2354.

No. 2492. Crocker's Ammoniated Practical Superphosphate, sent by W. E. Grubbs, Shelby City, Ky. Tag sent corresponded to No. 2341.

CURRIE FERTILIZER CO., LOUISVILLE, KY.

No. 2541. Currie's Tobacco Grower, sampled by Deputy Inspector from stock of William Leming, Hodgenville, Ky. No tags on the goods. This sample was collected April 9th and as the official analysis was made in January of this year we have used No. 2333 official for 1894, for comparison.

No. 2490. Currie's Raw Bone Meal, sent by Leonard Drane, Eminence, Ky. Mr. Drane stated that it was 1893 goods, but sent no tag.

GLOBE FERTILIZER CO., LOUISVILLE, KY.

No. 2558. Kentucky Standard Tobacco Grower, sampled by Deputy Inspector from stock of B. B. Edwards & Bro., Gordonsville, Ky. Tag sent corresponded to No. 2379.

No. 2559. Globe Bone Dust, sampled etc. from same. Tag sent corresponded to No. 1849.

No. 2560. Progress Phosphate, sampled etc. from same. Tag sent corresponded to No. 2123.

No. 2561. Big Four Tobacco Grower, sampled etc. from same. Tag sent corresponded to 2376.

No. 2562. Same brand etc., from stock of Hunt & Crutcher, Vine Grove, Ky. No tags on the goods. This is the first season this brand has been offered for sale in this State and therefore the analysis should compare with No. 2376. It may be noted here that the official sample (2376) and the sample from Gordonsville (2561) both contained nitrates, while that from Vine Grove (2562) contained none.

No. 2563. Eagle Fertilizer, sampled, &c., from stock of F. M. Joplin, Elizabethtown, Ky. Tag sent corresponded to No. 2377.

No. 2564. Same brand, &c., from stock of Miller & Halstead, Elkton, Ky. Tag sent corresponded to No. 2377.

GOULDING FERTILIZER CO. (Limited), Pensacola, Fla.

No. 2548. Goulding's Bone Compound, sampled by deputy inspector from stock of Alvis & Rankin, Henderson, Ky. Tag sent corresponded to No. 1989.

J. B. JONES, Louisville, Ky.

No. 2542. Bromophyte, sampled by deputy inspector from stock of L. Vannort, Leitchfield, Ky. Tag sent corresponded to No. 2280.

No. 2543. Pure Raw Bone Meal, sampled, &c., from stock of Kefauver & Durbin, Big Clifty, Ky. Progress Phosphate tags on the sacks. As Mr. Jones had not had his bone analyzed at the time of collecting this sample, we compare this with the analysis for 1893, No. 2097.

No. 2544. Pure Ammoniated Bone Meal, sampled, &c., from stock of L. Vannort, Leitchfield, Ky. Tag sent corresponded to No. 2098.

THE JONES FERTILIZING CO., Cincinnati, O.

No. 2545. Pure Raw Bone Meal, sampled by deputy inspector from stock of Watkins & Co., Elizabethtown, Ky. Tag sent corresponded to No. 2315.

No. 2546. Same brand, &c., from stock of Head & Cessna, Hodgenville, Ky. Tag sent corresponded to No. 2315.

No. 2547. Ammoniated Bone Meal, sampled, &c., from stock of Watkins & Co., Elizabethtown, Ky. Tag sent corresponded to No. 2317.

THE LOUDENBACK FERTILIZER CO., URBANA, O.

No. 2381. Urbana Prize Tobacco Grower, sent by G. M. Bedinger & Co., Bowling Green, Ky. Tag sent corresponded to No. 2313.

No. 2508. Same brand, sampled by Deputy Inspector from stock of Winfree Bros., Hopkinsville, Ky. Tag sent corresponded to No. 2313.

No. 2509. Same brand etc., from stock of P. V. Mayes, Franklin, Ky. Tag sent corresponded to No. 2313.

No. 2510. Same brand, etc., from Rogers, Bassett & Co., Leitchfield, Ky. Tag sent corresponded to No. 2313.

No. 2790. Same brand, etc., from stock of Miller & Co., Hardinsburg, Ky. Tag sent corresponded to No. 2313.

No. 2511. Urbana Superphosphate and Potash, sampled, etc., from stock of P. V. Mayes, Franklin, Ky. Tag sent corresponded to No. 2066.

No. 2791. Same brand, etc., from stock of Miller & Co., Hardinsburg, Ky. Tag sent corresponded to No. 2066.

No. 2512. Urbana Ammoniated Dissolved Bone, sampled, etc., from stock of P. V. Mayes, Franklin, Ky. Tag sent corresponded to No. 2067.

No. 2792. Same brand, etc., from stock of Miller & Co., Hardinsburg, Ky. Tag sent corresponded to No. 2067.

No. 2513. Urbana Sweepstakes Bone Phosphate, sampled, etc., from stock of Henry Nichols, Hodgenville, Ky. Tag sent corresponded to No. 2064.

No. 2514. Urbana Bone Meal, sampled, etc., from stock of Rogers, Bassett & Co., Leitchfield, Ky. Tag sent corresponded to No. 2065.

A. B. MAYER MANUFACTURING CO., St. Louis, Mo.

No. 2549. Anchor Brand Complete Fertilizer, sampled by deputy inspector from stock of Depp & Terhune, Glasgow, Ky. Tag sent corresponded to No. 1898.

MICHIGAN CARBON WORKS, Detroit, Mich.

No. 2575. Jarves' Tobacco Fertilizer, sampled by deputy inspector from stock of Robey, Taylor & Co., Franklin, Ky. Tag sent corresponded to No. 2243.

No. 2576. Jarves' Drill Phosphate, sampled, &c., from stock of Chrisman & Hughes, Glasgow, Ky. Tag sent corresponded to No. 2244.

No. 2577. Homestead Tobacco Grower, sampled, &c., from same. Tag sent corresponded to No. 2240.

No. 2578. Same brand, &c., from stock of Forbes & Bro., Hopkinsville, Ky. Tag sent corresponded to No. 2240.

No. 2579. Homestead Potato Grower, sampled, &c., from stock of L. L. Patterson & Bro., Elizabethtown, Ky. Tag sent corresponded to No. 2242.

NATIONAL FERTILIZER CO., Nashville, Tenn.

No. 2521. Tennessee Guano, sampled by deputy inspector from stock of Kefauver and Durbin, Big Clifty, Ky. Tag sent corresponded to No. 2234.

No. 2522. National Dissolved Bone, sampled, &c., from stock of C. W. Quiggins, Elizabethtown, Ky. Tag sent corresponded to No. 2236.

No. 2523. Same brand, &c., from Stock of D. E. Patterson, Hodgenville, Ky. Tag sent corresponded to No. 2236.

No. 2524. Tobacco Grower, sampled, &c, from same. Tag sent corresponded to No. 2235.

No. 2525. Same Brand &c., from stock of F. K. Taylor, Bowling Green, Ky. Tag sent corresponded to No. 2235.

No. 2526. Same brand &c., from stock of Winfree Bros., Hopkinsville, Ky. Tag sent corresponded to No. 2235.



NOLTE & DOLCH FERTILIZER CO., St. Louis, Mo.

No. 2611. Pure Raw Bone Meal, sent by Almer Barnes, Mt. Washington, Ky. Tag sent corresponded to No. 2299.

NORTH-WESTERN FERTILIZING CO., Chicago, Ill.

No. 2529. Horse Shoe Brand Prairie Phosphate, sampled by Deputy Inspector from stock of Hocker & Co., Beaver Dam, Ky. Tag sent corresponded to No. 2360.

No. 2530. H. S. B. Fine Raw Bone, sampled &c. from stock of Miller & Halstead, Elkton, Ky. No tags on the sacks. As the North-Western Fertilizing Co. had all their brands analyzed early in the season we compare this with the official analysis for 1894, No. 2355.

No. 2610. Same brand &c., sent by John C. Pierce, Goshen, Ky. Tag sent corresponded to No. 2355.

No. 2531. H. S. B. Superphosphate and Raw Bone Mixture, sampled by Deputy Inspector from stock of F. M. Joplin, Elizabethtown, Ky. Tag sent corresponded to No. 2169.

No. 2532. H. S. B. Ky-Ana Phosphate, sampled &c. from stock of R. W. Balser, South Carrollton, Ky. Tag sent corresponded to No. 2168.

No. 2533. Same brand &c. from stock of H. Myer, Adairville, Ky. Tag sent corresponded to No. 2168.

No. 2534. H. S. B. Tobacco Grower, sampled &c. from same. Tag sent corresponded to No. 2357.

No. 2535. Same brand &c. from stock of Forbes & Bro., Hopkinsville, Ky. Tag sent corresponded to No. 2162.

No. 2536. H. S. B. Challenge Corn Grower, sampled, etc., from stock of Miller & Halstead, Elkton, Ky. Tag sent corresponded to No. 2163.

No. 2537. Same brand, etc., from stock of Gillum & Son, Russellville, Ky. No tags on sacks. As this analysis is almost identical with 2536 we compare it with the same official sample No. 2163.

No. 2538. H. S. B. Ky. Corn & Tobacco Grower, sampled, etc., from stock of Forbes & Bro., Hopkinsville, Ky. Tag sent corresponded to No. 2166.

No. 2539. Same brand, etc., from stock of Claud Haddox, Allensville, Ky. Tag sent corresponded to No. 2166.

No. 2540. Same brand, etc., from stock of McCartney & Grainger, Franklin, Ky. Tag sent corresponded to No. 2166.

JOHN S. REESE & CO., BALTIMORE, MD.

No. 2527. Reese's Pacific Guano, sampled by Deputy Inspector, from stock of G. G. Ellis, Henderson, Ky. No tags on sacks. Mr.

Ellis claimed that tags were on the road. As this sample was taken before the official analysis for the present year was made, we compare it with No. 2252, the official sample for last year.

No. 2528. Crown Bone Phosphate and Potash, sampled, etc., from stock of J. A. Small & Bro, Owensboro, Ky. Tag sent corresponded to No. 2281.

J. F. & W. H. SINGER, NASHVILLE, TENN.

No. 2620. Standard Raw Bone Meal, sent By Whitsitt Hall, Auburn, Ky. Tag sent corresponded to No. 2601.

STANDARD GUANO & CHEMICAL MFG. CO., NEW ORLEANS, LA.

No. 2783. Pure Ground Bone, sent by S. E. Steger, Trenton, Ky. Tag sent corresponded to No. 2472.

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### Explanations in Regard to the Tables.

In the following tables we have given in the first column the name of the brand; next, where the samples were taken; then, the "station number," and, lastly, the analysis and valuation. The same order is preserved in the tables as in the description of the samples, hence it was not thought necessary to repeat the name of the manufacturer. In the case of each brand, the official analysis is first given in bold faced type, for comparison. This official analysis is the same as the analysis that was on the tag attached to the sack from which the sample was taken, except in a few instances where the tag was not furnished us, or where there were no tags on the sacks, in which cases we have had to use our judgment as to what year's analysis to take.

TABLE III.

NAME OF FERTILIZER.	WHERE SAMPLED.	Station Number.	POUNDS IN THE HUNDRED.										Estimated Value per Ton.	
			Phosphoric Acid.						Total.	Nitrogen.	Equivalent to Ammonia.	Potash.		
			In Fine Bone.	In Medium Bone.	Available.	Insoluble.	From Sulphate.	From Muriate.						
Furman High Grade Guano.	Official, 1892.....	1869	.....	.....	9.85	1.75	11.60	2.66	3.23	.....	3.32	32.09		
	Cave Spring.....	2483	.....	.....	10.72	0.40	11.12	1.55	1.88	.....	1.00	25.76		
Furman High Grade Fertilizer.	Official, 1893.....	2257	.....	.....	9.50	1.46	10.96	2.24	2.72	.....	2.83	29.10		
	Oak Grove.....	2489	.....	.....	9.39	2.87	12.26	1.72	2.09	.....	1.45	26.16		
	do.....	2493	.....	.....	10.31	2.85	13.16	1.56	1.89	.....	1.56	27.20		
	Casky.....	2515	.....	.....	8.98	2.01	10.99	2.61	3.17	.....	2.12	29.25		
Buffalo Bone Fertilizer.	Henderson.....	2516	.....	.....	8.01	2.98	10.99	1.99	2.42	.....	2.11	25.69		
	Official, 1893.....	2217	.....	.....	9.38	1.97	11.35	2.28	2.77	.....	2.00	28.45		
	Henderson.....	2517	.....	.....	9.71	2.14	11.85	1.96	2.38	.....	2.04	27.87		
	Casky.....	2518	.....	.....	8.32	2.62	10.94	2.19	2.66	.....	1.59	26.22		
Furman Sol'ble Bone with Ammonia and Potash.	Official, 1893.....	2258	.....	.....	10.64	1.39	12.03	1.25	1.52	.....	1.62	25.70		
	Casky.....	2519	.....	.....	8.24	1.56	9.80	1.30	1.58	.....	1.23	21.50		

TABLE III.—Continued.

NAME OF FERTILIZER.	WHERE SAMPLED.	Station Number.	POUNDS IN THE HUNDRED.						Potash.		Estimated Value per Ton.
			Phosphoric Acid.			Nitrogen.	Equivalent to Ammonia.	From Sulphate.	From Muriate.		
			In Fine Bone.	In Medium Bone.	Available.					Insoluble.	
Farish Furman Formula.	Official, 1893.....	2259	.....	.....	11.61	0.56	12.17	.....	.....	3.21	23.60
	Casky.....	2520	.....	.....	11.21	1.16	12.37	.....	.....	1.90	21.85
	Official not known...		.....	.....	.....	.....	.....	.....	.....	.....	.....
	Pembroke.....	2348	.....	.....	12.10	1.32	13.42	.....	.....	2.04	.....
Fine Ground Bone.	Official, 1893.....	2278	12.13	9.08	.....	.....	21.21	3.36	4.08	.....	31.62
	Adairville.....	2565	15.66	5.27	.....	.....	20.93	3.01	3.65	.....	30.85
Kentucky and Tennessee Tobacco Grower.	Official, 1893.....	2113	.....	.....	8.83	3.81	12.64	1.98	2.40	3.27	28.82
	Glasgow.....	2566	.....	.....	9.89	3.04	12.93	1.88	2.28	.....	29.92
Gilead Phosphate.	Official, 1892.....	1906	.....	.....	8.14	4.58	12.72	3.08	3.74	2.39	31.54
	Glendale.....	2567	.....	.....	10.87	3.11	13.98	2.26	2.74	.....	32.02
	Adairville.....	2568	.....	.....	9.57	2.65	12.22	2.44	2.96	1.87	29.68

Commercial Fertilizers.

Ohio Valley Phosphate.	2196	.....	.....	.....	8.78	4.31	13.09	1.62	1.97	.....	1.89	26.08
Adairville .....	2569	.....	.....	.....	10.55	4.39	14.94	1.69	2.05	.....	1.94	29.46
Official, 1893 ..	2198	.....	.....	.....	8.13	3.90	12.03	4.17	5.06	5 10	.....	39.98
Adairville .....	2570	.....	.....	.....	10.73	3.53	14.26	3.03	3.68	5.32	.....	39.93
Madisonville .....	2571	.....	.....	.....	11.00	2.64	13.64	3.67	4.46	5.14	.....	42.16
Phoenix Phosphate.	2197	.....	.....	.....	7.39	3.25	10.64	1.94	2.36	.....	1.14	23.52
Madisonville .....	2572	.....	.....	.....	8.57	3.05	11.65	1.76	2.14	.....	1.14	24.71
Glendale .....	2573	.....	.....	.....	8.88	3.67	12.50	1.57	1.91	.....	0.95	24.54
Glasgow .....	2574	.....	.....	.....	9.25	3.20	12.45	1.68	2.04	.....	0.95	25.42
White Burley Tobacco Fertilizer.	2187	.....	.....	.....	10.55	3.01	13.56	2.23	2.71	.....	3.72	32.76
Bowling Green .....	2551	.....	.....	.....	10.08	2.03	12.11	2.34	2.84	.....	2.58	30.56
Square Bone.	1588	.....	.....	.....	10.12	9.79	19.91	2.62	3.18	.....	.....	33.55
Bowling Green .....	2552	.....	.....	.....	13.55	3.49	17.04	1.34	1.63	.....	.....	30.49
Square Bone.	2191	.....	.....	.....	10.97	9.63	20.60	1.95	2.37	.....	.....	32.23
Leitchfield .....	2553	.....	.....	.....	11.50	5.67	17.17	1.17	1.42	.....	.....	27.63
Buckeye Phosphate.	344	.....	.....	.....	12.04	2.44	14.48	2.96	3.59	.....	0.33	37.02
Bowling Green .....	2554	.....	.....	.....	11.16	2.32	13.48	1.83	2.22	.....	0.26	31.03

TABLE III.—Continued.

NAME OF FERTILIZER.	WHERE SAMPLED.	Station Number.	POUNDS IN THE HUNDRED.										Estimated Value per Ton.	
			Phosphoric Acid.					Total.	Nitrogen.	Equivalent to Ammonia.	Potash.			
			In Fine Bone.	In Medium Bone.	Available.	Insoluble.	From Sulphate.				From Muriate.			
Buckeye Phosphate.	Official, 1893.....	2188	.....	.....	10.68	3.01	13.69	2.45	2.97	.....	.....	.....	.....	29.77
	Glasgow.....	2555	.....	.....	10.73	2.34	13.07	1.76	2.14	.....	.....	.....	.....	26.68
Ammoniated Dissolved Bone.	Official, 1893.....	2190	.....	.....	11.06	2.46	13.52	1.69	2.05	.....	.....	.....	.....	27.04
	Beaver Dam.....	2556	.....	.....	12.53	1.61	14.14	1.18	1.43	.....	.....	.....	.....	26.99
XXX Phosphate.	Official, 1894.....	2438	.....	.....	10.95	4.71	15.66	.....	.....	.....	.....	.....	.....	19.88
	Big Clifty.....	2557	.....	.....	14.13	0.91	15.04	.....	.....	.....	.....	.....	.....	23.07
Crocker's Kentucky Tobacco Fertilizer.	Official, 1894.....	2354	.....	.....	9.31	1.38	10.69	2.13	2.59	.....	.....	3.34	.....	28.12
	Shelby City.....	2491	.....	.....	10.07	2.01	12.08	2.02	2.45	.....	.....	.....	3.74	29.69
	Glasgow Junction.....	2550	.....	.....	9.53	1.87	11.40	2.22	2.70	.....	.....	.....	3.31	29.04
Crocker's Ammoniated Practical Superphosphate.	Official, 1894.....	2341	.....	.....	8.37	1.14	9.51	0.82	1.00	.....	.....	.....	1.19	18.67
	Shelby City.....	2492	.....	.....	8.34	1.66	10.00	0.94	1.14	.....	.....	.....	1.20	19.37

Currie's Tobacco Official, 1894..... 2333..... 8.06 3.67 11.73 1.55 1.88 9.59..... 35.33

Commercial Fertilizers.

Currie's Tobacco Grower.	Official, 1894.....	2333	.....	8.06	3.67	11.73	1.55	1.88	9.59	.....	35.33
	Hodgensville.....	2541	.....	8.97	4.31	13.28	1.87	2.27	.....	7.72	33.25
Currie's Raw Bone Meal.	Official, 1893.....	2177	10.73	.....	.....	21.16	4.17	5.06	.....	.....	34.68
	Eminence.....	2490	14.22	6.66	.....	20.88	3.98	4.83	.....	.....	34.05
Kentucky Standard Tobacco Grower.	Official, 1894.....	2379	.....	8.15	2.53	10.68	2.76	3.35	4.00	.....	31.35
	Gordonsville.....	2558	.....	9.35	1.87	11.22	2.51	3.05	3.69	.....	31.48
Globe Bone Dust.	Official, 1892.....	1849	.....	8.26	2.38	10.64	1.34	1.63	1.00	.....	22.23
	Gordonsville.....	2559	.....	9.17	1.92	11.09	1.31	1.59	1.02	.....	23.41
Progress Phosphate	Official, 1893.....	2123	.....	8.85	2.48	11.33	1.90	2.31	0.99	.....	25.53
	Gordonsville.....	2560	.....	10.22	2.47	12.69	1.42	1.72	1.17	.....	26.17
Big Four Tobacco Grower.	Official, 1894.....	2376	.....	8.22	2.72	10.94	2.47	3.00	2.93	.....	28.79
	Gordonsville.....	2561	.....	8.69	2.03	10.72	2.25	2.73	2.64	.....	27.88
	Vine Grove.....	2562	.....	7.94	2.99	10.93	1.72	2.09	2.43	.....	24.73
Eagle Fertilizer.	Official, 1894.....	2377	.....	8.95	3.08	12.03	2.12	2.57	2.16	.....	27.58
	Elizabethtown.....	2563	.....	10.56	2.09	12.65	1.67	2.03	1.22	.....	26.46
	Elkton.....	2564	.....	10.30	2.58	12.88	2.05	2.49	1.06	.....	27.57
Goulding's Bone Compound.	Official, 1892.....	1989	.....	8.25	2.23	10.48	2.56	3.11	.....	1.52	27.28
	Henderson.....	2548	.....	10.49	0.60	11.09	2.39	2.90	.....	1.93	29.87

TABLE III.—Continued.

NAME OF FERTILIZER.	WHERE SAMPLED.	Station number.	POUNDS IN THE HUNDRED.										Estimated Value Per Ton
			Phosphoric Acid.			Total.	Nitrogen.	Equivalent to Ammonia	Potash.				
			In Fine Bone.	In Medium Bone.	Available.				Insoluble.	From Sulphate.	From Muriate.		
Bromophyte.	Official, 1893 . . . . .	2280	.....	.....	2.88	1.15	4.03	1.28	1.55	.....	0.29	11.03	
	Leitchfield . . . . .	2542	.....	.....	4.75	2.25	7.00	2.61	3.17	.....	0.31	20.21	
Pure Raw Bone Meal	Official, 1893 . . . . .	2097	7.96	14.45	.....	.....	22.41	4.05	4.92	.....	.....	34.92	
	Big Clifty . . . . .	2543	8.78	14.15	.....	.....	22.93	3.96	4.81	.....	.....	35.06	
Pure Ammoniated Bone Meal.	Official, 1893 . . . . .	2098	14.71	2.56	.....	.....	17.27	2.66	3.23	.....	.....	25.93	
	Leitchfield . . . . .	2544	5.22	2.35	.....	.....	7.57	3.26	3.96	.....	.....	19.62	
Pure Raw Bone Meal	Official, 1894 . . . . .	2315	19.20	3.57	.....	.....	22.77	3.49	4.24	.....	.....	34.10	
	Elizabethtown . . . . .	2545	18.59	7.56	.....	.....	26.15	3.66	4.44	.....	.....	37.42	
	Hodgensville . . . . .	2546	17.11	8.50	.....	.....	25.61	3.64	4.42	.....	.....	36.76	
Ammoniated Bone Meal.	Official, 1894 . . . . .	2317	17.15	1.25	.....	.....	18.40	4.14	5.03	.....	.....	33.00	
	Elizabethtown . . . . .	2547	12.51	1.92	.....	.....	14.43	5.31	6.45	.....	.....	34.04	

Urbana Prize Tobacco Grower.	Official, 1894 . . . . .	2313	.....	.....	11.31	0.84	12.15	2.63	3.19	.....	.....	6.95	37.38
	Bowling Green . . . . .	2381	.....	.....	9.48	2.89	12.37	0.64	0.78	.....	.....	4.42	24.48



Commercial Fertilizers.

Urbana Prize Tobacco Grower.	Official, 1894.....	2313	.....	11.31	0.84	12.15	2.63	3.19	.....	6.95	37.38
	Bowling Green.....	2381	.....	9.48	2.89	12.37	0.64	0.78	.....	4.42	24.48
	Hopkinsville.....	2508	.....	8.67	4.02	12.69	0.67	0.81	.....	4.79	24.31
	Franklin.....	2509	.....	8.44	3.59	12.03	0.56	0.68	.....	4.69	23.17
	Leitchfield.....	2510	.....	8.69	3.45	12.14	0.56	0.68	.....	4.53	23.31
	Hardinsburg.....	2790	.....	14.17	0.86	15.03	2.99	3.63	.....	8.65	45.44
Urbana Superphosphate and Potash.	Official, 1893.....	2066	.....	10.20	1.10	11.30	1.96	2.38	.....	2.55	28.65
	Franklin.....	2511	.....	6.82	2.98	9.80	0.77	0.93	.....	2.19	18.87
	Hardinsburg.....	2791	.....	13.01	0.93	13.94	1.41	1.71	.....	4.75	33.55
Urbana Ammoniated Dissolved Bone.	Official, 1893.....	2067	.....	11.96	0.59	12.55	2.45	2.97	.....	3.58	34.42
	Franklin.....	2512	.....	8.08	1.62	9.70	0.88	1.07	.....	2.83	21.34
	Hardinsburg.....	2792	.....	13.55	1.10	14.65	1.81	2.20	.....	4.88	36.31
Urbana Sweepstakes Bone Phosphate.	Official, 1893.....	2064	.....	9.35	1.55	10.90	2.21	2.68	.....	3.30	29.30
	Hodgensville.....	2513	.....	6.71	2.10	8.81	0.83	1.01	.....	1.20	17.30
Urbana Bone Meal.	Official, 1893.....	2065	.....	11.86	5.59	17.45	2.53	3.07	.....	3.53	37.51
	Leitchfield.....	2514	.....	12.34	1.91	14.25	1.83	2.22	.....	2.30	31.98
Anchor Brand Complete Fertilizer.	Official, 1892.....	1898	.....	4.95	5.26	10.21	2.87	3.48	.....	1.98	25.24
	Glasgow.....	2549	.....	5.97	5.39	11.36	4.07	4.94	.....	0.81	30.55
Jarves' Tobacco Fertilizer.	Official, 1893.....	2243	.....	6.21	1.11	7.32	2.29	2.78	2.70	.....	24.16
	Franklin.....	2575	.....	6.97	0.95	7.92	2.21	2.68	.....	1.52	22.93

Table III. --Continued.

NAME OF FERTILIZER.	WHERE SAMPLED.	Station Number.	POUNDS IN THE HUNDRED.										Estimated Value per Ton.		
			Phosphoric Acid.		Nitrogen.	Equivalent to Ammonia.	Potash.		Total.						
			In Fine Bone.	In Medium Bone.			Available.	Insoluble.	From Sulphate.	From Muriate.	Total.			Total.	
Jarves' Drill Phosphate.	Official, 1893	2244	.....	.....	8.52	1.29	9.81	1.28	1.55	.....	.....	.....	.....	.....	20.38
	Glasgow	2576	.....	.....	8.97	1.42	10.39	1.29	1.57	.....	.....	.....	.....	.....	21.26
Homestead Tobacco Grower.	Official, 1893	2240	.....	.....	9.70	0.74	10.44	3.60	4.37	.....	.....	.....	.....	.....	36.98
	Glasgow	2577	.....	.....	9.60	1.39	10.99	3.33	4.04	.....	.....	.....	.....	.....	37.50
	Hopkinsville	2578	.....	.....	10.12	1.38	11.50	3.46	4.20	.....	.....	.....	.....	.....	37.01
Homestead Potato Grower.	Official, 1893	2242	.....	.....	9.63	0.77	10.40	3.44	4.18	.....	.....	.....	.....	.....	36.20
	Elizabethtown	2579	.....	.....	8.59	2.19	10.78	2.06	2.50	.....	.....	.....	.....	.....	27.57
Tennessee Guano.	Official, 1893	2234	.....	.....	7.56	0.87	8.43	1.84	2.23	.....	.....	.....	.....	.....	22.06
	Big Clifty	2521	.....	.....	9.01	2.41	11.42	1.51	1.83	.....	.....	.....	.....	.....	24.01
National Dissolved Bone.	Official, 1893	2236	.....	.....	9.58	1.61	11.19	1.21	1.47	.....	.....	.....	.....	.....	23.55
	Elizabethtown	2522	.....	.....	10.93	1.33	12.26	0.81	0.98	.....	.....	.....	.....	.....	23.57
	Hodgensville.	2523	.....	.....	11.14	1.56	12.70	0.95	1.15	.....	.....	.....	.....	.....	24.66
Tobacco Grower.	Official, 1893	2235	.....	.....	7.61	0.88	8.49	1.83	2.22	.....	.....	.....	.....	.....	22.22

Hodgensville ..... 2524 ..... 9.06 1.19 10.25 2.11 2.56 ..... 2.54 27.34

Commercial Fertilizers.

	2235	7.61	0.88	8.49	1.83	2.22	.....	2.54	27.34
Tobacco Grower.									
Hodgensville.....	2524	.....	1.19	10.25	2.11	2.56	.....	2.54	27.34
Bowling Green.....	2525	.....	1.05	11.32	1.91	2.32	.....	2.10	28.04
Hopkinsville.....	2526	.....	1.75	10.89	1.78	2.16	.....	1.04	24.85
Pure Raw Bone Meal	2299	18.54	.....	20.24	4.42	5.37	.....	.....	35.73
Mount Washington..	2611	20.42	.....	23.69	3.84	4.66	.....	.....	36.35
Horse Shoe Brand Prairie Phosphate.	2360	.....	4.45	11.05	1.79	2.17	.....	.....	19.95
Beaver Dam.....	2529	.....	2.57	9.62	1.82	2.21	.....	.....	19.85
H. S. B. Fine Raw Bone.	2355	12.43	.....	24.38	4.10	4.98	.....	.....	37.15
Elkton.....	2530	14.17	.....	23.62	3.97	4.82	.....	.....	36.19
Goshen.....	2610	8.77	.....	23.90	3.95	4.80	.....	.....	35.79
H. S. B. Superphos phate and Raw Bone Mixture.	2169	.....	7.33	15.53	2.70	3.28	0.51	.....	29.85
Elizabethtown.....	2531	.....	9.17	18.08	3.07	3.73	0.47	.....	33.59
H. S. B. Ky-Ana Phosphate.	2168	.....	4.06	10.38	1.17	1.42	.....	.....	17.86
South Carrollton....	2532	.....	3.26	11.74	1.91	2.32	.....	.....	24.02
Adairville.....	2533	.....	3.90	9.84	1.99	2.42	.....	.....	20.40
H. S. B. Tobacco Grower.	2357	.....	4.03	11.91	2.74	3.33	2.42	.....	29.22
Adairville .....	2534	.....	4.20	11.12	2.39	2.90	1.57	.....	25.09
H. S. B. Tobacco Grower.	2162	.....	4.32	11.78	2.44	2.96	0.77	.....	26.11
Hopkinsville.....	2535	.....	2.89	12.00	2.94	3.57	2.29	.....	32.19
H. S. B. Challenge Corn Grower.	2163	.....	3.34	11.50	2.13	2.59	0.65	.....	25.30

Table III.--Continued.

NAME OF FERTILIZER.	WHERE SAMPLED.	Station Number.	POUNDS IN THE HUNDRED.										Estimated Value per Ton.
			Phosphoric Acid.			Total.	Nitrogen.	Equivalent to Ammonia.		Potash.			
			In Fine Bone.	In Medium Bone.	Available.			Insoluble.	From Sulphate.	From Muriate.			
Jarves' Drill Phosphate.	Official, 1893.....	2244	.....	.....	8.52	1.29	9.81	1.28	1.55	.....	.....	.....	20.38
	Glasgow.....	2576	.....	.....	8.97	1.42	10.39	1.29	1.57	.....	.....	.....	21.26
Homestead Tobacco Grower.	Official, 1893.....	2240	.....	.....	9.70	0.74	10.44	3.60	4.37	.....	.....	5.14	36.98
	Glasgow.....	2577	.....	.....	9.60	1.39	10.99	3.33	4.04	.....	.....	6.39	37.50
	Hopkinsville.....	2578	.....	.....	10.12	1.38	11.50	3.46	4.20	.....	.....	4.67	37.01
Homestead Potato Grower.	Official, 1893.....	2242	.....	.....	9.63	0.77	10.40	3.44	4.18	.....	.....	5.10	36.20
	Elizabethtown.....	2579	.....	.....	8.59	2.19	10.78	2.06	2.50	.....	.....	3.11	27.57
	Tennessee Guano.	2234	.....	.....	7.56	0.87	8.43	1.84	2.23	.....	.....	1.21	22.06
National Dissolved Bone.	Official, 1893.....	2521	.....	.....	9.01	2.41	11.42	1.51	1.83	.....	.....	1.09	24.01
	Big Clifty.....	2236	.....	.....	9.58	1.61	11.19	1.21	1.47	.....	.....	1.32	23.55
	Elizabethtown.....	2522	.....	.....	10.93	1.33	12.26	0.81	0.98	.....	.....	0.86	23.57
Tobacco Grower.	Hodgensville.....	2523	.....	.....	11.14	1.56	12.70	0.95	1.15	.....	.....	0.89	24.66
	Official, 1893.....	2235	.....	.....	7.61	0.88	8.49	1.83	2.22	.....	.....	1.30	22.22

Hodgensville.....	2524	.....	.....	.....	9.06	1.19	10.25	2.11	2.56	.....	.....	2.54	27.34
Bowling Green.....	2525	.....	.....	.....	10.27	1.05	11.32	1.91	2.32	.....	.....	2.10	28.04

Commercial Fertilizers.

Pure Raw Bone Meal	Hodgensville .....	2524	.....	.....	9.06	1.19	10.25	2.11	2.56	.....	2.54	27.34
	Bowling Green .....	2525	.....	.....	10.27	1.05	11.32	1.91	2.32	.....	2.10	28.04
	Hopkinsville .....	2526	.....	.....	9.14	1.75	10.89	1.78	2.16	.....	1.04	24.85
	Official, 1893 .....	2299	18.54	1.70	.....	.....	20.24	4.42	5.37	.....	.....	35.73
	Mount Washington ..	2611	20.42	3.27	.....	.....	23.69	3.84	4.66	.....	.....	36.35
Horse Shoe Brand Prairie Phosphate.	Official, 1894 .....	2360	.....	.....	6.60	4.45	11.05	1.79	2.17	.....	.....	19.95
	Beaver Dam .....	2529	.....	.....	7.05	2.57	9.62	1.82	2.21	.....	.....	19.85
H. S. B. Fine Raw Bone.	Official 1894 .....	2355	12.43	11.95	.....	.....	24.38	4.10	4.98	.....	.....	37.15
	Elkton .....	2530	14.17	9.45	.....	.....	23.62	3.97	4.82	.....	.....	36.19
	Goshen .....	2610	8.77	15.13	.....	.....	23.90	3.95	4.80	.....	.....	35.79
H. S. B. Superphos phate and Raw Bone Mixture.	Official, 1893 .....	2169	.....	.....	8.20	7.33	15.53	2.70	3.28	0.51	.....	29.85
	Elizabethtown .....	2531	.....	.....	8.91	9.17	18.08	3.07	3.73	0.47	.....	33.59
H. S. B. Ky-Ana Phosphate.	Official, 1893 .....	2168	.....	.....	6.32	4.06	10.38	1.17	1.42	.....	.....	17.86
	South Carrollton .....	2532	.....	.....	8.48	3.26	11.74	1.91	2.32	.....	.....	24.02
	Adairville .....	2533	.....	.....	5.94	3.90	9.84	1.99	2.42	.....	.....	20.40
H. S. B. Tobacco Grower.	Official, 1893 .....	2357	.....	.....	7.88	4.03	11.91	2.74	3.33	2.42	.....	29.22
	Adairville ... ..	2534	.....	.....	6.92	4.20	11.12	2.39	2.90	1.57	.....	25.09
H. S. B. Tobacco Grower.	Official, 1893 .....	2162	.....	.....	7.46	4.32	11.78	2.44	2.96	0.77	.....	26.11
	Hopkinsville .....	2535	.....	.....	9.11	2.89	12.00	2.94	3.57	2.29	.....	32.19
H. S. B. Challenge Corn Grower.	Official, 1893 .....	2163	.....	.....	8.16	3.34	11.50	2.13	2.59	0.65	.....	25.30

TABLE III.—Continued.

NAME OF FERTILIZER.	WHERE SAMPLED.	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 Sulphate.	From Muriate.		
	Elkton .....	2536	.....	.....	8.43	4.11	12.54	2.07	2.51	0.71	.....	.....	26.07
	Russellville .....	2537	.....	.....	8.45	4.18	12.63	2.06	2.50	0.70	.....	.....	26.10
	Official, 1893 .....	2166	.....	.....	6.72	2.81	9.53	1.96	2.38	0.35	.....	.....	21.44
H. S. B. Kentucky Corn and Tobacco Grower.	Hopkinsville .....	2538	.....	.....	6.07	4.18	10.25	2.15	2.61	.....	0.52	.....	22.00
	Allensville .....	2539	.....	.....	8.06	4.75	12.81	1.98	2.40	0.29	.....	.....	24.88
	Franklin .....	2540	.....	.....	6.22	4.44	10.66	2.03	2.46	.....	0.44	.....	21.83
Reese's Pacific Guano	Official, 1893 ... ..	2252	.....	.....	9.15	0.97	10.12	2.46	2.99	0.96	0.96	0.96	28.38
	Henderson .....	2527	.....	.....	10.72	1.78	12.50	1.85	2.25	.....	.....	1.07	27.87
Crown Bone Phosphate and Potash.	Official, 1893 .....	2281	.....	.....	12.99	1.29	14.28	.....	.....	.....	.....	2.31	25.39
	Owensboro .....	2528	.....	.....	13.71	3.24	16.95	.....	.....	.....	.....	0.89	26.23
Standard Raw Bone Meal.	Official, 1894 .....	2601	10.86	10.03	.....	.....	20.89	3.90	4.73	.....	.....	.....	33.39
	Auburn .....	2620	13.37	8.92	.....	.....	22.29	3.87	4.70	.....	.....	.....	34.65
Pure Ground Bone.	Official, 1894 .....	2472	12.78	7.10	.....	.....	19.88	3.69	4.48	.....	.....	.....	31.94
	Trenton .....	2783	23.08	.....	.....	.....	23.08	3.59	4.36	.....	.....	.....	35.13