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BULLETIN NO. 14. - - - - NEW SERIES.

REPORT

—OF—


Agricultural Experiment Station,

OF THE

Agricultural and Mechanical College,

AUBURN, ALA. - - - - APRIL, 1890.

PEA VINES AS A FERTILIZER.

 The Bulletins of this Station will be sent Free to any citizen of the State, on application to the Director.

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AGRICULTURAL EXPERIMENT STATION,
Agricultural and Mechanical College,
AUBURN, ALA. - - - - APRIL, 1890.

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NITROGEN AS A FERTILIZER.

[N. T. LUPTON, CHEMIST.]

In estimating the value of commercial fertilizers, phosphoric acid, potash, and nitrogen are the only constituents taken into consideration. Of course, these are no more necessary for the growth of vegetation than other elements which enter into the composition of plants, but as they are more generally deficient in soils, especially after long continued cultivation, this deficiency must be supplied in order to produce abundant crops.

The bones of animals, both recent and fossil, with the immense deposits of phosphatic material found in this and other countries, have furnished the farmer a good supply of phosphoric acid at a reasonable price. The natural sources of potash have also been sufficient to keep the cost of this element within moderate bounds. The supply of nitrogen, however, is not so abundant, and hence it maintains a high value in the commercial world. In addition to this, nitrogenous materials very readily undergo decomposition, and the gaseous nitrogen passes into the atmosphere. Its chief sources as a fertilizer, are blood, tankage, fish scrap, cotton seed, cotton seed meal, animal manure, the salts of ammonia from gas works, and sodium nitrate, or Chili salt-petre. While about four-fifths of the atmosphere consists of nitrogen, this immense supply is virtually useless as a fertilizer. It must be in a state of chemical combination, as it appears from the most reliable investigations, before plants can use it. How this combination is brought about in the ordinary growth of vegetation, is an interesting question. The passage of electricity through the air is known to cause the union of minute quantities of nitrogen and oxygen, and some low organisms, called microbes, found on the roots of plants, are believed to change this element into

a form suitable for use by the plant, but whether atmospheric nitrogen, under any circumstances, contributes directly to the nutrition of plants is a disputed question.

THE SOURCES OF THE NITROGEN OF VEGETATION.

The question of the supply of nitrogen to vegetation, says a recent writer in the *Chemical News*, is one of the utmost importance, not merely from a theoretical, but from a practical point of view. Put in a slightly different form, it means, are we, as far as the nitrogenous constituents of our frames are concerned, living on the earth's income, or, as in the case of coal, on its capital? Do plants depend for their growth on the combined nitrogen present in the soil and sub-soil, supplied by manures and by the decomposing remnants of defunct organisms, or brought down by the rain in the form of ammonia or nitric acid? Or, are they able to fix in their tissues, directly or indirectly, any portion of the unlimited store of free nitrogen existing in the atmosphere? Such fixation might conceivably take place in various ways; by the direct oxidation of the plant, by the mediation of fungi or microbes, by some reaction of constituents of the soil, by the silent electrical discharge, etc.

The ablest scientific and practical investigators in the field of agricultural science have been studying this question for years past, but it must be confessed, results are not concordant. Some conclude from numerous experiments, that certain soils have the power, under peculiar circumstances, to fix free nitrogen; that is, to cause it to enter into chemical combination and serve as plant food; others like Berthelot, the distinguished French chemist, and the German chemists, Hellriegel and Willfarth, believe that free nitrogen requires the influence of living organisms, or microbes, which are found on the roots of some plants, to bring it into organic combination, while Boussingault is quoted in an article in the *Chemical News*, above referred to, as saying: "If there is in physiology a fact perfectly demonstrated it is the non-assimilability of free nitrogen of plants, even those of an inferior order, such as mycodermis and fungi."

Thus we see how different are the conclusions of the most skillful experimenters in this difficult field of investigation.

PLANTS AS COLLECTORS OF NITROGEN.

Whatever views may be held in regard to the relation of atmospheric nitrogen to the nutrition of plants, every educated farmer knows that certain crops collect this important element from some source and accumulate it in the soil. Prof. Wagner, Director of the Agricultural Research Station near Darmstadt, Germany, in a recent publication, divides plants into *nitrogen-collectors* and *nitrogen-consumers*. He concludes from many carefully conducted experiments that the nitrogen-collectors—peas, clover, lucerne, and leguminous plants generally—have the power to fix atmospheric nitrogen and by accumulating it in the soil, add to the capital of the farm, while cereals, grass, potatoes, turnips, tobacco, corn, cotton, etc., as nitrogen-consumers, have no such power, but take up from the soil, in the form of nitrogenous salts, all the nitrogen contained in the crop.

THE VALUE OF PEA VINES AS A FERTILIZER.

Pea vines and clover are universally recognized as enrichers of the soil, and are grown to some extent for purposes of fertilization. With a view of encouraging the growth of these valuable plants, especially of peas, and of answering some important questions, an investigation was undertaken a few months ago, to determine the real value of pea vines as a fertilizer, and the relative value of vines and roots. With the aid of Dr. J. T. Anderson, assistant chemist in the State Laboratory, some interesting results have been obtained. Several chemists have investigated the composition and value of *roots*, among whom may be mentioned Dr. Walker in England, Dr. Weiske in Germany, and Dr. Atwater in this country; but I have found no presentation of the comparative value of the vines and roots as fertilizers. To determine this question, four samples were taken October, 1889, from a crop raised on the experiment farm, as follows: Sample A was taken from a space one

yard square. The vines were carefully cut, leaving the usual amount of stubble with the roots. A trench was dug around this square yard to a depth of several feet, and the earth washed away by a stream of water from a suitable hose. The roots were collected as completely as possible.

Samples B, C and D were from a cubic foot each, selected at random in the patch, the earth was removed entirely, dried, and then carefully sifted from the roots. Care was taken to secure, as far as possible, all fibres, however small. It was found that in this soil, a sandy loam with sandy sub-soil, the roots were virtually all included in the first foot in depth. Vines and roots with stubble attached were air dried, and weighed with the following results :

Weights Expressed in Grams.

	A.	B.	C.	D.
Weight of vines.....	210	137	58	69
Weight of stubble and roots.....	67	20	11	9

Calculated for one acre, these give in pounds :

	A.	B.	C.	D.
Weight of vines.....	2,236	13,128	5,558	6,612
Weight of roots.....	713	1,916	1,054	862

Thus we have in A a little more than three times as much vines as roots ; in B nearly seven times as much ; in C five and a half times as much ; and in D a little more than seven and a half times as much ; the average being six of vines to one of roots.

The vines and roots yielded as follows :

	A.		B.		C.		D.	
	per cent.		per cent.		per cent.		per cent.	
	Vines,	Roots	Vines,	Roots	Vines,	Roots	Vines,	Roots
Phosphoric acid.....	1.03	1.09	0.56	0.56	0.55	0.62	0.44	0.30
Potash.....	1.24	1.17	1.25	1.11	1.33	1.24	1.35	1.14
Nitrogen.....	2.62	1.09	1.73	0.75	1.45	0.54	1.45	0.36
Moisture.....	11.79	10.95	10.49	11.10	11.48	9.05	11.04	9.53
Crude ash.....	14.37	20.65	8.87	23.54	7.81	18.18	7.31	17.53

The amounts of phosphoric acid, nitrogen and potash, calculated for one acre, are given in the following table in pounds :

	A.		B.		C.		D.	
	pounds. Vines, Roots		pounds. Vines, Roots		pounds. Vines, Roots		pounds. Vines, Roots	
Phosphoric acid.....	23.03	7.77	73.51	10.72	30.56	6.53	29.09	2.58
Potash	27.72	8.34	164.10	21.26	74.10	13.06	89.26	9.82
Nitrogen	58.58	7.77	227.11	14.37	80.59	5.69	95.87	3.10

Table expressing averages in pounds on one acre with commercial values, taking the yield of the four samples analyzed :

	pounds.		Value in dollars and cents.	
	Vines,	Roots.	Vines,	Roots.
Phosphoric acid.....	39.05	6.90	\$ 2.93	.52
Potash.....	88.79	13.12	.89	.13
Nitrogen.....	115.54	7.70	22.53	2.50
			\$ 26.35	3.15

To determine the loss of nitrogen caused by allowing the vines to lie upon the ground during the fall and winter, samples of dry vines were collected during the last weeks of December and January, and the percentage of nitrogen determined. The following table gives these results, and for comparison, the percentage of nitrogen in green vines is also given as previously obtained :

	Percentage of Nitrogen.			
	(1)	(2)	(3)	(4)
Green vines collected in October.....	2.62	1.73	1.45	1.45
Dry vines collected in December.....	0.81	0.88	....	....
Dry vines collected in January.....	0.66	0.72	0.66	0.70

The leaves had mostly disappeared from the dry vines, and such changes had taken place by atmospheric agencies, that it was impossible to institute, with any degree of exactness, a comparison between the weight of green vines on

a given area, air dried in the Laboratory, and the weight of same when dried in the field and gathered in December and January. The shrinkage from loss of moisture and decomposition by atmospheric agencies would, however, greatly increase the relative loss of nitrogen as exhibited in the above table.

CONCLUSIONS.

It is evident that much of the nitrogen collected by pea vines is lost when the crop is left exposed on the soil where it grew.

No experiments have been made to test the view of those who hold that more or less of this nitrogen becomes oxidized and passes into the soil as nitrate. The gaseous condition of nitrogen, ammonia, and other compounds of this element which result from the decomposition of organic substances, renders it, however, more than probable that the nitrogen escapes into the air. Many of our best agriculturists, however, condemn the practice of turning under the pea vines while green, in our climate, unless some other crop is to follow immediately, believing that the saving of nitrogen contained in the vines will not compensate for the loss produced by the exposure of the ploughed land to atmospheric agencies during the fall and winter.

An excellent plan would be to use the vines as a feed stuff, preserve the manure, and return it to the soil just before the time of planting.

The following conclusions are drawn from these results :

1. Pea vines contain a large percentage of phosphoric acid, potash and nitrogen, the three valuable constituents of commercial fertilizers, and are especially rich in nitrogen, which they accumulate directly or indirectly from the atmosphere and furnish as a fertilizer to other crops.

2. In these experiments the vines weigh about *six* times as much as the roots, and are about *eight and a third* times as valuable as a fertilizer, calculating their value on the basis of valuations used in Alabama for commercial fertilizers.

3. The vines lose a large percentage of their nitrogen when left on the ground during the fall and winter months.

No. 1519. COTTON SEED HULL ASHES FROM CENTRAL OIL CO.,
SELMA, ALA.

Moisture.....	11.00	per cent.
Organic matter.....	8.95	"
Insoluble matter (silica).....	7.95	"
Oxide of iron and alumina.....	3.03	"
Lime, or calcium oxide.....	2.22	"
Magnesia, magnesium oxide.....	8.84	"
Potash.....	26.14	"
Soda.....	11.76	"
Phosphoric Acid ($P_2 O_5$).....	11.69	"
Sulphuric Acid ($S O_3$).....	2.15	"
Chlorine.....	0.96	"
Carbonic Acid (calculated).....	5.31	"
	100.00	"

A sample of fertilizer marked "Acid Phosphate with Potash" from Messrs. T. S. & J. P. Kirley, Scottsboro, Ala., was examined Feb. 6, 1890, and found to contain metallic lead in grains or particles varying in size from that of mustard seed to that of a buckshot. Eight ounces of the fertilizer contained one and one-sixth ounces of lead.

Another sample sent by the same parties was examined March 11th, which contained metallic lead as in the previous sample.

Analyses Reported by Dr. N. T. Lupton from October 1, 1889, to April 1, 1890.

PHOSPHATES CONTAINING NITROGEN AND POTASH.

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Station No.	NAME OF FERTILIZER.	BY WHOM SENT.	Phosphoric Acid.			Nitrogen.	Potash.	Commercial Value.
			Water Soluble.	Citrate Soluble.	Acid Soluble.			
1399	Fertilizer	Rawls & Perry, Cuthbert, Ga.....	4.80	3.48	1.99	2.31	1.50	\$22 92
1402	Georgia State Grange Fertilizer	Baldwin Fertilizing company, Savannah, Ga..	8.21	2.16	2.24	1.82	2.00	24 64
1403	Ammoniated Dissolved Bone	“ “ “ “	9.44	0 85	2.32	1.78	2 04	24 41
1404	Ammoniated Dissolved Bone	John C. Cheney, Montgomery, Ala.	8.00	3 04	1.45	1.68	1.18	24 29
1405	Rock City Guano.....	“ “ “ “	6.73	2 69	1.44	2.17	1.92	24 51
1408	Fertilizer	J. C. Webb, Demopolis, Ala	2.72	2.19	0.83	2.31	0.85	17 21
1410	Troy Perfect Guano	Troy Fertilizer company, Troy, Ala.....	9.79	1 05	1.60	2.10	1.81	26 26
1411	Pike County Guano	“ “ “ “	9.92	1.97	1 95	1 68	1.30	25 68
1412	Farmer's Alliance Guano.	“ “ “ “	9.58	1.90	1.90	1.96	1 21	26 07
1413	F. F. I. Co. High Grade Guano.....	Adair Brother & Co., Atlanta, Ga	7 27	2.73	1.65	3.36	3.00	31 10
1414	Golden Grain Fertilizer.....	“ “ “ “	8.08	2.82	1.31	3.01	3.31	31 39
1415	Buffalo Bone Guano.....	“ “ “ “	7 16	3 69	1.72	2.73	2.20	29 11
1416	F. F. I. Co. Soluble Bone	“ “ “ “	7.50	3 05	1 93	1.26	1 31	22 04
1421	Ammoniated Dissolved Bone	John Merryman & Co., Baltimore, Maryland.	7.56	2.65	3.69	1.89	2.06	24 74
1425	Phosphate & Crushed cotton seed.....	A. St. C. Tennille, Troy, Ala.....	6.33	0 76	6.13	1.12	0.08	15 07
1435	Webb's Excelsior	J. C. Webb, Demopolis, Ala.....	1.42	5.28	0.84	4.96	1.47	30 86
1439	C. S. Meal, Oil and Guano	Eufaula Oil and Fert. Co., Eufaula, Ala.....	7 94	2.83	1.51	1.40	3 39	25 00
1441	Southern Ammoniated Dis. bone	Ma'dox, Rucker & Co., Atlanta, Ga.....	10.02	0 61	0.50	2 38	2.15	27 37
1442	Old Dominion Guano	“ “ “ “	10 92	0.82	0.91	2.80	2.08	30 61
1443	Farmer's Ammoniated Dissolved Bone.....	Hammond, Hull & Co., Savannah, Ga.....	9.06	1.20	2 23	1.75	1.02	23 23
1444	Old Reliable.....	“ “ “ “	8.50	1.99	2.68	1.82	0.42	23 24
1445	Ga. State Stand. Amm'd Superphosphate.....	“ “ “ “	8.42	0.94	2 90	1.75	2.37	23 23
1448	High Grade Veg. Fertilizer.....	“ “ “ “	6.99	0.92	0 80	4.75	5.55	35 93
1455	Magnet Soluble Guano.....	Davis, Marshall & Co., Mobile, Ala.....	4 45	4.10	3.00	2.66	1.82	25 01

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1458	Carolina Fertilizer	Bradley Fert. Co., Boston, Mass.	8.83	2.27	1.01	1.89	1.13	25	15
1459	B. D. Sea Fowl Guano	" " "	8.81	2.19	1.03	2.31	1.59	27	09
1460	Eagle Ammoniated Dissolved Bone	" " "	8.79	2.24	1.56	1.82	0.79	24	42
1461	Bradley's Ammoniated Dissolved Bone	" " "	8.48	2.20	1.56	2.52	1.21	27	05
1462	Bradley's Patent	" " "	11.28	0.67	0.33	1.89	1.00	26	29
1465	Americus Guano	Williams & Clarke Fert. Co., N. Y.	8.04	1.52	1.72	1.68	1.06	21	95
1466	Eufaula Fertilizer	Eufaula Oil and Fertilizer Co., Eufaula, Ala.	8.04	1.40	1.84	1.68	3.70	24	41
1468	Fertilizer	S. E. Greenhill, Pleasant Site, Ala.	6.89	2.33	1.47	2.59	1.80	25	73
1471	Ammoniated Guano	Rasin Fert. Co., Baltimore, Md.	6.24	3.39	2.46	2.24	1.85	25	02
1472	Soluble Pacific Guano	W. J. Pollard, Augusta, Ga.	6.54	3.44	3.38	2.17	1.26	24	69
1475	Home Mixture	Columbus Fert. Co., Columbus, Ga.	7.29	2.01	1.24	2.03	1.82	23	68
1476	East Alabama Fertilizer No. 2	East Alabama Fertilizer Co., Clayton, Ala.	9.19	2.38	1.08	1.54	3.19	26	54
1477	East " " No. 1	" " "	8.08	2.25	2.11	2.52	2.19	27	50
1478	Lister's Ammoniated Dissolved Bone	Lister's Ag. and Chem. Works, Newark, N. J.	7.78	1.55	2.42	2.10	1.48	22	66
1481	Atlantic Soluble Guano	Atlantic Phos. Co., Charleston, S. C.	7.10	1.85	1.47	1.96	1.73	22	79
1482	" Fertilizer	" " "	5.76	4.43	3.80	1.54	0.95	22	23
1483	Fertilizer	Albany Fertilizer Co., Albany, Ga.	6.52	1.66	1.35	2.80	1.74	24	93
1486	M. S. Guano	W. J. Hudson, Mobile, Ala.	5.76	4.43	3.80	1.57	0.95	22	35
1488	Gossypium Phospho	S. E. Greenhill, Pleasant Site, Ala.	6.40	2.08	2.46	2.66	1.64	24	73
1489	Home Mixture	J. W. Crawford, Lawrenceville, Ala.	6.47	2.42	1.45	2.31	1.92	24	25
1490	Patent Pacific Guano	Southern, Phos. Co., Atlanta, Ga.	10.59	0.89	0.76	2.38	2.13	28	63
1493	Ashepoo Fertilizer	Ashepoo Fertilizer Co., Charleston, S. C.	7.66	2.20	2.60	1.61	1.14	22	20
1497	Ammoniated Dissolved Bone	W. F. Vandiver, Montgomery, Ala.	6.89	3.75	3.93	1.33	1.65	22	79
1499	Fertilizer	Wight, Weloskey & Brown, Albany, Ga.	8.54	1.81	0.74	2.80	1.40	27	84
1502	Americus Guano	Williams & Clarke Fert. Co., N. Y.	9.38	1.69	0.94	2.24	1.20	26	53
1503	Home Mixture	Columbus Fert. Co., Columbus, Ga.	6.02	3.44	1.08	2.10	2.28	24	66
1504	Fertilizer	Chattahoochee Fert., Co., Eufaula, Ala.	7.27	2.19	1.08	2.17	1.90	24	63
1505	Fertilizer	R. Q. Edmondson & Bro., Eufaula, Ala.	7.06	4.22	2.87	1.40	1.13	23	51
1509	Lee Fertilizer	M. T. Trawick, Opelika, Ala.	7.08	1.75	1.80	2.10	1.94	23	37
1510	Farmer's Club Guano	" " "	7.66	2.26	1.58	2.03	2.38	25	17
1511	Coweta High Grade	Coweta Fert. Co., Newnan, Ga.	8.71	0.76	1.20	2.24	2.14	25	07
1512	Aurora Am'd Phosphate	" " "	8.14	0.71	1.11	2.10	2.73	24	19
1513	Fertilizer	J. C. Killebrew, Newton, Ala.	7.81	1.21	2.90	2.10	2.08	23	80
1514	Homestead Guano	Adair Bros. & Co., Atlanta, Ga.	8.85	0.72	0.87	1.82	.....	21	44
1515	Adair's Amd. Dissolved Bone	" " "	8.23	1.63	2.02	2.66	1.97	27	13
1517	East Alabama Fertilizer No. 3	East Alabama Fert. Co., Clayton, Ala.	6.79	1.58	2.65	1.82	2.77	22	41

Analyses Reported by Dr. N. T. Lupton from October 1, 1889, to April 1, 1890—Continued.

PHOSPHATES CONTAINING NITROGEN AND POTASH.

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Station No.	NAME OF FERTILIZER.	BY WHOM SENT.	PHOSPHORIC ACID.			Nitrogen.	Potash.	Commercial Value.
			Water Soluble.	Citrate Soluble.	Acid Soluble.			
1521	Ammoniated Dissolved Bone.....	Kennesaw Guano Co., Atlanta, Ga.....	6.45	1.92	4.16	2.24	1.77	23.01
1522	High Grade Ammoniated Guano.....	" " " ".....	6.91	2.34	3.61	2.24	1.74	24.34
1524	Complete Fertilizer.....	Pike Martin, Montgomery, Ala.....	1.07	3.04	1.01	2.52	0.13	16.11
1528	Crown Guano.....	Treadwell, Abbott & Co., Atlanta, Ga.....	8.00	2.36	3.52	2.66	1.94	27.85
1531	East Alabama Fertilizer No. 5.....	East Alabama Fertilizer Co., Clayton, Ala.....	7.10	1.92	2.52	1.75	2.72	23.07
1532	" " " 6.....	" " " ".....	6.77	2.41	2.70	1.75	2.96	23.55
1533	" " " 7.....	" " " ".....	6.95	2.45	2.48	1.61	2.37	22.74
1535	Fertilizer.....	Huntsville Fert. Co., Huntsville, Ala.....	7.64	3.65	0.82	2.94	0.50	23.04
1539	Guano, lot No. 1.....	J. C. Killebrew, Newton, Ala.....	7.48	2.49	2.04	1.96	2.47	25.06
1540	Guano, lot No. 2.....	" " " ".....	7.94	2.33	1.97	1.96	2.37	25.41
1541	Guano, lot No. 3.....	" " " ".....	8.33	2.22	2.29	1.82	2.15	25.06
1543	Soluble Pacific Guano.....	W. L. Sampey, Clanton, Ala.....	8.85	2.07	0.94	2.10	0.92	25.49
1544	Fertilizer, No. 5.....	John H. Murphay, Mt. Pinson, Ala.....	8.52	0.52	1.69	2.38	1.45	24.29
1546	Ammoniated Dissolved Bone.....	Treadwell, Abbott & Co., Atlanta, Ga.....	6.79	2.03	3.98	2.73	1.41	25.28
1547	Bono Fertilizer.....	Bono Fertilizer Co., Baltimore, Md.....	6.85	3.96	0.88	1.96	2.28	26.13
1548	Gilt Edge Guano.....	G. Harnes, Trimble, Ala.....	7.37	3.59	2.07	2.80	0.97	28.33
1549	Chatham Guano.....	J. S. Lisenby, Echo, Ala.....	7.75	2.61	3.54	1.89	2.45	25.37
1552	Georgia State Grange Fertilizer.....	O. W. Cooper, Oxford, Ala.....	7.12	1.75	4.51	1.75	2.07	22.19
1555	Guano.....	H. I. Steed, Haw Ridge, Ala.....	5.95	1.83	1.03	1.89	1.52	20.57
1557	Fertilizer.....	G. H. See, New Castle, Ala.....	7.54	1.15	1.74	2.45	1.39	23.97
1559	Fertilizer No. 1.....	J. P. Darr, Millport, Ala.....	7.66	2.39	2.31	1.75	1.50	23.41
1561	Fertilizer.....	" " " ".....	5.74	3.12	1.87	3.01	2.57	27.57
1562	Fertilizer.....	W. J. Hudson, Mobile, Ala.....	2.95	4.72	1.62	2.10	0.67	20.39
1563	Fertilizer.....	Byars Coale, Carrolton, Ala.....	6.16	2.12	1.70	2.52	2.09	24.33
1567	Fertilizer.....	J. H. McGaha, Coal Fire, Ala.....	6.24	2.27	1.93	2.55	2.00	24.86

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1569	Fertilizer	J. A. Gass, Benevola, Ala.	6 54	1.69	1.85	2.66	2.36	25 07
1570	Globe Guano	Geo. A. Folmer & Son, Lucerne, Ala.	1 59	8.70	1 24	4 34	5.05	37 40
1571	Rock City Guano	S. P. Barron, Andalusia, Ala.	6 98	2.27	1.06	1 82	1 21	22 17
1573	Fertilizer	J. Bradley, Beard, Alabama	7 08	2.06	2 36	2 38	2 40	25 39
1578	Southern Ammoniated Dissolved Bone	R. E. L. Bugg, Goldville, Ala.	7.83	1 54	1 40	1 6	1 35	21 95
1579	Georgia State Grange Fertilizer	W. R. Hunnicutt & Son, Hefflin, Ala.	7.56	1.58	4 26	2 10	2 15	24 05
1583	Mobile Standard Guano	J. M. Funderburk, Reform, Ala.	3.05	4.82	2 84	1 82	1.60	20 43
1585	Troy Perfect Guano	Troy Fert. Co., Troy, Ala.	9 13	0 76	1 78	2 24	2 73	26 39
1586	Georgia State Grange Fertilizer	S. J. Brown, Dadeville, Ala.	7 35	2.19	4 93	1 89	1.95	23 63

ACID PHOSPATE WITH POTASH.

Station No.	NAME OF FERTILIZER.	BY WHOM SENT.	Phosphoric Acid.			Potash.	Commercial Value.
			Water Soluble.	Citrate Soluble.	Acid Soluble.		
1401	Bone and Potash	Baldwin Fertilizer Co., Savannah, Ga.	10 54	2 22	1 85	4 02	\$23 16
1407	Phosphate with Potash	John C. Cheney, Montgomery, Ala.	11.02	2 57	1 75	2 27	22 65
1417	Phosphate with Potash	Adair Brothers & Co., Atlanta, Ga.	7 66	4 15	1 7.	2 65	20 36
1529	Crown Acid Phosphate	Ireadwell, Abbott & Co., Atlanta, Ga.	10 90	3.43	1 56	2 47	23 96
1587	Dissolved Bone.....	J. B. Smith, Mulberry, Ala.	10.56	2 36	0.21	0 67	20.05

Analyses Reported by Dr. N. T. Lupton from October 1st, 1889, to April 1st, 1890.

ACID PHOSPHATES.

Station No.	NAME OF FERTILIZER.	BY WHOM SENT.	Phosphoric Acid.			Commercial Value.
			Water Soluble.	Citrate Soluble.	Acid Soluble.	
1398	Phosphate	Tinsley Fertilizer Co., Selma, Ala.	7.31	4.57	2.32	\$17 82
1400	Georgia State Grange Acid Phosphate	Baldwin Fertilizer Company, Savannah, Ga	10 15	2 34	4 42	18 73
1406	Phosphate	John C. Cheney, Montgomery, Ala	11.88	2.43	1.80	21 46
1409	Troy Acid Phosphate	Troy Fertilizer Company, Troy, Ala	13.40	2 02	1.47	23 13
1418	Phosphate	Adair Brothers & Co., Atlanta, Ga	11.40	4.36	0.92	23 64
1419	Magnet Acid Phosphate	Davis, Marshall & Co., Mobile, Ala.	11.92	2.39	1.92	21 46
1420	Phosphate	Tinsley Fertilizer Company, Selma, Ala.	10.50	3.02	1.92	20 38
1422	Phosphate	McMillan & Harrison, Mobile, Ala.	10.50	2 42	0.28	19 38
1424	Phosphate saturated with C. S. Oil	A. St. C. Tennille, Troy, Ala	8.65	5.61	4.47	21 39
1438	Phosphate	East Alabama Fertilizer Company, Clayton, Ala.	6.79	7.68	2 50	21 70
1440	Southern Acid Phosphate	Maddox, Rucker & Co., Atlanta, Ga	13.63	1 24	0.14	22 34
1446	Georgia State Standard Acid Phosphate	Hammond, Hull & Co., Savannah, Ga	12.26	2 00	1 31	21 39
1449	English Acid Phosphate	W. F. Vandiver & Co., Montgomery, Ala	12.21	2.44	1.84	21 97
1463	Palmetto Acid Phosphate	Bradley Fertilizer Company, Boston, M. ss.	12.23	1.18	0.60	20 11
1467	Acid Phosphate	Chattahoochee Fertilizer Company, Eufaula, Ala.	10 69	3.13	1.88	20 72
1469	Phosphate	C. A. Hughes, Get-up, Ala	10 06	5.78	2.76	23 70
1470	Acid Phosphate	Rasin Fertilizer Company, Baltimore, Md	13.44	2.08	1.28	23 28
1473	Tinsley's Phosphate	W. C. Kennon	11.44	2.54	2.55	20 97
1474	Soluble Bone	Columbus Fertilizer Company, Columbus, Ga.	10 56	3.15	2 01	20 56
1479	Atlantic Dissolved Bone	Atlantic Phosphate Company, Charleston, S. C.	12.44	1.50	2 09	20 91
1480	Atlantic Acid Phosphate	" " " "	11.07	1.58	1.50	20 00
1485	Berkley Phosphate	M. T. Trawick, Opelika, Ala	10.54	3.30	3.13	21 76
1487	M. S. Acid Phosphate	W. J. Hudson, Mobile, Ala.	11.50	3.06	2.00	21 84

1491	Phosphate	C. A. Hughes, Get-up, Ala.	9.35	4.83	3.04	21	27
1494	Ashepoo Phosphate	Ashepoo Phosphate Company, Charleston, S. C.	12.74	2.81	0.46	23	32
1495	XX Phosphate	W. F. Vandiver, Montgomery, Ala.	11.50	2.66	2.33	21	24
1496	Diamond Solable Bone	" " "	11.78	2.70	2.30	21	72
1506	Berkley Acid Phosphate	Chattahoochee Fertilizer Company, Eufaula, Ala.	8.90	3.42	2.09	18	48
1516	Adair's Acid Phosphate	Adair Bros & Co., Atlanta, Ga.	11.82	3.54	1.22	23	04
1523	High Grade Acid Phosphate	Kennesaw Guano Company, Atlanta, Ga.	9.75	3.68	3.79	20	14
1525	Berkley Phosphate	J. Burkes, Auburn, Ala.	12.36	0.91	2.07	19	90
1527	Acid Phosphate	C. W. Williams, Bosenburg, Ala.	3.55	7.39	4.20	16	41
1534	Dissolved Bone	East Alabama Fertilizer Company, Clayton, Ala.	11.67	1.83	2.26	20	25
1536	Phosphate No. 1	McQueen Smith, Prattville, Ala.	12.55	3.84	2.31	24	58
1537	" " 2	" " "	13.03	4.08	0.53	25	66
1538	" " 3	" " "	9.77	5.65	3.08	23	13
1545	Wando Acid Phosphate	W. L. Sampey, Clanton, Ala.	10.88	3.13	2.79	21	01
1550	Phosphate No. 9	McMillan & Harrison, Mobile, Ala.	9.86	4.56	1.51	21	63
1551	" " 7	" " "	10.11	2.46	1.29	18	85
1553	Georgia State Grange Acid Phosphate	O. W. Cooper & Co., Oxford, Ala.	9.19	2.00	3.74	16	78
1556	Atlantic Acid Phosphate	O. T. Jeter, Boyd Tank, Ala.	11.57	1.68	1.63	19	87
1566	Phosphate	J. P. Darr, Millport, Ala.	12.36	4.42	1.82	25	17
1564	"	Ward & May, Cuba Station, Ala.	11.90	2.62	2.08	21	90
1566	"	J. H. McGaha, Coal Fire, Ala.	9.38	5.30	2.10	22	02
1568	"	J. D. Connell, Brundidge, Ala.	12.13	4.12	1.29	24	37
1572	Acid Phosphate	S. P. Barron, Andalusia, Ala.	9.60	3.70	3.71	19	95
1576	Phosphate	Farmers Alliance, Auburn, Ala.	11.63	2.94	2.09	21	85
1577	"	J. H. Burgess, Beard, Ala.	8.33	2.24	1.64	15	85
1580	"	H. B. Rives, Portland, Ala.	10.17	1.98	3.82	18	22
1581	High Grade English Acid Phosphate No. 2	A. C. Lunni, Pine Apple, Ala.	10.52	2.89	2.56	20	11
1582	Tinsley's Acid Phosphate No. 1	" " "	11.15	4.01	1.60	22	74
1584	Phosphate	E. M. Rice, Auburn, Ala.	6.89	4.37	3.60	16	80

MISCELLANEOUS FERTILIZERS.

St. No.	NAME OF FERTILIZER.	BY WHOM SENT.	Phosphoric Acid.			Nitrog'n	Potash.
			Water Soluble.	Citrate Soluble	Acid Soluble.		
1423	Kainite.....	McMillian & Harrison, Mobile, Alabama					12.96
1436	Cotton Seed Meal.....	East Alabama Fert. Co., Clayton, "			3.34	7.28	1.67
1437	Muriate of Potash.....	" " " "					50.69
1447	Kainite.....	Hammond, Hull & Co., Savannah, Ga					12.44
1453	Muriate of Potash.....	Troy Fertilizer Co., Troy, Alabama					50.24
1454	Concentrated Tankage.....	" " " "			1.20	11.83	
1456	Carib Guano.....	John Quite, Mobile, "		4.02	19.38		
1457	" ".....	" " " "		6.93	12.34		
1484	Swan Island Guano.....	A. Adams, " "		8.50	12.33		
1492	Green Sand.....	Foster M. Kirksey, Eutaw " "			0.028		0.115
1500	Cotton Seed Meal.....	Montgomery Oil Works, Montg'ry, "			3.20	7.28	1.71
1501	C. S. Hull ashes.....	" " " "			6.82		27.20
1507	Tankage.....	A. B. Mayer, Man'f Co., St. Louis, Mo.			4.78	2.52	
1508	Carib Guano.....	W. J. Hudson, Mobile, Alabama		2.67	17.35		
1518	Muriate of Potash.....	East Alabama Fert. Co., Clayton, "					48.87
1526	Natural Phosphate.....	" " " "			1.13		
1530	Cotton Seed Meal.....	Huntsville Fert. Co., Huntsville, "			2.75	4.90	1.29
1542	Swan Island Guano.....	A. Adams, Mobile, " "	0.12	5.79	15.19		
1558	Bone Dust.....	W. G. Robertson, Carrollton, " "			14.76	2.17	
1565	Bat Manure.....	W. S. Wall, Richland Springs, Texas..			3.86	8.05	1.31
1574	Fertilizer.....	J. G. Stewart, Mobile, Alabama.			19.82		
1575	Supposed Phosphate.....	Shelley, Booker & Co., Birmingham, "			0.88		
FERTILIZERS USED ON EXPERIMENT STATION, AUBURN, ALA.							
Nos. 1588--1592	Cotton Seed Meal.....				2.51	4.18	1.73
	Ammonium Sulphate.....					11.71	
	Dissolved Bone Dust.....		10.64	5.47	1.10		
	Edisto Acid Phosphate.....		10.92	4.46	1.33		
	Kainit.....						12.75

Guaranteed Analyses of Commercial Fertilizers, as rendered to Commissioner of Agriculture by Dealers and Manufacturers---Season '89-90.

NAME OF FERTILIZER OR CHEMICAL.	BY WHOM REPORTED. NAME AND ADDRESS.	BY WHOM MANUFACTURED.	WHERE MANUFACTURED.	Weight of Package.	Nitrogen.	PHOSPHORIC ACID.					Commercial Value.
						Water Soluble.	Citrate Soluble	Acid Soluble	Potash.		
Cumberland Bone Sup. Phos. of Lime	Charles Ellis, Savannah, Ga.	Charles Ellis	New York	200	1.50	6	3	1	1.50	20 85	
Elliston Acid Phosphate	do do	do	New York	200		11.75	1.25			19 50	
Ammoniated Guano	Lorentz & Rittler, Baltimore, Md.	Lorentz & Rittler	Baltimore, Md.	200	2	6	2	2	3	22 80	
No. 1 English Acid Phosphate	do do	do	Baltimore, Md.	200		12	1	1		19 50	
Americus Guano	Americus Guano Co., Americus, Ga.	Americus Guano Co.	Americus, Ga.	200	2	7	2	2	1	22 30	
John M. Green's Formula	do do	do	do	200	2	7	2	2	1	22 30	
Americus Dissolved Bone	do do	do	do	200		10	3	2		19 50	
Eddystone Sol. Guano	do do	do	do	200	2	7	2	2	1	22 30	
Magnet Sol. Guano	Davis, Marshall & Co., Mobile, Ala.	Davis, Marshall & Co.	Mobile, Ala.	200	2.50	4	4	1	1	22 75	
Magnet Acid Phosphate	do do	Edisto Phosphate Co.	Charleston, S. C.	200		6	6	1		18 00	
German Kainit	do do	Imported	Germany						10	10 00	
Owl Brand	Davie & Whittle, Petersburg, Va.	Davie & Whittle	Petersburg, Va.	200	1.50	6	2	1	1	18 85	
Owl Brand	do do	do	do	200	1.85	6	3	2	1	25 96	
Webb's Excelsior S.	Jno. C. Webb, Demopolis, Ala.	John C. Webb	Demopolis, Ala.	200	4 41	3 16	2 44	0 25	2 68	27 53	
Webb's Excelsior	do do	do	do		4 96	1 42	5 28	0 84	1 47	32 50	
Standard Fertilizer	Columbus Oil Mills, Columbus, Miss.	Columbus Oil Mills	Columbus, Miss.	100	2.85	6 27	3	1 60	3 11	28 13	
Acid Phosphate	do do	do	do	100		12 52	2 67	2 08		22 78	
Perfection Guano	McMillan & Harrison, Mobile, Ala.	McMillan & Harrison	Mobile, Ala.	200	2	3	5 25	2	1	21 17	
Kainit	do do	Imported	do	200					12 50	12 50	
Acid Phosphate	do do	do	do	200		10	2	0 25		18 00	
Kennesaw High Grade Am.	Kennesaw Guano Co., Atlanta, Ga.	Kennesaw Guano Co.	Atlanta, Ga.	200	2	5	3 50		1 50	22 05	
Kennesaw Am. Dis. Bone	do do	do	do	200	2	5	3 50		1	21 55	
Kennesaw High Grade Acid Phos.	do do	do	do	200		10	3 50			20 25	
Mark Clayton's Choice Am. Dis. Bone	do do	do	do	200	2	5	3 50		1 50	22 05	
Clifton Complete Fertilizer	Clifton Chem. & Phos. Co., Atlanta, Ga.	Clifton Ch. & Phos. Co.	do	200	2	8	2	2	1	23 80	
Clifton acid phosphate	do do	do	do	200		11	2	2		19 50	
Crown guano	Treadwell, Abbott & Co., Atlanta, Ga.	Walton & Whann Co.	Charleston, S. C.	200	1.50	6	3	1	1	20 35	

Guaranteed Analyses of Commercial Fertilizers, as rendered to the Commissioner of Agriculture by Dealers and Manufacturers—Continued.

NAME OF FERTILIZER OR CHEMICAL.	BY WHOM REPORTED.		BY WHOM MANUFACTURED.	WHERE MANUFACTURED.	Weight of Package.	Nitrogen.	PHOSPHORIC ACID.					Commercial Value.
	NAME AND ADDRESS.						Water Soluble.	Citrate Soluble.	Acid Soluble.	Potash.		
Am. dissolved bone.....	Treadwell, Abbott & Co., Atlanta, Ga.	Bowker Fertilizer Co..	Brighton, Mass	200	1.50	6	2	1	1	1	18 85	
Crown acid phosphate	do do	Walton & Whann Co..	Charleston, S. C.	200	...	8	3	1	1	1	17 50	
T. A. & Co's ammoniated dissolved bone	do do	do	do	200	1.75	5	2	2	1.25	18 57		
Complete fertilizer.....	Scholze Bros., Chattanooga, Tenn	Scholze Bros	Chattanooga, T.	200	2	8	1	..	1.50	22 80		
Acid phosphate.....	do do	Walton & Whann Co..	Charleston, S. C.	200	...	10	2	..	..	18 00
Coweta high grade.....	H. C. Fisher, G. M., Newnan, Ga....	Coweta Fertilizer Co..	Newnan, Ga	200	1.85	7	1	1	2	22 71		
Aurora am. phospho.....	do do	do	do	200	1.75	6	50	1.50	1	1.50	20 32	
Georgia State grange fertilizer.	Baldwin Fert. Co., Savannah, Ga....	Baldwin Fertilizer Co..	Port Royal, S. C.	200	1.75	8	2	1.50	2	23 82		
Am. dissolved bone.....	do do	do	do	200	1.75	8	2	1.50	2	23 82		
Bone and potash.....	do do	do	do	200	...	9	2	1.50	4	20 50		
Georgia State grange acid phosphate ..	do do	do	do	200	...	10	2	2	..	18 00		
Bone compound.....	do do	do	do	200	1.75	8	2	1.50	..	21 82		
Am. dissolved bone.....	Jno. Merryman & Co., Baltimore, Md.	Jno. Merryman & Co..	Barren Isl'd, N Y	167	1.65	6	2	2.50	1	19 43		
Georgia Test.....	do do	do	do	167	1.65	6	2	2.50	1	19 43		
High grade acid phosphate.....	do do	do	do	200	...	10	1	1	..	16 50		
Rock City guano.....	National Fert. Co., Nashville, Tenn..	National Fertilizer Co..	Nashville, Tenn.	200	1.65	6	2	1	1	19 43		
Tennessee guano.....	do do	do	do	200	1.65	6	2	1	1	19 43		
Old Hickory guano.....	do do	do	do	200	1.65	6	2	1	1	19 43		
National dissolved bone.....	do do	do	do	200	.83	8	2	1	1	19 24		
Am. dissolved bone.....	do do	do	do	200	.83	8	2	1	..	18 24		
National tobacco fertilizer	do do	do	do	200	2.06	6	2	1	3	23 03		
Nationnl vegetable fertilizer.....	do do	do	do	200	2.50	6	2	1	2	23 75		
Acid phosphate.....	do do	do	do	200	...	10	2	1	..	18 00		
Acid phosphate with potash.	do do	do	do	200	...	10	2	1	2	20 00		
Edisto acidulated rock.....	Edisto Phos. Co., Charleston, S. C	Edisto Phosphate Co..	Charleston, S. C.	200	...	9	3	1.50	..	18 00		
Edisto dissolved bone.....	do do	do	do	200	...	9	3	1.50	..	18 00		
Edisto am. sup. phos.....	do do	do	do	200	1.23	7	2	1.50	..	18 29		

Edisto am. dissolved bone.....	do	do	do	do	200	1.64	7	2	1.50	.....	19	90
Edisto soluble guano.....	do	do	do	do	200	1.64	7	2	1.50	.....	19	90
Edisto am. fertilizer.....	do	do	do	do	200	2.06	7	2	1.50	.....	21	53
Edisto acid phosphate.....	do	do	do	do	200	..	8	2	1.50	.....	15	00
Lister's am. dis. bone phosphate.....	Lister's A. C. Works, Newark, N. J.	Lister's A. C. Works.....	Newark, N. J.	167	1.65	6	2	3	1	19	43	
Standard am. sol. guano.....	Standard G. & Chem. Mfg Co., N. O.	Standard Guano.....	New Orleans, La	200	1.84	4	4	0	50	2	21	18
Stern's am. raw bone sup. phos.....	do	do	do	200	1.84	4	4	1	2	21	18	
Champion farmers choice.....	do	do	do	200	1.84	4	4	0	50	0.67	19	85
Dissolved bone.....	do	do	do	200	..	13	0	50	..	20	25	
Alabama cotton grower.....	do	do	do	200	2.25	4	4	..	..	2	22	77
Gossypium phospho.....	Geo. W. Scott Mfg. Co., Atlanta, Ga.	G. W. Scott Mfg Co.....	Atlanta, Ga.....	200	2	6	3	1	1.50	22	80	
Scott's animal am. guano.....	do	do	do	200	1.56	6	3	1	1	20	93	
Scott's potasso. phospho.....	do	do	do	200	..	7	5	1	2	20	00	
Scott's high grade acid phos.....	do	do	do	200	..	7	50	50	1	19	50	
Bowker's cotton fertilizer.....	Jno. D. Weld, Savannah, Ga.....	Bowker Fertilizer Co.....	Elizabethp rt, N J	200	1.75	7	2	2	1	25	21	57
Nassau guano.....	do	do	do	200	1.75	7	2	2	1	25	21	57
Crown guano.....	do	do	do	200	1.75	7	2	2	1	25	21	57
Bowker's dissolved bone phosphate.....	do	do	do	200	..	9	2	2	1	25	17	75
Nassau dissolved bone phosphate.....	do	do	do	200	..	10	3	2	..	19	50	
Home mixture.....	Columbus Fert. Co, Columbus, Ga.....	Columbus Fertilizer Co	Girard, Ala.....	200	2.25	6	2	2	1.50	22	27	
Soluble bone.....	do	do	do	200	..	10	3	1	..	19	50	
Farmer's friend fertilizer.....	Read Fertilizer Co., New York.....	Read Fertilizer Co.....	New York	200	1.85	6	3	2	1	21	71	
Standard.....	Albany Fertz & F. I. Co., Albany, Ga.....	Albany Ft. Co & F I Co	Albany, Ga.....	200	2.75	6	1.50	1.25	1.60	23	57	
Ammoniated bone.....	Slingluff & Co., Baltimore, Md.....	Slingluff & Co.....	Baltimore, Md..	200	2	6	3	1	2	23	30	
Baltimore dissolved bone.....	do	do	do	200	1.50	7	50	3	1	2	23	60
High grade acid phosphate.....	do	do	do	200	..	11	2	1	..	19	50	
OskaLimne.....	do	do	do	200	..	9	50	3	1	3.50	22	25
Potapasco am. sol. phosphate.....	Potapasco Guano Co., Augusta, Ga.....	Potapasco Guano Co..	do	200	2	6.75	2.25	1.50	1	22	30	
Am. dissolved bone.....	do	do	do	200	1.75	6.75	2.25	1.50	1	21	32	
Potapasco acid phosphate.....	do	do	do	200	..	9	3	1	1	19	00	
Potapasco acid phosphate.....	do	do	do	200	..	10	3	1	..	19	50	
Ashpoo fertilizer.....	Ashpoo Phos. Co., Charleston, S. C.....	Ashpoo Phos. Co.....	Charleston, S. C.	200	1.85	6.25	2.25	2.25	1	20	96	
lutaw fertilizer.....	do	do	do	200	1.85	6.25	2.25	2.25	1	20	96	
Ashpoo acid phosphate.....	do	do	do	200	..	8	50	2	1	15	75	
lutaw acid phosphate.....	do	do	do	200	..	8	50	2	1	15	75	
Gainit.....	do	do	do	200	..	..	..	..	11	11	00	

Guaranteed Analyses of Commercial Fertilizers, as rendered to the Commissioner of Agriculture by Dealers and Manufacturers—Continued.

NAME OF FERTILIZER OR CHEMICAL.	BY WHOM REPORTED.		WHERE MANUFACTURED	Weight of Package.	Nitrogen.	PHOSPHORIC ACID.					Commercial Value
	NAME AND ADDRESS.					BY WHOM MANUFACTURED.	Water Soluble	Citrate Soluble	Acid Soluble	Potash.	
Mobile standard guano.....	W. J. Hudson,	Mobile, Ala.	W. J. Hudson	Mobile, Ala.	200		1.86	4	5	1	1	21 75
Mobile standard acid phosphate.....	do	do	do	do	200	1.75	10	3	1	1	19 50
Goulding's bone compound.....	W. & H. M. Goulding,	Baltimore Md	W. & H. M. Goulding.	Baltimore, Md	200	1.75	7	2	1	1	21 32
Am. dissolved bone.....	N. W. Fertilizing Co.	Chicago, Ill.	N. W. Fertilizer Co	Chicago, Ill	200	1.75	2	50	5.80	.50	19 77
English acid phosphate.....	N. H. Holmes,	Montgomery, Ala.	Imported.	England	200	...	11	2	1	...	19 50
Holmes' formula.....	do	do	N. H. Holmes	Montgomery, Ala	200	2.00	6	2	1	50	20 30
Lvey's formula.....	do	do	do	do	200	2.00	6	2	1	50	20 30
Guano guano.....	do	do	do	do	200	2	6	2	1	1	20 80
Zell's ammoniated bone super-phosphate	The Zell Guano Co.,	Baltimore, Md.	The Zell Guano Co	Baltimore, Md.	200	1.87	6	3		1 25	22 04
Zell's economizer.....	do	do	do	do	200	1.87	6	3		1 25	22 04
Zells calvert guano.....	do	do	do	do	200	1.75	6	2	3	1	19 82
Brown's cotton and corn.....	R. B. Brown Oil Co.,	St. Louis, Mo.	R. B. Brown Oil Co.	St. Louis, Mo	200	2.50	8			2	23 75
Soluble Pacific guano.....	Pacific Guano Co.,	Wood Hall, Mass	Pacific Guano Co	Wood Hall, Mass	200	2.15	7	3	2	1	24 38
Baker standard guano.....	Chemical Co. of Canton,	Baltimore, Md	Chem. Co. of Canton	Baltimore, Md.	200	1.75	5	80	3 20	3 10	22 32
Pure dissolved ammoniated bone.....	do	do	do	do	200	1.75	5	80	3 20	3 10	22 32
Resurgam guano.....	do	do	do	do	200	1.25	4	80	3 2	3 10	18 87
Pure dissolved South Carolina bone.....	do	do	do	do	200	...	9	5	2	...	21 01
Atlantic soluble guano.....	Atlantic Phos. Co.,	Charleston, S. C.	Atlantic Phos Co	Charleston, S. C.	200	1	6	2	1.50	2	17 90
Atlantic acid phosphate.....	do	do	do	do	200	...	10	2	2.50	...	18 00
High grade acid phosphate.....	do	do	do	do	200	...	10	2	2.50	...	18 00
Cherokee dissolved bone.....	do	do	do	do	200	...	9	2	1.50	1	17 50
Atlantic dissolved bone.....	do	do	do	do	200	...	9	2	1.50	1	17 50
Soluble guano.....	Ashley Phos. Co.,	Charleston, S. C.	Ashley Phosphate Co.	do	200	2	4	4	2	1	20 80
Cotton and corn combined.....	do	do	do	do	200	1.75	4	4	2	1	19 82
Small grain specific.....	do	do	do	do	200	1.75	4	4	2	1	19 82
Ammoniated dissolved bone.....	do	do	do	do	200	1	4	4	2	1	16 90
Soluble fish guano.....	do	do	do	do	200	2.50	4	4	1	1	22 75

Acid phosphate.....	do	do	do	do	200	6	4	2	1	16 00				
Dissolved bone.....	do	do	do	do	200	7	5	2	.....	18 00			
Kainit.....	do	do	do	do	20	.....	.....	.....	13	13 00			
Atlantic ammoniated dissolved bone	Pelzer, Rodgers & Co , Charleston, S.C	Atlantic Phos. Co	do	do	200	1	8	2	1.50	1	19 90			
“ dissolved bone.....	do	do	do	do	200	10	2	2.50	.....	18 00			
“ acid phosphate.....	do	do	do	do	200	9	2	1.50	1	17 50				
“ fertilizer.....	do	do	do	do	200	2	6	2	2	2	21 80			
Dissolved bone phosphate So. Car	G. Ober & Sons Co., Baltimore, Md	G. Ober & Sons Co	Baltimore, Md	do	200	9	2	50	1.50	.....	17 25		
Georgia cotton compound	do	do	do	do	200	2	6	75	2	25	1.50	1	23 80	
Soluble ammoniated sup. phos. of lime..	do	do	do	do	200	2	6	75	2.25	1.50	.....	1	23 80
Farmer standard phosphate.....	do	do	do	do	200	1.75	6	75	2.25	1.50	.....	1	22 80
Bono fertilizer.....	Bono Fertilizer Co.,	Bono Fertilizer Co	do	do	20	1.65	7	2	1	50	21 43
Bradley's patent	Bradley Fertilizer Co., Boston, Mass.	Bradley Fertilizer Co.	Boston, Mass	do	200	1.85	6	50	2	50	2	1	21 71	
B. D. Sea Fowl Guano	do	do	do	do	200	1.85	6	50	2	50	2	1	21 71	
Palmeto acid phosphate	do	do	do	do	200	.....	9	3	1	.....	.....	.....	18 00
Carolina Fertilizer	do	do	do	do	200	1.85	6	50	2	50	2	1	21 71	
Each Am. sup. phosphate	do	do	do	do	200	1.65	6	2	2	.....	.....	.....	19 43
Bradley's Am. dissolved bone	do	do	do	do	200	1.65	6	2	2	.....	.....	.....	19 43
Eufaula fertilizer.	Eufaula Oil and Fert. Co. Eufaula, Ala.	Eufaula Oil and Ft. Co	Eufaula, Ala	do	20	1.25	6	50	2	50	1.25	2.50	20 87	
Berkley acid phosphate	Berkeley Phos. Co., Charleston, S. C.	Berkeley Phos Co	Charleston, S. C	do	200	.....	9	1	.....	.....	.....	1.05	16 05
Berkley dissolved bone	do	do	do	do	200	.....	10	50	1.50	.....	.....	.....	18 00
“ soluble guano	do	do	do	do	200	2	06	7	1	1	05	21 08
“ Am. dissolved bone	do	do	do	do	200	1.65	7	1	.....	.....	.....	1.05	19 48
Alabama fertil zer	Ala. Fert. Co., Montgomery, Ala	Alabama Fert Co	Montgomery	do	200	2	50	8	2	10	2	26 75		
Favorite formula fertilizer	do	do	do	do	200	2	50	6	2	8	1	22 75		
Ala. Fertilizer Co acid phosphate.....	do	do	do	do	200	.....	11	2	13	.....	.....	.....	19 50
Kainit.....	do	do	Imported	Imported	200	.....	.....	.....	.....	.....	.....	11	11 00
Muriate Potash	do	do	do	do	200	.....	.....	.....	.....	.....	.....	80	80 00
Sterling guano.....	Clarence Angier, Atlanta, Ga	Ga. Chem. Works	Augusta, Ga	do	200	1	75	6	3	.....	.....	1	21 32
Lockwood Cotton grower	do	do	do	do	200	1.75	6	3	.....	.....	.....	1	21 32
Sterling acid phosphate.....	do	do	do	do	200	.....	9	3	.....	.....	.....	1	19 00
Lockwood acid phosphate.....	do	do	do	do	200	.....	9	3	.....	.....	.....	1	19 00
Lockwood cotton grow r	do	do	do	do	200	1.75	6	75	2	25	1.50	1	22 82	
Sterling guano	do	do	do	do	200	1	75	6	75	2	25	1.50	1	22 82
Lockwood acid phosphate.....	do	do	do	do	200	.....	9	3	1	.....	.....	1	19 00
Sterling acid phosphate.....	do	do	do	do	200	.....	9	3	1	.....	.....	1	19 00

Guaranteed Analyses of Commercial Fertilizers, as rendered to the Commissioner of Agriculture by Dealers and Manufacturers—Continued.

NAME OF FERTILIZER OR CHEMICAL.	BY WHOM REPORTED.		WHERE MANUFACTURED.	Weight of Package.	Nitrogen.	PHOSPHORIC ACID.					Commercial Value.
	NAME AND ADDRESS.					BY WHOM MANUFACTURED.	Water Soluble.	Citrate Soluble.	Acid Soluble.	Potash.	
East Alabama Fertilizer.....	East Ala. Fert. Co., Clayton, Ala. . .	East Ala. Fert. Co	Clayton, Ala. . .	200	1.50	8	1	12	1	2	21 53
L. & W. I. X. L. Am Sup. phosphate	Langston & Woodson, Atlanta, Ga.	Langston & Woodson..	Charleston, S. C.	200	2	7 50	2	50	1	1	23 80
L & W. diss. bone with am. and potash	do do	do	do	200	1.70	7.50	2	50	1	1	22 63
L. & W. high grade acid phos.	do do	do	do	200	....	8 50	3	50	1	....	18 00
Trawick's dissolved bone.....	M. T. Trawick, Opelika, Ala.	M. T. Trawick	Opelika, Ala.	200	....	11	2	2	....	....	19 50
Lee fertilizer.....	do do	Lee Fertilizer Works..	do	200	2.25	8	1	1	....	2	24 27
Farmer's club guano.....	do do	do	do	200	2	8	1	1	....	1.75	23 05
Trawick's dissolved bone.....	do do	do	do	200	....	11	2	2	....	....	19 50
Planter's pride.....	Marietta Guano Co., Atlanta, Ga.	Marietta Guano Co.	Atlanta, Ga.	200	1.50	6	2	2	....	1	18 85
Piedmont acid phosphate.....	do do	do	do	200	....	10	1	....	.50	....	16 50
Ga. State standard acid phosphate.....	Hammond, Hull & Co., Savannah, Ga.	Hammond, Hull & Co.	Savannah, Ga. . .	200	..	10	2	1	....	....	18 00
Crescent bone acid phosphate.....	do do	do	do	200	..	10	2	1	....	....	18 00
Forest City acid phosphate.....	do do	do	do	200	..	10	2	1	....	....	18 00
Ga. State standard dissolved bone phos.	do do	do	do	200	..	10	2	1	....	....	18 00
Port Royal acid phosphate.....	do do	do	do	200	..	10	2	1	....	....	18 00
Port Royal dissolved bone phosphate....	do do	do	do	200	..	10	2	1	....	....	18 00
Oglethorpe acid phosphate.....	do do	do	do	200	..	10	2	1	....	....	18 00
Hardie's cotton boll acid phosphate.	do do	do	do	200	..	10	2	1	....	....	18 00
Oglethorpe dissolved bone phosphate...	do do	do	do	200	..	10	2	1	....	....	18 00
Genuine German Kainit.....	do do	do	do	200	..	....	....	....	....	11	11 00
Ga. State Standard Am. sup. phosphate.	do do	do	do	200	1.65	7	1	1	....	2	20 43
“ “ “ “ “ “ “ “ “ “ “ “ “ “ “ “	do do	do	do	167	1.65	7	1	1	....	2	20 43
Port Royal cotton Fertilizer.....	do do	do	do	200	1.65	7	1	1	....	2	20 43
Oglethorpe Am. dissolved bone....	do do	do	do	200	1.65	7	1	1	....	2	20 43
Forest City dissolved bone.....	do do	do	do	200	1.65	7	1	1	....	2	20 43
Crescent bone fertilizer.....	do do	do	do	200	1.65	7	1	1	....	2	20 43
Farmers am. dissolved bone.....	do do	do	do	200	1.65	7	1	1	....	1	19 43

Alliance am. dissolved bone.....	do	do	do	do	200	1.65	7	1	1	1	19 43
Old Reliable	do	do	do	do	200	1.65	7	1	1		.10 18 53
So. Ca. am. dissolved bone	do	do	do	do	200	1.65	7	1	1		.10 18 53
H. H. & Co. pure animal bone, high grade vegetable fertilizer.....	do	do	do	do	200	5	7	1	1	5	36 50
Eng. cotton boll acid phosphate.....	do	do	do	do	200	...	10	2	1		18 00
M. H. & Co., am. dissolved bone.....	do	do	Georgia Fert. Co	do	200	1.65	7	1	1	1	19 43
M. H. & Co., H.G. acid phosphate.....	do	do	do	do	200	...	10	2	1		15 00
W. O. C.....	Coweta Fertilizer Co, Newnan, Ga	do	Coweta Fert. Co	Newnan, Ga	200	2	8	2	1	2	24 80
W. G. & Co., manipulated guano.....	The Wilcox & Gibbs G. Co. Savan. Ga	do	Wilcox & Gibbs G. Co.	Savannah, Ga	200	2.10	6	2.75	2	2 50	23 82
Excellent Ga. standard guano.....	do	do	do	do	200	1.75	6	2	50	2	20 57
W. G. & Co., sup. phosphate.....	do	do	do	do	200	1.75	6	4	2	2.50	24 32
Pure Eng. acid phosphate.....	do	do	do	do	200	1.75	11	2	1		26 32
High grade acid phosphat'e.....	do	do	do	do	200	...	8	5	1		19 50
Standard home mixture.....	Meridian F. Factory, Meridian, Miss.	do	Meridian Fert. Factory	Meridian, Miss	200	2	6	4	2	1	23 80
English acid phosphate.....	do	do	Imported	England	200	...	10	1	1		16 50
Huntsville fertilizer.....	Huntsville F. & M. Co., Huntsville, Ala	do	Huntsville F. & M. Co	Huntsville, Ala.	200	2 25	6.75	3.25	75	1	24 77
Allen's Truck guano	The Tygert-Allen F. Co, Philadel. Pa.	do	Tygert-Allen Fert. Co.	Philadelphia, Pa	200	8	4	2		2 50	42 70
Empire guano	The Rasin Fert. Co., Baltimore, Md..	do	Rasin Fertilizer Co	Baltimore, Md	200	2	4	5	2	1.75	23 05
Sol. Sea Island Guano	do	do	do	do	200	2	4	5	2	1.75	23 05
So. American guano	do	do	do	do	200	2	4	5	2	1.75	23 05
King Guano	do	do	do	do	200	2	4	5	2	1.75	23 05
Giant guano.....	do	do	do	do	200	2	4	5	2	1.75	23 05
Folmer's guano	Globe Fert. Co, Louisville, Ky	do	Globe Fertilizer Co	Louisville, Ky	200	4	8	2	5	23	00
Boguss phosphate	do	do	do	do	200	1.25	8	2	1	17	87
Tinsley's standard fert.* (see note)	Tinsley Fertilizer Co., Selma, Ala	do	Tinsley Fertilizer Co.	Selma, Ala	200	2	8	2	1	1.50	24 30
Tinsley's standard acid phos.....	do	do	do	do	200	...	11	3	1		21 00
Eddystone soluble guano.....	Jno. M. Green, Atlan'a, Ga	do	Atlanta Guano Co...	Atlanta, Ga	200	2	7	2	2	1	22 30
Atlanta am. sup. phosphate.....	do	do	do	do	200	2	7	2	2	1	22 30
" soluble bone	do	do	do	do	200	...	8	2	2		15 00
Rainbow sol. phosphate.....	do	do	do	do	200	1	8	2	2	1	19 90
Sunny South acid phosphate.....	do	do	do	do	200	...	8	2	2		15 00
Wando soluble guano.....	F. B. Hacker, Charleston, S. C	do	Wando Phosphate Co.	Charleston, S. C.	200	1.65	6.50	2	2	2	19 68
Wando am. dissolved bone.....	do	do	do	do	200	.75	7	3	2	1	18 92
Wando acid phosphate.....	do	do	do	do	200	...	10	1		.50	16 50
Wando dissolved bone.....	do	do	do	do	200	...	10	1		.50	16 50

Guaranteed Analyses of Commercial Fertilizers, as rendered to the Commissioner of Agriculture by Dealers and Manufacturers—Continued.

NAME OF FERTILIZER OR CHEMICAL.	BY WHOM REPORTED. NAME AND ADDRESS.	BY WHOM MANUFACTURED.	WHERE MANUFACTURED.	Weight of Package.	Nitrogen.	PHOSPHORIC ACID.					Commercial Value.
						Water Soluble.	Citrate Soluble.	Acid Soluble.	Potash.		
Vando acid phosphate.....	F. B. Hacker, Charleston, S. C.....	Vando Phosphate Co..	Charleston, S. C.	200	9	1	1	1	1	16 00	
Etiwan guano.....	Etiwan Phos. Co., Charleston, S. C.	Etiwan Phosphate Co.	do	200	1.75	5	2	2	1 25	18 50	
Etiwan am. sup. phosphate.....	do do	do	do	200	1.50	5	2	1	1	17 35	
Etiwan am. dissolved bone.....	do do	do	do	200	.87	7	2	1	1	17 89	
Etiwan am. dissolved bone.....	do do	do	do	200	10	1	1	1	1	16 50	
Etiwan acid phosphate.....	do do	do	do	200	8	3	1	1	1	17 50	
Southern acid phosphate.....	Southern Phos. Co., Atlanta, Ga....	Southern Phos. Co.	Atlanta, Ga	200	10	4	2	1	1	21 00	
Southern am. dissolved bone.....	do do	do	do	200	2	7	1.50	2	1 50	21 55	
Old Dominion guano.....	do do	do	do	200	2.25	8	1 50	2	1 50	24 52	
Patent Pacific guano.....	do do	do	do	200	2	8	1 50	1	1 50	23 75	
Patapsco am. sol. phosphate.....	Ga Chemical Works, Augusta, Ga....	Georgia Chem. Works.	Augusta, Ga	200	2	6	3	1	1	22 30	
“ acid phosphate.....	do do	do	do	200	9	3	1	1	1	19 00	
“ am. dissolved bone.....	do do	do	do	200	1.75	6	3	1	1	21 32	
Mastodon am. sol. phos.....	do do	do	do	200	10	3	1	1	1	19 50	
Georgia Formula.....	do do	do	do	200	2	6	3	3	1	22 30	
Acid phosphate.....	do do	do	do	200	1.75	6	3	3	1	21 32	
“ “.....	do do	do	do	200	9	3	2	1	1	19 00	
“ “.....	do do	do	do	200	10	3	2	1	1	19 50	
Mastodon am. sol. phosphate.....	do do	do	do	200	2	6 75	2 25	1 50	1	22 30	
Georgia Formula.....	do do	do	do	200	2	6	2	2	2 25	22 05	
Plow brand raw bone sup. phosphate...	Walton & Whann Co, Charleston, S.C	Walton & Whann Co.	Charleston, S.C.	200	2	6	2	2	2 25	22 05	
Reliance am. sup. phosphate.....	do do	do	do	200	1 50	5	2	1	1	17 35	
W. & W. Co. am. dissolved bone.....	do do	do	do	200	.87	7	2	1	1	17 89	
Diamond soluble bone.....	do do	do	do	200	10	1	1	1	1	16 50	
X X acid phosphate.....	do do	do	do	200	10	1	1	1	1	16 50	
Eng. acid phos. high grade.....	do do	do	do	200	10	1	1	1	1	16 50	
High grade Eng. acid phosphate.....	do do	do	do	200	11.50	1	1	1	1	18 75	
So. States standard am. bone.....	C. L. Montague & Co., Savannah, Ga..	C. L. Montague & Co.	Savannah, Ga..	200	1 65	6	3	1	1 25	21 18	

State Alliance favorite.....	do	do	do	do	200	.82	7	3	1	1	19 22
Alliance standard.....	Savannah Guano Co., Savannah, Ga.	Savannah Guano Co.	do	do	200	1.65	6	3	1	1.25	21 18
Our own am. bone	do	do	do	do	200	1.65	6	3	1	1.25	21 18
Excelsior am. bone.....	do	do	do	do	200	1.65	6	3	1	1.25	21 18
Diamond cotton food am. bone.....	do	do	do	do	200	1.65	6	3	1	1.25	21 18
Dissolved bone acid phosphate.....	do	do	do	do	200	...	9	4	1	...	19 50
English dissolved bone acid phosphate.....	do	do	do	do	200	...	9	4	1	...	19 50
Standard of Alabama.....	do	do	do	do	200	825	7	3	1	1	19 22
Southern Pacific guano.....	do	do	do	do	200	1	7	3	1	1.25	20 15
Farmer's favorite.....	do	do	do	do	200	825	7	3	1	1	19 22
Acid phosphate.....	Ga. Chemical Works, Augusta, Ga.	Georgia Chem. Works.	Augusta, Ga.	do	200	...	9	3	1	1	19 00
"	do	do	do	do	200	...	10	3	1	...	19 50
Furman's high grade guano.....	Adair Bros. & Co., Atlanta, Ga.	Furman Farm Improvement Co.	Atlanta, Ga.	do	200	2.25	7	50	2	1.50	25 27
Buffalo bone guano.....	do	do	do	do	200	2	7	5	2	50	2
Furman's sol. bone with am and potash.....	do	do	do	do	200	.85	8	3	2	1	20 81
Farish Furman's formula.....	do	do	do	do	200	...	8	3	2	2.50	19 00
Furman's acid phosphate.....	do	do	do	do	200	...	11	2	2	...	19 50
Golden gr in fert liz r.....	do	do	do	do	200	2.25	7	2	2	2	50
Homestead guano.....	do	do	do	do	200	2	7	2	2	...	21 30
Adair's am. dissolved bone.....	do	do	Adair Bros. & Co	do	200	2	8	2	2	1	23 80
Planer's soluble guano.....	do	do	do	do	200	1.85	7	50	2	50	2
Adair's acid phosphate.....	do	do	do	do	200	...	11	2	2	...	19 50
King cotton.....	W. N Reeves, Eufaula, Ala.	Chattahoochee Ft Co.	Eufaula, Ala.	do	200	2.31	4	80	3	48	1 99
The complete cotton fertilizer.....	Commercial Guano Co., Savannah, Ga.	Commercial Guano Co.	Savannah, Ga.	do	200	1.65	7	1	1	1.50	1 75
Pomona guano.....	do	do	do	do	200	1.65	7	1	1	1.75	20 18
Chatham guano.....	do	do	do	do	200	1.65	7	1	1	1.50	20 18
Cherokee am bone.....	do	do	do	do	200	1.65	7	1	1	1.50	19 93
Old time guano.....	do	do	do	do	200	1.65	6	2	1	1.50	1
Am. dissolved bone phos.....	do	do	do	do	200	...	11	1	1	...	18 00
Pomona acid phosphate.....	do	do	do	do	200	...	11	1	1	...	18 00
Chatham acid phosphate.....	do	do	do	do	200	...	11	1	1	...	18 00
Georgia bone compound.....	do	do	do	do	200	...	9	1	1	1	50
Chimax Guano.....	do	do	do	do	200	1.65	6	1	1	1	19 93
Troy Perfect.....	The Troy Fertilizer Co., Troy, Ala.	Troy Fert. Co.	Troy, Ala.	do	200	1.75	7	1	1	...	1
Farmers alliance.....	do	do	do	do	200	1.75	7	1	1	1	19 82
Pike county.....	do	do	do	do	200	1.75	7	1	1	1	19 82

Guaranteed Analyses of Commercial Fertilizers, as rendered to the Commissioner of Agriculture by Dealers and Manufacturers Continued.

NAME OF FERTILIZER OR CHEMICAL.	BY WHOM REPORTED. NAME AND ADDRESS.	BY WHOM MANUFACTURED.	WHERE MANUFACTURED.	Weight of Package.	Nitrogen.	PHOSPHORIC ACID.					Commercial Value.
						Water Soluble.	Citrate Soluble.	Acid Soluble.	Potash.		
The Troy acid phosphate.....	The Troy Fertilizer Co., Troy, Ala...	Troy Fert Co.....	Troy, Ala.....	200	..	10	2	.....	.....	18 00
W. W. & B. high grade ammoniated Sam- son guano.....	Wight, Weslosky & Brown, Albany, Ga	Wight, Weslosky & Brown.....	Albany, Ga...	200	1.31	7	2	.....	2	20 61
Vandiver's high grade acid phosphate..	W. F. Vandiver & Co., Montgom'y, Ala.	Wando Phos. Co.....	Charleston, S. C.	200	..	10	1	50	.....	16 50
Vandiver's am. dissolved bone.....	do do	do	do	200	75	7	3	2	1	18 92	
W. & W. am. dissolved bone.....	do do	Walton & Whann Co..	Wilmington, Del	200	87	7	2	1	1	17 89	
Diamond soluble bone.....	do do	do	do	200	..	10	1	1	.....	16 50
XX acid phosphate.....	do do	do	do	200	..	10	1	1	.....	16 50
Soluble Pacific guano.....	W. J. Pollard, Augusta, Ga.....	Pacific Guano Co.....	Boston, Mass...	200	1 85	6.50	2 50	2	1	21 71	
Alliance high grade acid phosphate.....	Penn & Co., Opelika, Ala.....	Berkley Phosphate Co.	Charleston, S. C.	200	..	10	3	2	.....	19 50
Home fertilizer.....	Boykin, Carmer & Co., Baltimore, Md.	Boykin, Carmer & Co..	Baltimore Md...	167	2.20	9	3	.....	.....	20 58
Home fertilizer chemicals.....	do do	do	do	213	5 75	.....	.....	.....	7	29 42
Stono soluble guano.....	E. H. Frost & Co., Charleston, S. C.	Stono Phos. Works...	Charleston, S. C.	200	2	6	2	2	1	20 80	
Stono Dissolved bones.....	do do	do	do	200	..	10	2	2	.....	18 00
Stono acid phosphate.....	do do	do	do	200	..	8	2	2	1	16 00	
Kainit.....	do do	do	do	200	..	.....	.....	.....	12	12 00
Americus am. bone sup. phosphate.....	Williams & Clark, New York, N. Y....	Williams & Clark Ft. Co	New York, N. Y	200	1.65	6	2	2	1	19 43	
Walton guano.....	Walton Guano Co., Atlanta, Ga...	Walton Guano Co...	Atlanta, Ga....	200	2	7	2	2	1	22 30	
Walton acid phosphate.....	do do	do	do	200	..	10	3	2	.....	19 50

* In Bulletin No. 2, New Series, the commercial value of Tinsley's "Standard" Fertilizer was printed at \$21.30, when it should have been \$24.30, an unintentional error being made against this brand of \$3.00. The percentage of ingredients was correctly stated; the error occurred in computing the commercial value of the ingredients. This statement is made in justice to said brand, which is manufactured by Tinsley Fertilizer Co., Selma, Ala.

For the information of the people of the State, I have thought proper to publish the "Fertilizer Laws," with a list of the fertilizer dealers to whom license have been issued, with date of issue.

I find a great many fertilizer dealers and farmers who are ignorant of the law governing this Department, especially that portion of it referring to the sale of fertilizers, and with the hope that all may be educated as to their duties and rights, is my excuse for publishing the fertilizer laws in full.

The list of licenses is published that all may know who have complied with the law and who have not. I have announced publicly and privately my intention to enforce the law to the letter so long as I remain at the head of this Department, and to successfully carry out this undertaking I invoke the aid of all law-abiding citizens of the State. The name of this Department implies that it was originated especially for the farmers of the State, and I shall undertake to administer it in their interest.

FERTILIZER LAWS.

SECTION 139. *Sale or exchange of commercial fertilizers.*—Commercial fertilizers must not be sold or exchanged without a license from the Commissioner authorizing the person making the sale or exchange to deal therein. All sales or exchanges made without such license are void.

SEC. 140. *License.*—On the payment of a fee of one dollar, the Commissioner must issue license to any person or firm, or corporation or association of persons authorizing the sale or exchange of fertilizers during a season, expiring on the thirtieth day of September of each year.

SEC. 141. *Tags to be supplied; licensee.*—The Commissioner must furnish the licensee on application, tags to be attached to fertilizers sold or exchanged, of the kind and description he is required by subdivision 17 of section 137 to prepare, on the payment to him of fifty cents for a number sufficient to tag a ton of fertilizers. *Before selling or exchanging, or offering to sell or exchange fertilizers, the licensee must attach one of the tags to each bag, barrel or package thereof, and a sale or exchange of fertilizers, not so tagged, is void.*

SEC. 142. *Fertilizers to be submitted to Commissioners.*—Before offering a fertilizer for sale or exchange, the person proposing to sell or exchange must submit to the Commissioner a written or printed statement setting forth—

1. The name and brand under which such fertilizer is to be sold or exchanged, the number of pounds contained in the bag, barrel or package, in which it is to be put upon the market, the name or names of the manufacturers, and the place of manufacturing.

2. A statement setting forth the amount of the named ingredients which they are willing to guarantee such fertilizer to contain. First, nitrogen; second, water soluble phosphoric acid; third, citrate soluble phosphoric acid; fourth, acid soluble phosphoric acid; fifth, potash; and such statements shall be held to constitute a guarantee to the purchaser that every package of such fertilizer contains not less than the amount of each ingredient set forth in the statement, and when such statement sets forth the maximum and minimum of any ingredient, the commercial value shall be estimated upon the minimum alone, but this shall not preclude the party from setting forth any other ingredient which the fertilizer may contain, which, as well as the preceding, shall be embraced in the guarantee.

SEC 143. *Fertilizers and chemicals for manufacturing to be branded.*—All fertilizers or chemicals for manufacturing or composting the same offered for sale, exchange or distribution, must have branded upon or attached to each bag, barrel or package, in such manner as the commissioner may by regulation establish, the true analysis of such fertilizer or chemical as claimed by the manufacturer, showing the percentage of valuable elements or ingredients such fertilizer or chemical contains, and its commercial value, calculated upon the standard of value of the principal ingredients as set forth in section 142, as priced by the commissioner of agriculture at the beginning of each season, and in every case the brand must specifically set forth

the percentage contained in the fertilizer or chemical of the several ingredients specified in section 142 in the terms of that section.

Sec. 144. *Fertilizer; what included in term.*—The term “fertilizer,” or “commercial fertilizer,” as used in this article, does not include common lime, land plaster, cotton seed, cotton seed meal, ashes or common salt not in combination.

Sec. 145. *Chemist of Department.*—The Professor of Chemistry of the Agricultural and Mechanical College is the official chemist of the Department. On the application of the Commissioner he must analyze and certify the analysis of all fertilizers, samples of which are furnished him, and at the request of the Commissioner, if he can without conflict with his duties as professor, must attend conventions of agricultural chemists, make reports of such matters as he may deem of interest to the Department, and render such other services in the line of his profession as the Commissioner may require.

Sec. 146. *Compensation of Chemist.*—The Chemist is entitled to such compensation as the Commissioner may deem reasonable; not exceeding five hundred dollars annually; and also to his necessary traveling expenses, while on duty assigned to him by the Commissioner; payable from the funds of the Department, on the certificate of the Commissioner.

Sec. 147. *Copy of official analysis; evidence.*—The copy of the official analysis of any fertilizer or chemical, under the seal of the Department of Agriculture, shall be admissible as evidence in any of the courts of this State, on the trial of any issue involving the merits of such fertilizer or chemical.

CRIMINAL LAWS.

Sec. 4153. *Dealing in fertilizers without submitting statement to Commissioner.* Any person who manufactures or exchanges, sells, or offers for sale or exchange, any fertilizer without first submitting the statement required by law to the Commissioner of Agriculture, must, on conviction, be fined not more than five hundred dollars for each offense.

Sec. 4154. *Selling fertilizers without attaching proper tags.*—Any person who sells, exchanges or offers for sale or exchange, any bag, package or barrel of fertilizer which has not been tagged as provided by law, must, on conviction, be fined not less than fifty dollars for each offense.

Sec. 4155. *Using more than once, and counterfeiting tags, etc.*—Any person who counterfeits the tag prepared by the Commissioner of Agriculture, or who knowingly uses a counterfeit of such tag, or who uses a second time a genuine tag, or who uses the tag of a former season, must, on conviction, be fined one hundred dollars.

Sec. 4156. *Making false certificate of analysis of fertilizers.* Any chemist, who wilfully makes a false certificate of the analysis, or of the ingredients of any fertilizers intended or offered for sale or exchange, must, on conviction, be imprisoned in the penitentiary for not less than two, nor more than five years.

Sec. 4157. *Dealing in commercial fertilizers without license.*—Any person, who sells or exchanges fertilizers, without having obtained a license from the Commissioner of Agriculture, as provided by law, must, on conviction, be fined not less than one hundred dollars for each offense.

Sec. 4158. *Fraud in manufacture, sale or exchange of fertilizers.*—Any person who commits a fraud in the manufacture, sale or exchange of any fertilizer, or any of the ingredients of a fertilizer, must, on conviction, be fined not less than one hundred dollars for each offense.

Dealers and manufacturers will observe from the reading of the foregoing sections of the Code, that *before they can sell fertilizers in this State, they must—*

1. Procure from the Commissioner of Agriculture a license authorizing them to make the sale or exchange. In all cases the fee of one dollar must accompany the application.

2. Each dealer and manufacturer is required to file in this office his guaranteed analysis of the several brands of fertilizers he proposes to sell or exchange.

3. The same guarantee that is filed in this office must appear upon the sacks, bags or barrels.

LIST OF LICENSES

For Season of 1889-90, With Date of Issue.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

- Dec. 14 Alabama Fertilizer Co., Montgomery, Montgomery.
 24 Alben, J. J. & J. L., Opelika, Lee.
 26 Adkison, D. I. B., Martha, Geneva.
 30 Armstrong, Thos. L., Balkum, Henry.
 30 Arnold, J. H., Liberty, Blount.
- Jan. 8 Askew & Harris, Dothen, Henry.
 8 Allen & Bro., D. G., Lafayette, Chambers.
 10 Andrews & Martin, Clayton, Barbour.
 11 Adams & Pearson, Alexander City, Tallapoosa.
 11 Acree, O. A. C., Newton, Dale.
 15 Akin & Son, J. C., Notasulga, Macon.
 17 Askew & Son, Cusseta, Chambers.
 18 Atkins & Bowman, Heflin, Cleburne.
 21 Auxford & Moseley, Hull, Tuscaloosa.
 22 Allen, Sellers & Co., Montgomery, Montgomery.
 23 Ashmore, J. W., Scottsboro, Jackson.
 28 Agee, W. P., Perdue Hill, Monroe.
 30 Andrews, E. L., Lafayette, Chambers.
- Feb. 5 Appling, Samuel, Fayette C. H., Fayette.
 17 Adair Bros. & Co., Atlanta, Ga.
 17 Allen & Co., R. W., Lafayette, Chambers.
- March 10 Alberson & Clemmonds, High Falls, Geneva.
 17 Ashurst, J. V., Tallassee, Elmore.
- Oct. 1 Berkely Phosphate Co., Charleston, S. C.
 28 Beavers & Marsh, Collinsville, DeKalb.
- Nov. 6 Brantley & Son, F. K., Troy, Pike.
 20 Betts, W. H., Burnt Corn, Conecuh.
 22 Baker, Joe, Baker, Henry.
 23 Boykin, Carmer & Co., Baltimore, Md.
 25 Beard, W. F., Troy, Pike.
- Dec. 3 Bradley, W. E., Abbeville, Henry.
 7 Ballard & Holder, Roanoke, Randolph.
 7 Brown & Oakley, Columbia, Henry.
 7 Bailey, B. W., Wicksburg, Henry.
 9 Boyd, Wm. R., Savannah, Ga.
 11 Beach, H. M., Columbia, Henry.
 30 Baker, E., Frio, Coffee.
- Jan. 30 Bowdon, Samuel, Gordon, Henry.
 1 Bowen, J. L., Five Points, Chambers.
 6 Bjack, W. A., Kennedy, Lamar.
 6 Brannon & Wright, Troy, Pike.
 7 Blackburn & Coggin, Fayette C. H., Fayette.
 8 Burdeshaw & Co., P. L., Dothan, Henry.
 10 Baxley & Falkner, Sterrett, Shelby.
 9 Beeland & Son, J., Greenville, Butler.
 14 Beason, F. R., Gurley, Madison.
 15 Brown & Co., J. A., Kellyton, Coosa.
 18 Baldwin & Co., W. E., Flint, Morgan.
 20 Bynum & Sons, J. E., Oneonta, Blount.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

Jan	23	Ballard, J., Omaha, Randolph.
	24	Breedlove & Co., J. P., Tuskegee, Macon.
	30	Banks, W. H. & N. P., Hurtsboro, Russell.
Feb.	3	Brice & Donekoo, Murphrees Valley, Blount.
	6	Brown & Co., W. D., Gravelle, Conecuh.
	8	Brandon & Russell, Sterling, Cherokee.
	10	Brown, J. A., Berry Station, Fayette.
	10	Burgess, J. A., Edwardsville, Cleburne.
	10	Byars & Son, W. G., Blount Springs, Blount.
	15	Burnett & Bro., J. F., Cedar Bluff, Cherokee.
	17	Borders & Co. A. H., Choccolocco, Calhoun.
	17	Blakeney, L. C., Millport, Lamar.
	21	Brown, W. S., Birmingham, Jefferson.
	25	Brantley & Edmonson, Troy, Pike.
	26	Burns & Wilson, Lincoln, Talladega.
	26	Bloch, Sol. D., Camden, Wilcox.
March	1	Bradley, Philip, Perdue Hill, Monroe.
	3	Bell & Low, Lincoln, Talladega.
	4	Burnett, G. W., Fayette, C. H., Fayette.
	18	Bliss, R. L., Florence, Lauderdale.
	18	Banks, Arnold & Co., Attalla, Etowah.
	20	Brown, A. J., Hillsboro, Lawrence.
	22	Bledsoe, J. W., Three Notch, Bullock.
	26	Brake, J. L., Warrior, Jefferson.
Oct.	1	Columbus Fertilizer Co., Columbus, Ga.
	24	Curtis & Wright, Luverne, Crenshaw.
	28	Chattahoochee Fertilizer Co., Eufaula, Barbour.
Nov.	13	Cheney, J. C., Montgomery, Montgomery.
	15	Crawford, J. W., Lawrenceville, Henry.
	21	Cooke, J. E., Marietta, Walker.
	23	Cleveland, M. L., Randolph, Bibb.
	25	Crim & Borland, Newton, Dale.
	27	Coleman, Walter S., Troy, Pike.
Dec.	9	Chesapeake Guano Co., Baltimore, Md.
	12	Chemical Company of Canton, Baltimore, Md.
	12	Cody, M. & J. M., Columbia, Henry.
	12	Cherry, Robert, Eufaula, Barbour.
	17	Coweta Fertilizer Co., Newnan, Ga.
	27	Casey, W. L., Ozark, Dale.
	28	Cherry & Smith, Opelika, Lee.
Jan.	2	Cassady, J. W., Strickland, Dale.
	3	Carleton, Geo. A., Grove Hill, Clarke.
	14	Crew & Dunnan, Goodwater, Coosa.
	15	Columbus Oil Mills, Columbus, Mississippi.
	18	Carroll, Major, Ozark, Dale.
	20	Crump & Son, J. C., Sand Mountain, DeKalb.
	20	Chambers, J. P. & E. M., Zornville, Henry.
	20	Cooke, Phillips & Walker, Kennedy, Lamar.
	22	Clayton, M. A., Cedar Bluff, Cherokee.
	22	Crew & McElrath, Goodwater, Coosa.
	23	Carlisle & Bro., M. W., La Fayette, Chambers.
	25	Comer & Trapp, Anniston, Calhoun.
	25	Chewacla Lime Works, Chewacla, Lee.
	28	Cox & Barrow, Tuskegee, Macon.
	31	Cameron, J. E., Notasulga, Macon.
Feb.	5	Coons, M. L., Kennedy, Lamar.
	5	Coons, M. L., Millport, Lamar.
	8	Caldwell & Co., J. R., Heflin, Cleburne.
	10	Cooke Bros., Cooke Springs, St. Clair.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

- Feb. 10 Cooke, J. E. & L., Birmingham, Jefferson.
 13 Cooper & Co., O. W., Oxford, Calhoun.
 14 Clark, White & Co., Guin, Marion.
 15 Clayton, G. A., Petrey, Crenshaw.
 21 Connell & Smith, Falkville, Morgan.
 24 Capps, M. V., Abbeville, Henry.
 24 Campbell & Co., A. E., Eunola, Geneva.
 26 Cole, Phillips & Co., Millport, Lamar.
- Mar. 11 Cobb & Poe, Sulligent, Lamar.
 17 Copeland, J. S., Troy, Pike.
 20 Carter & Co., Bradleyton, Crenshaw.
- Nov. 22 Davis, John H., Athens, Limestone.
- Dec. 1 Davis, John T., Jr., Columbia, Henry.
 4 Dowling & Bro., D. Y., Ozark, Dale.
 12 Davis & Son, Wm. F., Marion, Perry.
 16 Dean & Barnes, Dean's Station, Dale.
 30 Dumas & Co., J. T., Arlington, Wilcox.
 31 Duke & Co., R. J., Burnt Corn, Conecuh.
 31 Dunklin & Son, D. G., Greenville, Butler.
- Jan. 3 Dowling, J. W., Ozark, Dale.
 3 Dowling, R. J. & G. P., Ozark, Dale.
 8 Drum & Ezekiel, Greenville, Butler.
 10 Davis, Marshall & Co., Mobile, Mobile.
 10 Davidson Bros., Sulligent, Lamar.
 13 Douglass, Duncan & Robinson, Alexander City, Tallapoosa.
 17 Dake, Alex. G., Clanton, Chilton.
 17 Dawson, G. W., Camp Hill, Tallapoosa.
 17 Dean, W. R., Warrior, Jefferson.
 23 Daughtry & Co., R. M., Echo, Dale.
 24 Dickson & Porter, Evergreen, Butler.
 30 Denson & Cross, Pelham, Shelby.
- Feb. 1 Davis, E. R., Rock Run Station, Cherokee.
 3 Daniel & Co., J. G., Greenville, Butler.
 5 Dawson & Co., L. G., Ware, Elmore.
 6 Dennis, P. C., Cooper Station, Chilton.
 13 Doster, C. S. G., Prattville, Autauga.
 15 Deans, G. B., Calera, Shelby.
 19 Darr, J. P., Millport, Lamar.
 22 Davis, J. F. M. & T. J., Choccolocco, Calhoun.
- Mar. 14 DuBose, J. H., Silas, Choctaw.
 14 Denning & Co., C. P., Evergreen, Conecuh.
 24 Davenport & Co., N. S., Valley Head, DeKalb.
- Oct. 1 Etiwan Phosphate Co., Charleston, S. C.
- Nov. 18 East Alabama Fertilizer Co., Clayton, Barbour.
 25 Eufaula Oil and Fertilizer Co., Eufaula, Barbour.
- Dec. 28 Edmonson & Bro., R. Q., Eufaula, Barbour.
- Jan. 6 Earle & Co., P. H., Birmingham, Jefferson.
 21 Edmonds, Wm., York Station, Sumter.
 28 Ehrman, R., Clanton, Chilton.
 30 Emmons, T. J., Monroeville, Monroe.
 31 Elliott & Young, Leeds, Jefferson.
- Feb. 10 Easterling & Co., W. S., Berry Station, Fayette.
 20 Ethridge, W. R., Peach Bloom, Conecuh.
 22 Eutaw Mercantile Co., Eutaw, Greene.
- Mar. 6 Emmett, L. S., Albertsville, Marshall.
 24 Elliott, A. M., Columbiana, Shelby.
- Nov. 4 Folmar & Sons, Troy, Pike.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

Nov.	23	Folmar & Co , George A., Luverne, Crenshaw.
	29	Frost & Co., E. H., Charleston, S. C.
Dec.	4	Farley, John C., Opelika, Lee.
Jan.	4	Forrester. B. A., Cowarts, Henry.
	4	Foast, J. M., Warrior, Jefferson.
	24	Fulmer, Carlisle & Co., Goodwa'er, Coosa.
	24	French, B. D., Sylacauga, Talladega.
	24	Freeman & Cox, Notasulga, Macon.
	25	Farmer, T. J., Jr., Shorterville, Henry.
	25	Farnham & Co., J. H., Evergreen, Conecuh.
	28	Foster, R. M., Marion, Perry.
	29	Finch & Co., L., Evergreen, Conecuh.
	30	Frohoff, Frank, Hanceville, Blount.
Feb.	1	Formby & Stewart, Spring Garden, Cherokee.
	11	Fleming & Co., Charles P., Vincent, Shelby.
	11	Flinn, R. J., Luverne, Crenshaw.
	20	Fielder, J. B., Loachapoka, Lee.
	26	Fuelner, George, Soapstone, Dallas.
Mar.	1	Farmers Store, Leesburg, Cherokee.
	15	Freeman & Freeman, Walnut Grove, Etowah.
Oct.	23	Goulding, W & H. M., Baltimore, Md.
Nov.	20	Gulledge, F. A., Verbena, Chilton.
	29	Gilder, G. C., Mount Meigs, Montgomery.
Dec.	7	Gilbert, Jno. R., Pinckneyville, Clay.
	11	Griel Bros. & Co., Montgomery, Montgomery.
	11	Goree, L. F., Deatsville, Elmore.
	27	Gibson & Patterson, Tallassee, Elmore.
Jan.	9	Griffin & Co., G. L., Lafayette, Chambers.
	10	Garner, Wm., Ozark, Dale.
	10	Grady & Son, J. D., Stroud, Chambers.
	21	Grant, J. B., Louisville, Barbour.
	23	Greene, Jas. R., Waverly, Lee.
	23	Greene & Sons, R. M., Opelika, Lee.
	25	Gold Hill Alliance Store, Gold Hill, Lee.
	25	Griffith, Asa, Hanceville, Blount.
	29	Gosdin & Co., Goodwater, Coosa.
	30	Griffin & Orr, Oxford, Calhoun.
Feb.	4	Gilmer & Bruister, Butler, Choctaw.
	7	Guin, Perry C., Brockton, Fayette.
	20	Guest, S. W., Seaborn, Etowah.
	27	Gravlee & Co., J. A., Jasper, Walker.
Oct.	1	Hammond, Hull & Co., Savannah, Ga.
Nov.	26	Herring, B. W., Headland, Henry.
	27	Holman, J. C., Ozark, Dale.
	29	Harwell, W. O., Opelika, Lee.
	30	Hooten & Co., Columbia, Henry.
Dec.	10	Henderson Bros. & Co., Troy, Pike.
	12	Hudson, W. J., Mobile, Mobile.
	18	Holmes, N. H., Montgomery, Montgomery.
	19	Howle Bros., Edwardsville, Cleburne.
	19	Hunnicut & Son, W. R., Heflin, Cleburne.
Dec.	24	Henderson, L. & W. J., Troy, Pike.
	27	Hobbie & Teague, Montgomery, Montgomery.
	30	Hutchinson, J. N., Salem, Lee.
	30	Herzberg, H., Gadsden, Etowah.
Jan.	3	Hill, Noles, Jones & Co., Roanoke, Randolph.
	8	Henderson, J. E. & J. C., Ozark, Dale.
	10	Hirsch Bros., Seale, Russell.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

- Jan. 13 Holley, F. M., Lawrenceville, Henry.
 15 Haynie & Co., W. H. Loachapoka, Lee.
 15 Henderson, J. M. & Fox, Troy, Pike.
 18 Hodge & Co., H. P., Lafayette, Chambers.
 18 Hooper & Nolen, New Site, Tallapoosa.
 18 Hooper, Jno. F., New Site, Trilapoosa.
 20 Hooper & Co., C. W., Selma, Dallas.
 21 Holifield & Co., J. A., Auburn, Lee.
 21 Hoffman, W. & L*, Waverly, Lee.
 22 Heard, Geo. P., Georgiana, Butler.
 23 Hood, W. T., Oneonta, Blount.
 23 Hood, W. T., Murphree's Valley, Blount.
 28 Hodo, A. P., Carrollton, Pickens.
 29 Hood, David, Wynnville, Blount.
 31 Hill, Bell & Cheney, Anniston, Calhoun.
- Feb. 1 Hubbard & Hall, Sylacauga, Talladega.
 4 Harris, W. H., Troy, Pike.
 5 Henderson & Bro., Fullerton, Cherokee.
 5 Harkins & Bankhead, Fayette C. H., Fayette.
 6 Hansard, M. H., Mumford, Talladega.
 7 Henry & Co., Sam, Gadsden, Etowah.
 7 Huntsville F. & M. Co., Huntsville, Madison.
 7 Holloway & Gilchrist, Geneva, Geneva.
 7 Head, T. L., China Grove, Pike.
 10 Haynes & Co., D. P., Oxford, Calhoun.
 10 Hooper & Co., C. S., Blount Springs, Blount.
 10 Hamilton, Wm., Edwardsville, Cleburne.
 12 Hoge, Joseph, Portersville, DeKalb.
 12 Hamilton Bros., LaPlace, Macon.
 14 Henderson, T. J., Mountain Creek, Chilton.
 19 Humber, L. P., Fayette C. H., Fayette.
 21 Howard & Lamar, Tuskegee, Macon.
 26 Hardy, Jr., Miles, Soapstone, Dallas.
- March 10 Harrell & Post, Blount Springs, Blount.
 11 Henley, T. S., Townley, Walker.
 14 Hodges & Cox, Steele's Depot, St. Clair.
 20 Hughes, R. F., Piedmont, Calhoun.
 25 Hartsell, Bros. & Co., Hartsells, Morgan.
- April 2 Hixon Bros., Claiborne, Monroe.
 7 Hicks & Co., W. W., Dadeville, Tallapoosa.
 8 Hanchey, W. E., Troy, Pike.
 10 Haley, C. L., Ark, Winston.
- Feb. 3 Ivey, J. W., Petrey, Crenshaw.
- April 10 Ingle & Long, Ark, Winston.
- Nov. 11 Johnson, Jr., T. M., Augusta, Ga.
- Dec. 4 Johnson, J. J., Geneva, Geneva.
 6 Jones & Co., Newton, Dale.
- Jan. 7 Jordan & Son, Midway, Bullock.
 8 Jackson & Mehaffey, Columbus, Miss.
 13 Jackson & Co., Talladega, Talladega.
- Feb. 7 Jennings, Ben., Seale, Russell.
 10 Julian, G. W., Berry Station, Fayette.
- March 3 Jordan, Manning & Co., Guntersville, Marshall.
 5 Johnston, J. W., Columbiana, Shelby.
 13 Jones, H. A., Townley, Walker.
- Nov. 27 Kelly & Davis, Newton, Dale.
- Dec. 9 Knox, C. J., Troy, Pike.

DATE OF ISSUE, POST-OFFICE, AND COUNTY,

- Dec. 27 Klaus & Co., J., Huntsville, Madison.
 30 Kennon & Bro., Salem, Lee.
 30 Kelly, G. W., Newton, Dale.
- Jan. 4 King, Claude, Leighton, Colbert.
 10 Kennesaw Guano Co., Atlanta, Ga.
 17 Kingry & Co., Gordon, Henry.
 20 Koopman & Gerdes, Cullman, Cullman.
 23 Kirkpatrick & Co., Howell's X Roads, Cherokee.
 23 Kirkpatrick & Co., James D., Kirk's Grove, Cherokee.
 29 Keeble Co., H. C., Selma, Dallas.
 29 Karter, J. H., Cullman, Cullman.
 30 Keener, J. P., Keener, Etowah.
 31 Killough, W. M., Mount Pinson, Jefferson.
- Feb. 7 Kendrick & Co., A. T., Luverne, Crenshaw.
 14 Killian & Burt, Brandon, DeKalb.
 17 Kirk & Collins, Guin, Marion.
- March 3 Kevell, George, Montevallo, Shelby.
 6 King & Co., F. R., Leighton, Colbert.
 27 Knobles & Cragin, State Line, Miss., Washington.
 31 Keith, W. J., Geneva, Geneva.
- Oct. 1 Lowery, A. M., Canoe, Escambia.
- Nov. 11 Loeb, Simon, Augusta, Ga.
 27 Lockard, A. T., Troy, Pike.
 29 Little, Wilkinson & Co., Mobile, Mobile.
- Dec. 1 Lewis, D. L. & J. A., Sycamore, Talladega.
 14 Lull & Lancaster, Wetumpka, Elmore.
 24 Long, N. W. E., Hurtsboro, Russell.
- Jan. 2 Long & Co., Granger, Henry.
 6 Lorentz & Rittler, Baltimore, Md.
 8 Lehman, A., Greenville, Butler.
 11 Lewis & Co., D. L., Talladega, Talladega.
 11 Lann & Carter, Aberdeen, Miss.
 13 Lovejoy & Co., A. B., Sylacauga, Talladega.
 21 Lawrence, R., Cedar Bluff, Cherokee.
 25 Lemay, S. I., Hartselle, Morgan.
- Feb. 3 Little, C. E., Auburn, Lee.
 7 Lusk, T. B., Guntersville, Marshall.
 7 Lazenby, Reynolds & Co., Forest Home, Butler.
 10 Lantzmaster, J. P., Birmingham, Jefferson.
 15 Landerdale & Crew, Goodwater, Coosa.
 20 Lee & Co., Robert A., Greenville, Butler.
 24 Little & Co., F. M., Littleton, Etowah.
 25 Leslie, George, Gordon, Henry.
 28 Lawson & Sellers, Bryan Station, Jefferson.
- March 1 Lowery & Bro., J. M., Perdue Hill, Monroe.
 15 Latimer, S. F., Geneva, Geneva.
 15 Laney, H. N., Eden, St. Clair.
- April 7 Eden, I. R. W., Eden, St. Clair.
- Nov. 13 Montague & Co., Savannah, Ga.
- Dec. 12 Manley, Handley & Co., Roanoke, Randolph.
 14 Marks & Gayle, Montgomery, Montgomery.
 17 Mahan, W. H., Randolph, Bibb.
 24 Manasses, J., Clayton, Barbour.
 27 Mayfield, Pittman & Co., Roanoke, Randolph.
 31 Martin, Murdock, Clio, Barbour.
- Jan. 1 Miles, T. B., Union Springs, Bullock.
 2 Maas & Schwarz, Selma, Dallas.
 2 Moody & Co., W. S., Dothen, Henry.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

- Jan. 8 Malone & Collins, Geneva, Geneva.
 18 Merryman & Co., John, Baltimore, Md.
 22 Meadors, T. A., Kempville, Monroe.
 23 Morris, J. C., Day's Gap, Walker.
 23 Maxwell & Groggins, Alexander City, Tallapoosa.
 28 Moreman, J. M., Waverly, Lee.
 30 Martin, T. J., Harpersville, Shelby.
 31 Mathewson & Co., J. O., Augusta, Ga.
 31 Melton & Co., Pine Apple, Wilcox.
- Feb. 10 Marietta Guano Co., Atlanta, Ga.
 11 Miller, R. H., Castleberry, Conecuh.
 12 Milner & Hill, Columbiana, Shelby.
 15 Mills & Pouncey, Clayhatchie, Dale.
 20 Moore & King, Fayette C. H., Fayette.
 21 Morris & Bro., D. W., Chepultepec, Blount.
 25 Mayes, R. L., Guerryton, Bullock.
- Mar. 10 Martin, W. R., Womack Hill, Choctaw.
- April 5 Mills, J. B., Shorterville, Henry.
- Oct. 1 McMillan & Harrison, Mobile, Mobile.
- Nov. 11 McGriff & Oakley, Columbia, Henry.
- Dec. 2 McIver, G. Walter, Charleston, S. C.
 5 McGriff & Sanders, Columbia, Henry.
 11 McRae & Shaw, Clio, Barbour.
 17 McRae, John, L., Louisville, Barbour.
- Jan. 6 McMillan & Co., J. B., Talladega, Talladega.
 6 McCollum & Whitley, Winfield, Marion.
 10 McKenzie & Ware, Goodwater, Coosa.
 11 McGehee, Driver & Co., La Fayette, Chambers.
 15 McClesky Bros., Snead, Blount.
 15 McDonald & Co., F. C., Luverne, Crenshaw.
 22 McGhees & Co., Rome, Ga.
 24 McBrown Bros. & Co., Portersville, DeKalb.
 25 McGiffert, David, Knoxville, Greene.
 28 McCleskey, J. H., Attalla, Etowah.
 29 McLendon, E. W., Jernegan, Russell.
- Feb. 3 McCravey, Timberlake & Co., Huntsville, Madison.
 10 McLendon & Co., A. R., Springville, St. Clair.
 11 McElhaney, F. G., Auburn, Lee.
 11 McNutt, M. W., Brandon, DeKalb.
 24 McCary & Cothran, Alexis, Cherokee.
- March 3 McIntosh, W. C., Dadeville, Tallapoosa.
- Oct. 1 Northwestern Fertilizer Co., Chicago, Ill.
- Nov. 21 Norwood & Hattimer, Ft. Deposit, Lowndes.
- Dec. 4 Norman Bros., Ramer, Montgomery.
- Jan. 10 Neece, M. B., Huntsville, Madison.
 16 Noell, R. H., Heflin, Cleburne.
 22 Newton & Son, C. A., Belleville, Conecuh.
 31 Northcutt, Loden & Co., Winfield, Marion.
- Feb. 3 Nathan & Co., L. W., Montgomery, Montgomery.
 27 Nuzum, E. B., Tuscaloosa, Tuscaloosa.
- Mar. 22 Nix & Co., Deatsville, Elmore.
- Jan. 30 Owens, B. W., Blaine, Cherokee.
- Feb. 15 Oliver Bros. & Perry, Dadeville, Tallapoosa.
- Mar. 22 Ogletree & Jackson, Eastaboga, Talladega.
- Nov. 6 Pollard, W. J., Augusta, Ga.
 26 Purcell, H., Columbia, Henry.
 27 Poyner Bros., Newton, Dale.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

Dec.	3	Ponder, B. F., Opelika, Lee.
	17	Penn & Co., Opelika, Lee.
	31	Phillips, N. R., Clio, Barbour.
Jan.	1	Pugh, Stone & Co., Dadeville, Tallapoosa.
	8	Preer & Butler, Opelika, Lee.
Jan.	9	Parker, Cowles & Co., Alexander City, Tallapoosa.
	13	Polk, M. S., Alexander City, Tallapoosa.
	14	Porter & King, Town Creek, Lawrence.
	15	Preston, D. B., Opelika, Lee.
	15	Parker, H. C., Georgiana, Butler.
	16	Pearce & Co., J., Guin, Marion.
	17	Porter, Geo. C., Gordon, Henry.
	24	Pickens, J. M., Cullman, Cullman.
	28	Pridgen & Burk, Waverly, Lee.
	29	Prescott, C. M., Roanoke, Randolph.
Feb.	7	Payne, W. H., Dadeville, Tallapoosa.
	10	Pogue Bros, Dadeville, Tallapoosa.
	12	Pippin, J. W., Ozark, Dale.
	13	Phillips, D. T., Elkmont, Limestone.
	14	Perkins, W. W., Jr., Springville, St. Clair.
	20	Perry, Jno. O., Cane, Fayette.
	25	Pope, J. F., Wilsonville, Shelby.
March	5	Pettit & Son, J. D., Walnut Grove, Etowah.
	5	Phillips, A. J., Walnut Grove, Etowah.
	7	Porter, Martin & Co., Jacksonville, Calhoun.
	22	Prim & Kimball, Jackson, Clarke.
April	8	Phillips, G. W., Wynnville, Blount.
	16	Patton, W. H., Knoxville, Greene.
Nov.	9	Rainer Bros., Troy, Pike.
Dec.	13	Robertson, Taylor & Williams, Charleston, S. C.
	20	Ruffin & Son, J. L., Helena, Shelby.
	24	Ross & Henderson, Troy, Pike.
Jan.	6	Riley & Son, G. W., Echo, Dale.
	7	Roberts, Frank S., Mobile, Mobile.
	16	Riser, A. V., Alpine, Talladega.
	22	Rumph & Hixon, Perote, Bullock.
	24	Robinson, B. F., Jemison, Chilton.
	28	Rome Oil Mills & Fertilizer Co., Rome, Ga.
	28	Roberts & Webb, Pleasant Gap, Cherokee.
	29	Reynolds, F. L., Geneva, Geneva.
	29	Rhoy, J. C., Bangor, Blount.
	29	Roberts, Locklin & Co., Perdue Hill, Monroe.
	31	Roberts, G. W., Collinsville, DeKalb.
Feb.	5	Russell, E. J., Athens, Limestone.
	5	Raspberry, B. T., Strasburg, Chilton.
	10	Robinson, W. C., Coffeetown, Clarke.
	13	Robertson, W. G., Winfield, Marion.
	15	Roberts, T. A., Carrollton, Pickens.
	21	Raynes, L. W., Farill, Cherokee.
	24	Ray, Miller & Co., Thadeus, Tallapoosa.
March	1	Robertson, F. M., Fayette C. H., Fayette.
	5	Reavis & Son, B. W., Walnut Grove, Etowah.
	5	Rice, Carter H., New Market, Madison.
	7	Rowan, Dean & Co., Jacksonville Calhoun.
	13	Roberson & Jones, Crispwell, St. Clair.
	18	Riley & Levy, Strickland, Dale.
April	3	Reynolds, H. C. & W. B., Montevallo, Shelby.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

Oct.	1	Scott & Co., Geo. W., Atlanta, Ga.
	2	Simmons, M. R., Union Springs, Bullock.
	28	Slingluff & Co., Baltimore, Md.
Nov.	1	Skelton, R. S., Scottsboro, Jackson.
	13	Savannah Guano Co., Savannah, Ga.
	14	Steiner Bros. & Co., Greenville, Butler.
	14	Steiner & Sons, Jos., Greenville, Butler.
	25	Sanders, J. G., Sanders, Geneva.
Dec.	12	Smith & Meadows, Opelika, Lee.
	27	Schiffman & Co., S., Huntsville, Madison.
Jan.	8	Stephens, B. F., Louisville, Barbour.
	9	Sowell, Ellis & Co., Monroeville, Monroe.
	13	Schuessler & Co., Roanoke, Randolph.
	13	Smothers, Minor C., Kennedy, Lamar.
	13	Schuessler Bros., Lafayette, Chambers.
	13	Simpson, C. M., Brompton, St. Clair.
	15	Snead, J. H., Snead, Blount.
	15	Sowell, Ellis & Co., Repton, Conecuh.
	16	Steiner & Lobman, Pine Apple, Wilcox.
	16	Steinhart, A., Greenville, Butler.
	16	Sherrer, J. S., Notasulga, Macon.
	17	Street, Merit, Bluff Springs, Clay.
	20	Selman, J. B., Kellyton, Coosa.
	20	Sorrell & Hickman, Sylacauga, Talladega.
	20	Steiner & Frank, Dadeville, Tallapoosa.
	21	Sampey, W. L., Clanton, Chilton.
	22	Sellars & Co., J. A., Inverness, Bullock.
	22	Stewart, Burnett & Co., Spring Garden, Cherokee.
	24	Story, A. J., Columbus, Miss.
	25	Smith, Jasper, Guntersville, Marshall.
	30	Smith, Bros. & Co., Heflin, Cleburne.
	30	Stowers, W. F., Keener, Etowah.
	30	Savage & Co., L. W., Evergreen, Conecuh.
Feb.	3	Slone Bros., Lebanon, DeKalb.
	5	Snead, Jas. E., Wynnville, Blount.
	10	Sturdivant Bros., Dadeville, Tallapoosa.
	10	Sladghill, Jno. T., Fredonia, Chambers.
	17	Shiery, Reuben, Guin, Marion.
	19	Simpson & Co., C., Goodwater, Coosa.
	19	Smith, E. S., Argo, Jefferson.
	22	Scarborough & Milligan, Choccolocco, Calhoun.
	24	Segrest, J. R., Thaddeus, Tallapoosa.
	24	Stone & Co., J. A., Alexis, Cherokee.
	25	Sims, Jno. M., Dunham, Butler.
March	5	Smith & Bynum, Walnut Grove, Etowah.
	6	Smith Bros., Sylacauga, Talladega.
	12	Savage, H. J., Walker Springs, Clarke.
	13	Smith, Jno. F., Oxford, Calhoun.
	17	Smith & Co., F. C., Georgiana, Butler.
	20	Sistrunk & Jordan, Tallassee, Elmore.
Oct.	1	Tinsley Fertilizer Co., Selma, Dallas.
Nov.	23	Turner & Rentz, Camden, Wilcox.
	30	Trawick, M. T., Opelika, Lee.
Dec.	17	Torbert & Co., C. C., Society Hill, Macon.
	30	Tillis & O'Neal, Geneva, Geneva.
Jan.	6	Terry & Payne, New Market, Madison.
	8	Thompson, Jno. T., Huntsville, Madison.
	13	Tuttle, A. G., Shorter's Depot, Macon.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

Feb.	8	Talley, Dyer N., Trussville, Jefferson.
	10	Thompson & Son, W. P., Tuskegee, Macon.
	12	Tucker, Brock & Co., Lafayette, Chambers.
	18	Thomasson Bros., Fairfield, Covington.
	22	Tolland & Norris, Columbiana, Shelby.
March	5	Turner, P. C., Walnut Grove, Etowah.
Oct.	1	Vandiver & Co., W. F., Montgomery, Montgomery.
Jan.	17	Vinson, U. C., Georgiana, Butler.
Feb.	22	Vaughn & Co., A. L., Cuba Station, Sumter.
Mch.	24	Vansandt & Vansandt, Aurora, Etowah.
Oct.	1	Walton & Whann Co., Charleston, S. C.
	1	Waller & Co., N., Selma, Dallas.
	9	Webb, John C., Demopolis, Marengo.
	19	Winkler, A. G., Greenville, Butler.
Nov.	15	Weld, Jno. D., Savannah, Ga.
Dec.	1	Whiddon, W. W., Dothen, Henry.
	2	Walker, Clarence, T., Savannah, Ga.
	5	Weedon & Dent, Eufaula, Barbour.
	12	Williams, R. G., Opelika, Lee.
	14	Williamson, Thomas F., Opelika, Lee.
	21	White & Awbrey, Roanoke, Randolph.
	26	Wilcox & Gibbs Guano Co., Savannah, Ga.
	26	Wood, R., Childersburg, Talladega.
	26	Willis, J. J. S., Mount Andrew, Barbour.
	30	Wood & Co., J. P., Talladega, Talladega.
	31	Wade & Co., A. C., Calera, Shelby.
Jan.	3	Williams, R. S., Wetumpka, Elmore.
	6	Webster & Jones, Winfield, Marion.
	7	Weathers, J. D., Tuscaloosa, Tuscaloosa.
	7	Waters & Russell, Alexander City, Tallapoosa.
	8	Walker, J. M., Plevna, Madison.
	8	Weil Bros., Opelika, Lee.
	11	Walker, Teague & Co., Oxford, Calhoun.
	11	Warnock & Son, R. N., Oxford, Calhoun.
	13	Windham, A. B., Georgiana, Butler.
	17	Woolf, J. P., Piedmont, Calhoun.
	21	Whaley & Buckley, Attalla, Etowah.
	22	Walden, D., Trinity, Morgan.
	23	Walker, W. W., Montgomery, Montgomery.
	23	Williams, W. C., Millport, Lamar.
	23	Wilson & Bro., W. M., Clanton, Chilton.
	28	Wiggins, Sr., W. S., Monroeville, Monroe.
	28	Wiggins & Son, L. R., Monroeville, Monroe.
	30	Wright, A. R., Farill, Cherokee.
Feb.	3	Watkins, John P., Burnt Corn, Conecuh.
	3	Wharton & Co., A. U. R., Summit, Blount.
	7	Webb, E. J., Spring Garden, Cherokee.
	8	Whitman & Son, J. P., Guntersville, Marshall.
	13	Weir & Co., S. E., Kennedy, Lamar.
	18	Ward & May, Cuba Station, Sumter.
	18	Ward & McGowen, Cuba Station, Sumter.
	19	Winfrey, W. N., Woodland Mills, Morgan.
	19	Weldon & Co., Weldon, Shelby.
	25	Watkins & Co., F., Opelika, Lee.
Mar.	13	Watson, A. G., Cropwell, St. Clair.
	17	Wise, G. W. & J. A., Madison, Madison.
	20	Wells, K., Verbena, Chilton.

DATE OF ISSUE, POST-OFFICE, AND COUNTY.

Mar. 24 Woodall, A. W., Springville, St. Clair.
 28 Wimberly, H. T., Greenville, Butler.
 April 12 Waite & Co., D. W , Easonville, St. Clair.
 Dec. 30 Yeatman & Andrews, Millport, Lamar.
 Feb. 16 Yarbrough, John, Ashville, St. Clair.
 12 Young, R., Wilson, Escambia.
 20 Yeatman, J. D., Kennedy, Lamar.
 March 3 Yates, T. C., Whitney, St. Clair.
 March 7 Zarn, D. H., Zarnville, Henry.

DEPARTMENT OF AGRICULTURE,
MONTGOMERY, ALA., March 31, 1890.

The attention of farmers and others is called to the following rules adopted by the Commissioner of Agriculture in obedience to Section 137, Subdivision 19, of the Fertilizer Laws, for taking samples :

RULE 1.—All samples must be drawn in the presence of both buyer and seller, or their authorized agents.

RULE 2.—Take a small portion from several sacks or barrels, mix thoroughly and then place in two common quinine bottles, seal tight. Place the signature of both buyer and seller or their authorized agents, with the name of the goods, from whom purchased, and the guaranteed analysis as found on the sacks or barrels, with the date on the bottles; attach one of the tags to the bottle. The farmer will keep one, the merchant the other.

RULE 3.—If the farmer has cause to believe that the goods are not as represented in the guaranteed analysis, let him send the sample kept by him to this Department and the Commissioner will forthwith order the Chemist to analyze it and return the analysis to the sender as early as possible. If the merchant believes that the sample analyzed for the farmer does not correctly represent the goods, then he will send his sample and it will be analyzed in like manner as the first. *These analyses are free to all citizens of the State.*

RULE 4.—How to send samples. Send by express, prepaid, when practical. When there is no express office convenient, place the bottle in a tin can securely packed around with some substance to prevent breakage, and send by mail.

RULE 5.—Parties acting for others in drawing samples must present certificate of appointment, which certificate must accompany the sample when sent to the Department.

Where an alliance, or club, purchases a car load, or other lot of fertilizers, one sample, representative of the whole, should be carefully drawn, before the fertilizer is distributed to individuals, and forwarded to the Commissioner for analysis by the State Chemist.