1894

Report of results for 1893 at Calhoun, La.

Jordan G. Lee

SECOND SERIES,

No. 29.

BULLETIN

OF THE

NORTH LOUISIANA EXPERIMENT STATION.

WM. C. STUBBS, PH. D., DIRECTOR.

REPORT OF RESULTS FOR 1893

AT

CALHOUN, LA.,

BY

J. G. LEE, Assistant Director.

ISSUED BY THE STATE BUREAU OF AGRICULTURE.
H. C. NEWSOM, COMMISSIONER.

BATON ROUGE, LA.
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1894.

LOUISIANA STATE UNIVERSITY AND A. & M. COLLEGE.

BUREAU OF AGRICULTURE.

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The Bulletins and Reports will be sent free of charge to all farmers, by applying to Commissioner of Agriculture, Baton Rouge, La.

NORTH LOUISIANA EXPERIMENT STATION NO. 3,
Calhoun, La. December, 1893.

To W. C. Stubbs, Ph. D., Director:

DEAR SIR: I hand you herewith annual report of the results of all crops not previously published in Bulletins Nos. 25 and 27 on tobacco, fruits, vegetables, etc.

Respectfully,
J. G. LEE, B. S.,
Assistant Director.

LOUISIANA STATE UNIVERSITY AND A. AND M. COLLEGE,
OFFICE OF EXPERIMENT STATIONS,
Baton Rouge, La., January, 1894.

Hon. H. C. Newsom, Commissioner of Agriculture, Baton Rouge, La.:

DEAR SIR—I hand you herewith report of the North Louisiana Station, at Calhoun, and ask that it be published as Bulletin No. 29.

Respectfully submitted,
WM. C. STUBBS,
Director.

REPORT.

REVIEW OF THE YEAR.

Another cold, wet, spring, continued heavy rains during the early growing season, followed by a very dry summer and fall, made the year, in this section, disastrous and most unsatisfactory, not only for experiment work, but also for general farming. The total rainfall for April, May and June was 21.93 inches, while for July, August, September and October it was only 6 inches, for the four months. The rainfall for the year was 43.21, showing a decreased annual rainfall of 12 to 15 inches. (See annual weather summary.)

Experiments with fertilizers, however, carry with them strong and emphatic truths, and the information they furnish, it is hoped, will profit farmers of the hill sections of Louisiana. The variety tests have been fair for all—a "Survival of the fittest," and are known by their results.

The North Louisiana Agricultural Society continues to hold its monthly meetings here in Agricultural Hall, which, from early spring to late fall, are largely and enthusiastically attended.

The society is regarded as a valuable adjunct to the station. Farmers, assembling monthly, meeting in social intercourse, interchanging practical and progressive ideas about their business, inspecting stock, garden, orchard, trucks, noting experiments in fertilizers, varieties of crops, grasses, grains, clovers, etc., and receiving information from all, cannot be otherwise than widely and materially benefited.

The Agricultural Camp Meeting and Fair, held by the society the past summer, was an advanced step towards agricul

tural development. The meeting was largely attended. Able scientific papers were read and discussed and splendid displays of live stock and poultry and of the ladies' housework made. The presence of the Governor of the State, Murphy J. Foster, lent dignity to the occasion. His kindly words of advice and encouragement and his expressed interest in agriculture cannot but bring good results to the State.

The occasion will not be forgotten as one of great pleasure and large profit in things agricultural. Therefore, the station earnestly trusts that the society, encouraged by the splendid beginning of last August, will go forward with the enterprise that promises so much towards agricultural progress and development.

LIVE STOCK.

CATTLE.

The Holstein, Jersey, Guernsey and Devon breed of cattle, previously described, are retained at the station. The published records of the Holstein cow, Rubina and the Jersey, Beautiful Princess are held. The Guernsey cow, Thornless, made a record of 3.24 gallons of milk and 1.7 lbs. of butter per day.

The Devon cow, Red Rose Fair, has not been tested. The Jersey heifer "Lizzie Stubbs," mentioned in last report, and calf were sold to Dr. A. H. Gladden, Homer, La., for $125.00. The station now has for sale one Jersey heifer, "Julia," and one pair of Guernseys, "Prince Rupert" and "Columbia." From these breeds of cattle farmers may choose the breeds to suit their purpose and fancy. The Jersey and Guernsey represent the best dairy or butter breeds, while the Holstein and Devon are the best representatives of milk and general purpose breeds.

SHEEP AND HOGS.

The same breeds are kept, viz: Southdown, Shropshire and Merino, sheep; and the Essex, Berkshire and Red Jersey, hogs.

The Southdown and Shropshire combine wool and mutton,

are about equally prized here. The former is a little better for mutton than the latter, while the latter produces slightly more wool. The Merino is emphatically a wool producing sheep. the bucks often "shearing" 20 to 25 pounds. At this station, however, they are slow and rather uncertain breeders. The station feels that a combination wool and mutton sheep is the best sheep for this section, and recommends first a cross of Merino on native sheep, until all naked places on natives are clothed with wool; second, a cross then on Southdown or Shropshire for mutton qualities.

The Essex continues to be the most popular hog with the farmers of North Louisiana. They are the "lot hog" of all, and are especially suited for small family purposes. But little food is required to keep them in good condition, generally what they pick up about the yard and lots sufficing. They are, however. slow breeders.

The popularity of the Jersey and Berkshire is about equally divided. Both are good hustlers. The Berkshire are possibly the best general purpose hogs and are good breeders. The Jerseys are rapid and prolific breeders, and great consumers, but are good for maximum pork production. Crosses by them on natives are very popular in the neighborhood of the station. So many inquiries have been made and orders sent in for Poland China that the station has finally introduced them and will give them a fair trial.

The station desires to emphasize here that it is not breeding hogs for sale—that would not be its legitimate business. The breeds thought to be most suirable for this section are represented here, affording a sort of object lesson, from which farmers may take their choice of breeds. The station wanting no accumulation, sells only the surplus at greatly reduced prices. In some instances the management has been censured on account of delay in delivering pigs on order. Orders are registered here as received, and filled accordingly. There are now orders on hand over two years old and if no others come in it will require some time to fill them.

The station is proud of this great demand, however, for it is

evident that farmers are waking up to the improvement of their hogs. Let enterprising farmers come to the rescue and help fill orders for thoroughbred pigs until every farmer is supplied.

The following is the record of eggs laid by the several breeds of hens kept from January 15 to June 15:

RECORD OF EGGS LAID BY DIFFERENT BREEDS.

	NAME OF BREED.	NO. HENS ON TRIAL.	NO. EGGS.	NO. EGGS PER HEN.	REMARKS.
1	Light Brahma	2	10	5	Asiatic origin
2	Patridge Cochin		4	4	Asiatic origin
3	Buff Cochin	2	18	9	Asiatic origin
4	Barred Plymouth Rock	12	425	36	American origin
5	Minorca	3	12	4	European origin
6	Silver Spangled Hamburg	1	28	28	European origin
7	Langshans (black)	5	106	21	Asiatic origin
8	Leghorns (brown)	1	30	30	European origin
9	*Houdan-Minorca	1	25	25	Cross Houdan and Minorca
10	†Red Game	1	15	15	American origin
11	Bronze Turkey	1	26	26	American origin

* Houdan-Minorca, originated by station, crossing Houdan on Minorca—making a good cross.

†Not placed on record until February 15, and presented by Dr. A H. Gladden, Homer, La.

The Plymouth Rocks have led, followed closely by Brown Leghorn, Hamburg, Houdan-Minorca and Langshan. Previous to this year the Leghorns have made the best record for egg production for three successive years. The Plymouth Rocks had the advantage, however, of the run of the place.

It is impossible to maintain purity of the breeds without close confinement, and yet with such confinement is very prejudicial to health and egg production. The European breeds are all great spring and summer layers, are small, and non-setters. It is pretty well established that the Leghorns are the best egg producers of all the breeds.

The Asiatics are generally good winter and early spring layers and make excellent mothers, and are good table fowls.

The Langshans stand at the head of the list and are regarded as one of the best general purpose fowls.

The Plymouth Rock are also good winter and spring layers and make excellent mothers; they are hardy, of quick growth and good table fowls.

Of the breeds mentioned, the Langshan or Plymouth Rock are considered the best general purpose fowls; the Leghorns or Hamburgs the best egg producers. Such are the conclusions reached after several years experience, the hens being confined during the time in small pens and fed only on vegetable products raised on the farm. Were a wide range possible for them the results might be different. The Indian Game, so popular as a table fowl, the White Plymouth Rocks and pair Pekin ducks have been added to the yards this year, and the Wyandottes will be added soon. The Houdans have been discarded.

PRICE OF LIVE STOCK.

At the request of the Station the North Louisiana Agricultural Society has placed the following tariff of prices to govern all sales and service fees:

A bull calf, of any breed	$50 00 to	$ 75 00
A heifer calf, of any breed	75 00 to	125 00
A buck or ewe, of any breed	5 00 to	7 50
Grade buck or ewe, of any breed	3 00 to	5 00
Single cock		1 50
Chickens, pair		2 00
Chickens, trio		3 00
Chickens eggs, per setting of 13		1 00
Service of bulls		2 00
Service of bucks		1 00
Service of boar		1 00

Cash must be paid in advance.

FIELD EXPERIMENTS.

ROTATION OF CROPS.

The following is taken from a previous Bulletin:

"How can the worn lands of Louisiana be most speedily and economically restored to their primitive fertility? The answer would be, by proper rotation of crops, with or without fertilizers. What crops shall be selected for this rotation? Any combination which omits our cow pea would be injudicious. Several years ago the following rotation was decided upon as the best rotation attainable in this section: This rotation is corn, oats, followed by cow peas and cotton. This rotation is faulty in principle but correct in practice, and was adopted last season after two years' trial. The corn should precede the cotton, but experience has demonstrated that "Rust Proof" oats, the only variety successfully grown here, must be planted in October if maximum results are desired. Cotton cannot be removed in time for this crop, while corn can; hence this metathesis of crops. This rotation was adopted with and without fertilizers. It was begun in 1889. Three parallel strips, one half acre wide and two acres long, were selected for the experiments. The Eastern half of each is manured regularly with a fertilizer adapted to the crop, while the Western half remains without fertilizer."

The following is the condensed results for five years per acre.

Name of plat.	How Treated.	1889.	1890.	1891.	1892.	1893.
A	Fertilized half.....	12 bushels oats... 8 45 tons pea vines	28 bushels corn.....	55 2 bushels oats. 1,360 lbs. straw... 8 10 tons pea vines 4 6 bushels peas..	1,558 lbs. cotton	.....24.4 bushels corn
	Unfertilized half...	7¼ bushels oats... 4 22 tons pea vines	20.6 bushels corn.....	25.5 bushels oats.. 816 pounds straw. 2.4 tons pea vines 1.5 bushels peas..	331 lbs. cotton..	.....6.14 bushels corn
B	Fertilized half.....	829 pounds cotton....	24½ bushels oats.. 1.020 lbs. straw .. 10.2 tons pea vines	1,719 pounds cotton..	34.3 bushs. corn	.....40 bushels oats .....1,275 pounds straw .....4 bushels peas
	Unfertilized half...	528 pounds cotton....	8⅔ bushels oats... 710 pounds straw 5.6 tons pea vines	620 pounds cotton....	14.6 bushs. corn	.....22 bushels oats .....975 pounds straw .....No peas
C	Fertilized half	17 73 bushels corn....	708 pounds cotton....	16 8 bushels corn.....	47.8 bushs. oats	....1,446.4 pounds cotton
	Unfertilized half...	13 09 bushels corn....	429 pounds cotton....	4 8 bushels corn.....	22 5 bushs. oats	..... 560 pounds cotton

The oats in the foregoing fertilized plat were fertilized with the Station's grain fertilizer at rate 200 pounds cotton seed meal and 100 pounds acid phosphate, mixed, and scattered and harrowed in with oats. The peas, fertilized with fifty pounds acid phosphate and fifty pounds kainite. The pea, being a nitrogen gatherer, no nitrogen was applied artificially. The cotton was fertilized with Station's compost for cotton, consisting of

One ton acid phosphate,
100 bushels stable manure,
100 bushels green cotton seed,

built in the following proportions: First layer, five bushels stable manure; second layer, five bushels cotton seed; third, 100 pounds acid phosphate, etc. The cotton seed are made perfectly wet before spreading.

The corn received the compost for corn, the ingredients the same as above, the proportion only different, being

One ton acid phosphate,
200 bushels stable manure,
200 bushels green cotton seed,

built as above, except proportion is fifty pounds acid phosphate, five bushels manure, five bushels seed.

The details of how to make a compost will be found at end of Bulletin for '91, No. 8, second series.

COTTON.

Experiments in cotton were of three kinds:

1st. Manurial tests, embracing nitrogenous, phosphatic and potassic fertilizers and proper depths and time and number of applications of each.

2nd. Varieties best adapted to this soil.

3rd. Distances to be given in order to secure the largest profit.

Plat No. 1 was devoted to nitrogenous manure. The questions propounded to this plat are:

1st. Does this soil need nitrogen to grow cotton profitably?

2nd. If so, in what form can it be best presented?

3rd. In what quantities per acre?

In the plat nitrate of soda and sulphate of ammonia (mineral forms) have been tested with cotton seed meal and cotton seed (raw, rotted and composted, vegetable forms), and with dried blood and fish scrap (animal forms), and such quantities of each

taken as to contain 24 and 48 pounds of nitrogen per acre. Where 24 pounds per acre were used it is denominated as one or "single" ration, and where 48 pounds are used, as two or "double" ration.

There are six groups of four experiments each, viz: 1st, the nitrogenous fertilizers alone; 2nd, "mixed minerals" (acid phosphate and kainite, 1 part kainite to 2 parts phosphate), without nitrogen; 3rd, one and two rations of the nitrogenous fertilizer combined with mixed minerals.

In addition to above every tenth experiment has been left unmanured to secure the natural capacity of the soil—a starting point for calculating the benefits of the fertilizer used. By comparing the experiments with nitrogen alone, with those unmanured, we get the benefit of nitrogen uncombined. By comparing the results with nitrogen and mixed minerals, with those from mixed minerals, we get the benefit due to the combined nitrogen. By comparing results of each from combined and uncombined with its own mixed minerals and expressing results in percentages of the last, the relative merit of each form of nitrogen may be determined. By comparing the results of the 1 and 2 rations, approximate ideas as to quantity of nitrogen to be used per acre may be acquired. The capacity of the soil not being uniform in the plat, results are expressed in percentages, instead of pounds.

PREPARATION AND CULTIVATION OF PLAT.

The cotton plats were all broken in January with Hervy plow, three mules attached, about nine inches deep. In March plats were well pulverized with Acme harrow, and on the 27th of March rows were marked off 3½ feet apart and the land bedded. On April 11 the beds were opened, fertilizer distributed, another furrow run in same drill, to incorporate the fertilizer well with the soil, seed of the "Tennessee Gold Dust" variety sown and covered with harrow.

The after cultivation was shallow and as frequent as necessary with hoes, heelsweeps and scooters, side harrow and Stohl cultivator. The dry summer and early fall reduced expected yields materially, though the questions sought are, nevertheless, satisfactorily answered.

Following are the results in pickings per acre:

PLAT NO. 1 —NITROGEN EXPERIMENTS.

No. of Experiment.	Kind and quantity of manure used per acre.	1st picking, Aug. 24.	2nd picking, Sept. 20.	3rd picking, Oct. 16.	Yield per acre seed cotton; pounds.
1	160 lbs. nitrate soda	700	590	160	1450
2	*240 lbs. mixed minerals	510	500	120	1130
3	160 lbs. nitrate soda + 240 lbs. mixed minerals	800	680	180	1660
4	320 lbs. nitrate soda + 240 lbs mixed minerals	740	980	220	1940
5	120 lbs. sulphate ammonia	520	680	180	1380
6	240 lbs mixed minerals	440	510	100	1050
7	240 lbs. mixed minerals + 120 lbs. sulphate ammonia	660	580	80	1320
8	240 lbs. mixed minerals + 240 lbs. sulphate ammonia	780	680	140	1600
9	No manure	280	470	100	850
10	200 lbs. dried blood	460	510	100	1070
11	240 lbs. mixed minerals	360	380	75	810
12	240 lbs. mixed minerals + 200 lbs. dried blood	720	350	30	1100
13	240 lbs. mixed minerals + 400 lbs. dried blood	820	420	40	1280
14	360 lbs fish scrap	670	400	60	1130
15	240 lbs. mixed minerals	320	310	60	690
16	240 lbs. mixed minerals + 360 lbs fish scrap	760	350	10	1120
17	240 lbs. mixed minerals + 720 lbs. fish scrap	910	310	10	1230
18	360 lbs. cotton seed meal	540	380	40	960
19	240 lbs. mixed minerals	160	270	70	500
20	No manure	310	210	60	580
21	240 lbs. mixed minerals + 360 lbs. cotton seed meal	550	390	60	1000
22	240 lbs. mixed minerals + 720 lbs. cotton seed meal	550	420	50	1020
23	1,040 lbs. crushed cotton seed	500	320	70	890
24	240 lbs. mixed minerals	280	310	60	650
25	240 lbs. mixed minerals + 1,040 lbs. crushed cotton seed	470	320	40	830
26	240 lbs. crushed cotton seed + 2,080 lbs. mixed minerals	480	500	70	1050
27	1,040 lbs rotted cotton seed	240	460	120	820
28	240 lbs. mixed minerals	230	340	90	660
29	No manure	150	320	140	610
30	*240 lbs. mixed minerals + 1,040 lbs. rotted cotton seed	320	350	120	790
31	240 lbs. mixed minerals + 2,080 lbs. rotted cotton seed	520	420	70	1010
32	4,200 lbs. compost	680	300	40	1020
33	240 lbs. mixed minerals	300	310	110	720
34	4,200 lbs. compost + 80 lbs kainite	670	360	60	1090
35	8,400 lbs. compost + 80 lbs kainite	940	380	180	1500

*160 pounds acid phosphate, 80 pounds kainite.

CONCLUSIONS.

The answer to the first question, does this soil need nitrogen to grow cotton successfully? is very positive. Both the nitrogen used alone and combined with mixed minerals give conclusive results. The average where no manure was used is 680 pounds per acre. The average of nitrogen alone is 1,090 pounds, show a gain, due to nitrogen, of 410 pounds per acre. The average of the experiments with mixed minerals is 776 pounds. The average of one ration of nitrogen (24 pounds) combined with mixed minerals is 1,113 pounds, while that of two rations (48 pounds nitrogen) is 1,328 pounds, showing an excess due to one ration of nitrogen of 237 pounds and two rations 552, giving proof of the wants of nitrogen in this soil.

In what form is nitrogen best presented is not so definitely answered. The excesses of nitrate soda, uncombined and combined, over its mixed minerals are, respectively, 320, 530, 810 or 28, 47, 72 per cent. The excesses of sulphate ammonia, uncombined and combined, over its minerals are, respectively, 330, 270, 550 or 32, 26, 52 per cent. The excesses of dried blood over its mixed minerals are, respectively, 260, 290, 470 or 32, 36, 58 per cent. The excesses of fish scrap are likewise, 440, 430, 540 or 65, 64, 78 per cent. over its mixed minerals. Likewise, the excesses of cotton seed meal are, respectively, 400, 500, 520 or 92, 100, 104 per cent. Likewise, the excesses of crushed cotton seed are, respectively. 240, 180, 400 or 37, 28, 61 per cent., while the rotten cotton seed excesses are 160, 130, 350 or 24, 19, 53 per cent. over yield of its minerals. The average per cent. of increase, due to nitrate soda is, 49, of sulphate ammonia 36, dried blood 42, fish scrap 69, cotton seed meal 99, crushed cotton seed 40 and rotten cotton seed 32 per cent. Cotton seed meal is ahead, followed closely by fish scrap and nitrate soda. The average of the two mineral forms of nitrogen, nitrate soda and sulphate ammonia is 42 per cent., of the two animal forms, dried blood and fish scrap, is 55 per cent, and of the three vegetable forms, cotton seed meal, crushed cotton seed and rotten seed, is 57 per cent. The results again declare in favor of vegetable forms of nitrogen, followed closely by animal forms. It is certain that nitrogen is

necessary to grow cotton profitably, and yields well with any form, but the vegetable forms are preferred, because they are as good and most convenient and economical. What quantity per acre is best to use is answered definitely from a money standpoint. Estimating seed cotton at three cents, and twenty-four pounds nitrogen at nineteen and one-half cents per pound, the amount of each ration, by calculation there are losses in three cases and profit in four where double rations are used. Concurrent results of four years now strongly indicate that on these soils one ration, or twenty-four pounds of nitrogen, per acre is more profitable than larger quantities..

PLAT NO. 2—COTTON—PHOSPHATE EXPERIMENTS.

Here the various forms of acid phosphate are used alone and combined and in quantities of one and two rations, etc., as with nitrogen in Plat 1. Since every good phosphate or dissolved bone must contain a large quantity of gypsum (land plaster), there has been used in two experiments gypsum only to see how far the results, from experiments with acid phosphate or dissolved bone, are due to the presence of this substance. In this plat the same questions are propounded with phosphoric acid manures as are propounded with nitrogen in Plat 1, viz:

First. Does this soil need phosphoric acid to grow cotton profitably?

Second. If so in what form can it be best presented?

Third. In what quantities per acre?

Preparation, cultivation, etc., the same as in Plat No. 1.

The following are the results:

PLAT NO 2—COTTON—PHOSPHATE EXPERIMENTS.

Number of experiment.	Kind and quantity of manure used per acre.	Results 1893. First picking August 24.	Second picking September 21.	Third picking October 16.	Yield per acre of seed cotton in pounds.
1	80 pounds gypsum	460	610	180	1,250
2	160 " dissolved bone black	690	470	80	1,240
3	480 " cotton seed meat } Equal to basal mixture 120 " Kainite }	610	730	200	1,540
4	600 " basal mixture 160 " dissolved bone black	770	730	170	1,660
5	600 " basal mixture 320 " dissolved bone black	880	610	140	1,630
6	80 " gypsum	570	560	190	1,320
7	160 " acid phosphate	520	500	140	1,160
8	600 " basal mixture	780	570	100	1,450
9	No manure	500	340	120	960
10	600 pounds basal mixture 160 " acid phosphate	680	540	120	1,340
11	600 " basal mixture 320 " acid phosphate	660	470	100	1,230
12	160 " bone meal	520	330	40	890
13	600 " basal mixture	670	400	100	1,170
14	600 " basal mixture 160 " bone meal	740	350	40	1,130
15	600 " basal mixture 320 " bone meal	760	330	40	1,130
16	160 " South Carolina floats	250	300	60	610
17	600 " basal mixture	800	280	20	1,100
18	600 " basal mixture 160 " South Carolina floats	600	230	20	850
19	600 " basal mixture 320 " South Carolina floats	530	340	40	910
20	No manure	170	240	60	470
21	160 pounds Thomas' iron slag	140	240	110	490
22	600 " basal mixture	400	300	50	750
23	160 " Thomas' iron slag 600 " basal mixture	400	310	50	760
24	320 " Thomas' iron slag 600 " basal mixture	220	260	40	520
25	No manure	230	210	20	460

CONCLUSIONS.

Does this soil need phosphoric acid to grow cotton profitably? is apparently answered in the affirmative. The average increase of uncombined phosphates over no manure is 248 pounds, but combined with basal mixture it gives no increase over the latter, but a loss of eighty-six pounds.

What form is best to present? is answered emphatically in favor of the soluble forms, dissolved bone black and acid phosphate.

The third question, what quantity per acre? is answered in favor of the single ration; the double ration being an absolute loss in every instance. It is very certain that phosphoric acid is needed to grow cotton successfully, but in small quantities, and soluble forms and combined always with nitrogen manure. Gypsum shows no appreciable difference in yield.

PLAT NO. 3—COTTON—POTASH EXPERIMENTS.

In this plat potash has been used in the forms of kainite, cotton seed hull ashes, the muriate and sulphate of potash, quantities of each taken so as to represent single and double rations, as with nitrogen, etc., in plat 1.

The same questions are propounded with potash as with nitrogen in plat 1, viz:

First. Does this soil need potash to grow cotton profitably?

Second. If so, in what form can it be best presented?

Third. In what quantities per acre?

Preparation, cultivation, etc., the same as in plat 1.

Below are the results:

960
470
460
1890
630

PLAT NO. 3—COTTON—POTASH EXPERIMENTS.

Number of experiment.	Kind and quantity manure used per acre.	First picking August 28.	Second picking September 22.	Third picking October 20.	Yield per acre of seed cotton in pounds.
1	240 pounds cotton seed hull ashes	220	260	40	520
2	360 " cotton seed meal 240 " cotton seed hull ashes	700	220	20	940
3	360 " cotton seed meal 480 " cotton seed hull ashes	660	270	10	940
4	120 " cotton seed hull ashes	140	290	100	530
5	480 " cotton seed meal 240 " acid phosphate } meal phosphate	640	280	40	960
6	720 " meal phosphate 120 " cotton seed hull ashes	640	200	4	880
7	720 " meal phosphate 240 " cotton seed hull ashes	600	240	40	880
8	No manure	300	290	170	660
9	160 pounds kainite	360	240	40	640
10	720 " meal phosphate	640	280	40	960
11	720 " meal phosphate 160 " kainite	610	230	20	860
12	720 " meal phosphate 320 " kainite	600	240	40	880
13	40 " muriate potash	200	290	170	660
14	720 " meal phosphate	640	260	80	980
15	720 " meal phosphate 40 " muriate potash	640	250	20	910
16	720 " meal phosphate 80 " muriate potash	620	300	30	950
17	No manure	140	400	120	660
18	60 pounds sulphate potash	180	310	100	590
19	720 " meal phosphate	660	320	20	1.000
20	720 " meal phosphate 60 " sulphate potash	660	320	40	1,020
21	720 " meal phosphate 120 " sulphate potash	680	340	40	1.060

CONCLUSIONS.

The average results from experiments where no manure was used, is 660 pounds seed cotton, while the average of potash manures alone is 589 pounds, showing an absolute loss to potash of 71 pounds. The average results of meal phosphate uncombined is 975 pounds cotton, while the average of meal phosphate combined with potash is 930, showing a loss here to potash of forty five pounds. The sulphate of potash seems to be the best form to use, if it were needed. But experiments of this year agree with those of four past years, viz: That potash, in no

form, used alone or combined with other manures, is needed for the present in these soils. There is actual loss by its use this and last year.

PLAT NO. 4—COTTON—DEPTH OF MANURE—COMBINED.

The questions propounded in this plat are: First. What depth shall fertilizers be applied for best results? Second. Shall they be separate or combined? And incidentally the question is asked, do fertilizers affect germination in shallow applications? The following are the results:

FIRST PLAT NO. 4—COTTON—DEPTH OF MANURE COMBINED.

Number of experiment.	Kind and quantity of manure used per acre.	1893. Depth applied.	First picking August 16.	Second picking September 22.	Third picking October 17.	Yield seed cotton per acre.
1	160 pounds acid phosphate 40 " muriate potash 360 " cotton seed meal	6 to 8 inches	510	400	80	980
2	160 " acid phosphate 40 " muriate potash 360 " cotton seed meal	4 to 6 inches	620	360	60	1040
3	160 " acid phosphate 40 " muriate potash 360 " cotton seed meal	2 to 3 inches	640	360	60	1060
4	160 " acid phosphate 40 " muriate potash 360 " cotton seed meal	Top dressed	530	400	80	1010

Two to three inches give best results, followed closely by four to six and top dressed. Concurring results of previous

years emphasize the wisdom of shallow applications of fertilizers in these soils. Six to eight inches give poorest yield.

PLAT NO. 4—COTTON—DEPTH OF MANURE USED SEPARATELY.

In this plat cotton seed meal is left off in experiments 1 and 2; combined in double quantity in 3, and same quantity applied shallow in experiment 4. Following are results:

SECOND PLAT NO. 4—COTTON—DEPTH OF MANURES USED SEPARATELY.

Number of experiment.	Kind and quantity of manure ured per acre.	1893. Depth of application.	First picking August 15.	Second picking September 20.	Third picking October 18.	Yield of seed cotton per acre.
1	320 pounds acid phosphate 80 " muriate potash	6 to 8 inches	520	450	130	1100
2	320 " acid phosphate 80 " muriate potash	Top dressed	730	400	120	1250
3	320 " acid phosphate 80 " muriate potash 720 " cotton seed meal	2 to 3 inches	780	340	90	1210
4	320 " acid phosphate 80 " muriate potash 720 " cotton seed meal	4 to 6 inches Top dres'd	840	300	40	1180

Shallow applications have again given best results. Separate application has given better results than combined. Top dressing fertilizer on drill, after planting, does prevent successful germination.

PLAT NO. 5—COTTON—DISTANCE EXPERIMENTS—WHAT DISTANCE SHALL COTTON BE PLANTED IN DRILL FOR BEST RESULTS?

Number of experiment.	What distance apart and number of stalks in drill.	1893. First picking August 29.	Second picking September 22.	Third picking October 18.	Total yield per acre of seed cotton in pounds.
1	One stalk, eigl t inches in drill	100	640	360	1100
2	Two stalks, eight inches in drill	170	660	180	1010
3	One stalk, twelve inches in drill	120	720	200	1040
4	Two stalks, twelve inches in drill	140	650	170	960
5	One stalk, sixteen inches in drill	130	650	160	940
6	Two stalks, sixteen inches in drill	140	620	190	950
7	One stalk, twenty inches in drill	180	660	150	990
8	Two stalks, twenty inches in drill	150	690	130	970
9	One stalk, twenty-four inches in drill	100	640	160	800
10	Two stalks, twenty-four inches in drill	120	740	200	1160

Results vary with the seasons. Heretofore greater distance was declared necessary for cotton. Defective stands from cold spring prevents certain conclusions. Two stalks, twenty four inches, give best results.

PLAT NO. 6—COTTON—APPLICATION OF MANURES.

Nitrogen is very soluble. In the soil it is readily converted into ammonia. nitrates and nitrites, in which forms it is available as plant food. But the loose sandy character of this soil and the solubility of nitrogen, suggests the belief that an unknown quantity is leached out of the soil by heavy rains, and is therefore lost to the plant. The object of this plat is to ascertain if there be any loss to cotton and if there be any value in two or more applications of the nitrogen manures during growth. The applications are made only of the nitrogen fertilizers, as potash is stationary in the soil and phosphoric acid nearly so. The

mineral mixture (acid phosphate and kainite) is constant throughout. The nitrogen varies in form, but the same quantity of each is applied in second and third applications as in the first. Preparation, etc., same as other plats.

Following are the results:

PLAT NO. 6—COTTON—APPLICATION OF MANURES.

Number of Experiment.	Kind and Quantity Manure Used Per Acre.	When Applied.	First picking August 20	Second picking Sept. 22.	Third picking October 20.	Total yield seed cotton per acre.
1	240 lbs. mixed minerals 160 lbs. nitrate soda	At planting April 11	330	680	140	1150
2	240 lbs. mixed minerals 80 lbs. nitrate soda 80 lbs. nitrate soda	At planting April 11. At laying by—July 2.	320	610	100	1030
3	240 lbs. mixed minerals 53⅓ lbs. nitrate soda 53⅓ lbs nitrate soda 33⅓ lbs. nitrate soda	At planting At 2d working, June 5 At laying by	300	630	130	1060
4	240 lbs. mixed minerals 120 lbs. sulphate ammonia	At planting	400	630	100	1130
5	240 lbs. mixed minerals 60 lbs. sulphate ammonia 60 lbs sulphate ammonia	At planting. At laying by	300	550	100	950
6	240 lbs. mixed minerals 40 lbs. sulphate ammonia 40 lbs. sulphate ammonia 40 lbs. sulphate ammonia	At planting At second working At laying by	380	590	120	1090
7	240 lbs. mixed minerals. 360 lbs. cotton seed meal	At planting.	380	640	120	1140
8	240 lbs. mixed minerals. 180 lbs. cotton seed meal 180 lbs. cotton seed meal	At planting. At laying by	330	582	100	1012
9	240 lbs. mixed minerals. 120 lbs. cotton seed meal 120 lbs. cotton seed meal 120 lbs. cotton seed meal	At planting At second working At laying by	300	540	170	1010
10	240 lbs. mixed minerals 153⅓ lbs nitrate soda 40 lbs. sulphate ammonia 120 lbs. cotton seed meal	At planting	390	1020	230	1640
11	240 lbs. mixed minerals Plus ½ nitro. mix. of expt. 10 Plus ½ nitro. mix. of expt. 10	At planting. At laying by	320	840	190	1350
12	240 lbs. mixed minerals. Plus ⅓ nitro. mix. expt. 10 Plus ⅓ nitro. mix. expt. 10 Plus ⅓ nitro. mix. expt. 10	At planting At second working At laying by	300	760	240	1300

CONCLUSIONS.

In every case there has been a loss with two and three applications. The long tap root of cotton certainly intercepts the nitrogen as it sinks in the soil. There is no profit, but rather loss, in making two and three applications. Fertilizer for cotton should all be applied in drill at time of planting.

PLAT NO 4—COTTON—VARIETIES.

The Station has spared neither time nor money in obtaining and testing as many varieties of cotton as possible. Last spring forty varieties were planted, but only thirty six germinated successfully. They were placed under the same conditions and treated, as nearly as possible, alike. They were fertilized with a mixture consisting of 200 pounds acid phosphate, 200 pounds cotton seed meal and 100 pounds kainite per acre. These were carefully weighed in field and at gin, and ginned separately on a small twenty saw Gullet gin, feeder and condenser; lint and seed carefully weighed and per cent. of each calculated. Attention is directed to the comparative yields by pickings. Following are results:

PLAT NO. 4—VARIETIES OF COTTON.

No. experiment.	Name of Variety	First picking August 24	Second picking September 22.	Third picking October 18.	Total.	Gin weight		Remarks.
						Lint—per cent.	Seed—per cent	
1	Cook's Long Staple No. 1	560	460	260	1,280	29.50	70	State Experiment Station, Baton Rouge, La
2	Dalkeith Eureka	470	400	200	1,070	30.40	69.5	W. B. Humphries, Keithville, La
3	Bancroft's Herlong	760	380	140	1,280	31.20	68.4	Alexander Seed Company, Augusta, Ga
4	Tennessee Gold Dust	760	360	120	1,240	32.2	67.4	Alexander Seed Company, Augusta, Ga
5	Peterkin's New Chester	280	480	125	1,180	35.6	64.2	Alexander Seed Company, Augusta, Ga
6	Hawkins's Improved	380	445	380	1,200	33.2	65.8	Alexander Seed Company, Augusta, Ga
7	King's Improved	660	240	180	1,080	31.2	68.2	Alexander Seed Company, Augusta, Ga
8	Triutt's Improved	370	380	435	1,180	30.4	69	Alexander Seed Company, Augusta, Ga
9	Southern Hope	340	310	410	1,060	29.2	70.2	Alexander Seed Company, Augusta, Ga
10	J. O. Morris	500	400	220	1,120	33	66.4	J. O. Morris, Gainsville, La
11	Mathew's Extra Long Staple	400	290	170	860	28.7	69.8	Experiment Station, Baton Rouge, La
12	Eureka	350	360	220	930	31.2	68.4	Colthorp's, Milliken's Bend, La
13	Welborn's Pet	560	285	160	1,000	32.2	69.4	Alexander Seed Company, Augusta, Ga
14	Drake's Cluster	360	330	200	890	31.6	68.2	State Experiment Station, Baton Rouge, La
15	Marston	280	270	200	750	31.4	68.2	Sugar Experiment Station, New Orleans, La
16	Dickson	370	280	160	810	32.4	67.2	Mr. Prevost, New Orleans, La
17	Peterkin	240	270	240	750	37.2	62.4	Alexander Seed Company, Augusta, Ga
18	Kenneth's Long Staple	280	250	190	720	29.4	70.2	E. Fudicka, Monroe, La
19	Willis'	320	240	250	810	31.3	68.2	State Experiment Station, Baton Rouge, La
20	Peerless	420	280	160	860	32.1	67.2	Mr. Prevost, New Orleans, La
21	Cockran's Short Limb Prolific	340	320	260	920	31.2	68.2	State Experiment Station, Baton Rouge, La
22	Rockett's Favorite	260	320	420	1,000	32.6	67.3	J. C. Rockett, Farmerville, La
23	Okra Leaf	310	256	270	830	33.4	66	Alexander Seed Company, Augusta, Ga
24	Honey-cutt	190	310	450	950	30.7	69.20	State Experiment Station, Baton Rouge, La
25	Crawford's	280	310	400	990	31.7	68	Alexander Seed Company, Augusta, Ga
26	Excelsior	180	290	540	1,010	34.4	65	State Experiment Station, Baton Rouge, La
27	Colthorp's Pride	120	310	550	990	33.3	63	Colthorp Bros., Milliken's Bend, La
28	Texas Storm and Drought Proof	270	360	330	1,160	33	63.8	W. B. Smiley, Baileyville, Texas
29	Cook's Long Staple No 2	280	425	575	1,270	29.4	70	Alexander Seed Company, Augusta, Ga
30	W. B. Ethridge Small Seed	290	400	600	1,290	36.4	63	W. B. Ethridge, Downsville, La
31	Sea Island	160	480	330	970	40.2	59.3	Mr. Prevost, New Orleans, La
32	Kolb's Prolific	170	400	710	1,280	34	65.5	Sugar Experiment Station, New Orleans, La
33	Allen's Long Staple	230	410	445	1,115	29	70.5	Alexander Seed Company, Augusta, Ga

Peterkin and Peterkin Cluster, Excelsior, Kalbs Prolific, lead in best percentage of lint. W. B. Ethridge Small Seed, Kolb's Prolific, Cook's Long Staple, Bancroft's Herlong and Gold Dust, the largest yield seed cotton.

CORN.

Experiments in corn were of two kinds: First, manurial requirements, both as to the kinds of fertilizer to be used and the modes of application. Second, varieties of corn best suited to our wants.

PLAT NO. 7—NITROGENOUS MANURES.

The questions propounded to this plat are the same as those asked of cotton in plat 1, viz:

1st. Does this soil need nitrogen to grow corn profitably?

2nd. If so, in what form must it be presented?

3rd. What quantity per acre?

Exactly, as with cotton, the mineral, animal and vegetable forms have been used in single and double rations.

PREPARATION AND CULTIVATION OF LAND.

In January the land was broken eight or nine inches deep with Hervy plow (three mules), and harrowed with Acme harrow; rows marked off five feet apart in February and bedded out March 10th, beds opened, fertilizer distributed, rebedded on bed opened, corn planted and covered with harrow. After cultivation was with hoe, scooters, heelsweeps and Stahl cultivator every eight to twelve days apart and layed by June 1st.

Following are results:

PLAT NO 7—CORN—NITROGENOUS EXPERIMENTS.

Number of Experiment.	Kind and Quantity of Manure Per Acre.	1893 Bush. Shelled Corn Per Acre.
1	112 pounds nitrate soda	23.6
2	112 " acid phosphate.. } mixed minerals 56 " kainite ..... }	19.6
3	168 " mixed minerals 112 " nitrate soda	24.4
4	168 " mixed minerals 224 " nitrate soda	26.8
5	84 " sulphate ammonia	15.6
6	168 " mixed minerals	13.2
7	168 " mixed minerals 84 " sulphate ammonia	20
8	168 " mixed minerals 168 " sulphate ammonia	22.8
9	No manure	9.6
10	140 pounds dried blood	14
11	168 " mixed minerals	12
12	168 " mixed minerals 140 " dried blood	20
13	168 " mixed minerals 280 " dried blood	26
14	252 " fish scrap	23.6
15	168 " mixed minerals	14.4
16	168 " mixed minerals 252 " fish scrap	22.4
17	168 " mixed minerals 504 " fish scrap	26
18	No manure	12
19	252 pounds cotton seed meal	16.8
20	168 " mixed minerals	7.6
21	168 " mixed minerals 252 " cotton seed meal	20
22	168 " mixed minerals 504 " cotton seed meal	24
23	728 " crushed cotton seed	19 6
24	168 " mixed minerals	13.2
25	168 " mixed minerals 728 " crushed cotton seed	18 8
26	168 " mixed minerals 1456 " crushed cotton seed	21.6
27	728 " green cotton seed	16.8
28	168 " mixed minerals	10.8
29	168 " mixed minerals 728 " green cotton seed	17.6
30	168 " mixed minerals 1456 " green cotton seed	18.4
31	No manure	13.7

PLAT NO. 7—CORN—NITROGENOUS EXPERIMENTS—CONTINUED.

Number of Experiment.	Kind and Quantity of Manure Per Acre.	1893 Bush. Shelled Corn Per Acre.
32	2940 pounds compost	19.2
33	168 pounds mixed minerals	13.2
34	2940 " compost 56 " kainite	22.8
35	58-0 " compost 56 " kainite	23.8
36	720 " rotted cotton seed	14.8
37	168 " mixed minerals	6.8
38	168 " mixed minerals 720 " rotted cotton seed	16.7
39	168 " mixed minerals 1440 " rotted cotton seed	17.6
40	No manure	6.5

CONCLUSIONS.

The first question, does this soil need nitrogen to grow corn profitably? is answered yes, very positively. The average of no manure is 10.4 bushels, and of the nitrogen manures alone the average is 18.2, showing a gain due to nitrogen of 7.8 bushels per acre. The average of mixed minerals is 12.3 bushels of corn per acre; the average of one ration of nitrogen (18 pounds) combined with mixed minerals, is 20.3 bushels per acre, and of two rations (36 pounds nitrogen) it is 23, showing an excess due to nitrogen respectively of 8 bushels (one ration) and 10.7 (two rations), showing conclusively its need for profitable corn production in this soil.

The second question, in what form is nitrogen best presented? is not so definitely answered. The excesses of nitrate soda, combined and uncombined, over its mixed minerals are respectively 4, 4.6 and 6.4 bushels per acre. The sulphate ammonia excesses, combined and uncombined, over its mixed minerals are respectively 2.4, 6.8 and 9.6 bushels per acre. The dried blood excesses, combined and uncombined, over its mixed minerals are respectively 2, 8 and 14 bushels per acre. The excesses of

fish scrap over its mixed minerals, are respectively 8.2, 8 and 11.6 bushels per acre. The cotton seed meal excesses over its mixed minera s arerespectively 9.2, 12.4 and 16.4 bushels per acre. Likewise crushed cotton seed excesses, etc., are respectively .4, 5.6 and 8.4 bushels per acre. While green cotton seed show excesses over its mixed minerals respectively of 6, 6.8 and 7.6 bushels per acre, and rotten cotton seed show excesses over its mixed minerals of 6.8, 9.9 and 10.8 bushels per acre.

From the above the vegetable forms of nitrogen, cotton seed meal, cotton seed green, rotted, etc., has given best results, and while all forms of nitrogen have given good results with corn, the vegetable forms are preferred and recommended, because of the economy and convenience.

The third question, what quantity per acre? is answered positively in favor of the single ration, or 18 pounds nitrogen per acre. In every case there is a money loss with two rations.

PLAT NO. 8—PHOSPHORIC ACID EXPERIMENTS.

In this plat the same questions are propounded with corn as with cotton in plat No. 1, viz:

1st. Does this soil need phosphoric acid to grow corn profitably?

2nd. If so, in what form must it be presented?

3rd. In what quantities per acre?

As with cotton, the soluble forms, acid phosphate and dissolved bone black, and insoluble forms, bone meal, South Carolina floats and Thomas' slag meal, have been used. The preparation, etc., was the same as given in nitrogen plat above:

The following are the results.

PLAT NO. 8—CORN—PHOSPHORIC ACID EXPERIMENTS.

No. of Experiment.	Kind and Quantity of Manure Used Per Acre.	Bushels Corn per Acre, 1893.
1	56 pounds gypsum	16
2	112 pounds dissolved bone black	19.6
3	336 pounds cotton seed meal 84 pounds kainite } Basal mixture	22
4	420 pounds basal mixture 112 pounds dissolved bone black	22.8
5	420 pounds basal mixture 224 pounds dissolved bone black	20 8
6	56 pounds gypsum	8.8
7	112 pounds acid phosphate	8.8
8	420 pounds basal mixture	16.8
9	No manure	7.6
10	420 pounds basal mixture 112 pounds acid phosphate	22.4
11	420 pounds basal mixture 224 p unds acid phosphate	25.6
12	112 pounds bone meal	17.6
13	420 pounds basal mixture	21.6
14	420 pounds basal mixture 112 pounds bone meal	22.8
15	420 pounds basal mixture 224 pounds bone meal	26.8
16	112 pounds South Carolina floats	15.6
17	420 pounds basal mixture	20.4
18	420 pounds basal mixture 112 puunds South Carolina floats	22
19	420 pounds basal mixture 224 pounds South Carolina floats	22.8
20	No manure	10.5
21	112 pounds Thomas' iron slag	12.4
22	420 pounds basal mixture	22
23	420 pounds basal mixture 112 pounds Thomas' iron slag	22.4
24	420 pounds basal mixture 224 pounds Thomas' iron slag	24

CONCLUSIONS.

The results with phosphoric acid with corn are similar to those of cotton, viz: That phosphoric acid is needed to grow a profitable crop of corn, but the need is not so much as with cotton; that the soluble forms, acid phosphate and dissolved bone black, are preferred; that the double ration is unprofitable; that phosphates are needed in small quantities and should be combined with nitrogen fertilizers for best results with corn.

PLAT NO. 9—CORN—POTASH EXPERIMENTS.

The same questions are propounded in this plat with potash as with cotton in plat No. 1, viz:

1st. Does this soil need potash to grow corn profitably?

2nd. If so, in what form must it be presented?

3rd. In what quantities per acre?

Preparation and cultivation same as in plat above.

Following are results:

PLAT NO 9—CORN—POTASH EXPERIEENTS.

No. of Experiment.	Kind and Quantity of Manure Used Per Acre.	Bushels Corn Per Acre. 1893.
1	84 pounds cotton seed hull ashes	11
2	336 pounds cotton seed meal. 168 pounds acid phosphate... Meal phosphate	22
3	84 pounds cotton seed hull ashes. 504 pounds meal phosphate	22.4
4	504 pounds meal phosphate. 168 pounds cotton seed hull ashes	22.8
5	No manure	14.6
6	112 pounds kainite	13.6
7	504 pounds meal phosphate	25.2
8	504 pounds meal phosphate. 112 pounds kainite	24
9	504 pounds meal phosphate. 224 pounds kainite	20.4
10	28 pounds muriate potash	14
11	504 pounds meal phosphate	24
12	504 pounds meal phosphate. 28 pounds muriate potash	24
13	504 pounds meal phosphate. 56 pounds muriate potash	24.5
14	No manure	14
15	42 pounds sulphate potash	14.3
16	504 pounds meal phosphate	21
17	504 pounds meal phosphate. 42 pounds sulphate potash	21.5
18	504 pounds meal phosphate. 84 pounds sulphate potash	20

CONCLUSIONS

are the same and even more marked than with cotton, viz: That potash in no form, used singly or combined with other manures, is needed in this soil for corn. There is actual loss of potash used in every case.

PLAT NO. 10—CORN—APPLICATION OF MANURES.

The same suggestions here are made as with cotton. The mineral mixtures are constant throughout; the nitrogen varies in applications, but the same quantities are used in every case. Preparation, cultivatian, etc., the same as other plats.

The following are the results:

PLAT NO. 10—CORN—APPLICATION OF MANURES.

No. of Experiment.	Kind and Quantity of Manure Used Per Acre.	When Applied.	1893 Bushels of corn per acre.
1	168 lbs. mixed minerals 112 lbs nitrate soda	At planting, March 10	24
2	168 lbs. mixed minerals 56 lbs. nitrate soda	At planting, March 10	24.8
	56 lbs. nitrate soda	At laying by, June 11	
3	168 lbs. mixed minerals 37½ lbs. nitrate soda	At planting	24.8
	37½ lbs. nitrate soda	At 2nd working, April 27.	
	37½ lbs. nitrate soda	At laying by, June 11	
4	168 lbs. mixed minerals 84 lbs. sulphate ammonia	At planting	22.7
5	168 lbs. mixed minerals 42 lbs sulphate ammonia	At planting	24
	42 lbs. sulphate ammonia	At laying by	
6	168 lbs. mixed minerals 28 lbs. sulphate ammonia	At planting	27.6
	28 lbs. sulphate ammonia	At 2nd working	
	28 lbs. sulphate ammonia	At laying by	
7	168 lbs. mixed minerals 252 lbs. cotton seed meal	At planting	22.4
8	168 lbs. mixed minerals 126 lbs. cotton seed meal	At planting	24
	126 lbs. cotton seed meal	At laying by	
9	168 lbs. mixed minerals 84 lbs. cotton seed meal	At planting	26.4
	84 lbs. cotton seed meal	At 2nd working	
	84 lbs. cotton seed meal	At laying by	
10	168 lbs. mixed minerals 37½ lbs. nitrate soda 28 lbs. sulphate ammonia 84 lbs cotton seed meal	At planting	24.8
11	168 lbs. mixed minerals Plus one-half of nitrogen of No. 10	At planting	26
	Plus one-half of nitrogen of No. 10	At laying by	
12	168 lbs. mixed minerals Plus one-third of nitrogen of No. 10	At planting	26.8
	Plus one-third of nitrogen of No. 10	At 2nd working	
	Plus one-third of nitrogen of No. 10	At laying by	

CONCLUSIONS.

The average of one application is 23.4 bushels. The average of two applications is 24.7 bushels. The average of three applications is 26.4.

The excess of two applications over one application is 1.3 bushels; of three applications over one the excess is 3 bushels; and of three over two the excess is 1.7 bushels per acre.

Concurring results of previous years favor different applications of nitrogen manures for corn in this soil.

PLAT NO. 11—CORN—VARIETIES.

In the following plat tests were made of 28 varieties of corn. They were planted at the same time, fertilized with the station's compost for corn and treated as nearly as possible alike. The following are the results, showing per cent. of grain, per cent. of shuck, cob, and number of bushels per acre:

PLAT NO. 11—VARIETIES OF CORN.

No. Experiment.	Name of Variety.	Where Obtained.	Per cent. of grain.	Per cent. of cob.	Per cent. of shucks.	Bushels corn per acre.	Kind of Corn.
1	Giant Broad Grain	T. Wood & Son, Richmond, Va.	76.20	18.10	9.9	26	White dent
2	Mosby's Prolific	Sugar Experiment Station	79	11.50	8.8	22.8	White dent
3	Stowe	J. M Parkman, Calhoun, La	78.50	10.80	8.6	23.6	White dent
4	New Madrid	R. Frotscher, New Orleans, La.	75.40	15.50	9.20	23.6	White dent
5	Patterson	R. F. Patterson, Baton Rouge, La.	74.50	18.20	8.6	25.2	White dent
6	Welborn's Conscience	Alexander Seed Company, Augusta, Ga.	78.40	14	8.30	24.4	White dent
7	Virginia White Gourd Seed	T. W. Wood & Son, Richmond, Va.	78	13.60	8.50	28.4	Gourd seed dent
8	Rural Thoroughbred	T. W. Wood & Son, Richmond, Va.	76	14.10	9	8	White dent
9	Kansas King Field	T. W. Wood & Son, Richmond, Va.	75	15	9.40	22.6	White dent
10	Hendron's White Bread	Jenkins & Trobough, Fayetteville, Tenn.	76	14.5	9.20	28	White dent
11	Red Cob	J. L. Ford, Calhoun, La.	77.4	13.4	9	26	Red cob dent
12	King Philip	T. Wood & Son, Richmond, Va.	73	15.20	11.20	22.4	White dent
13	Brinker's	A. J. Brinker, Wood's Mill, La.	75	13.50	9.40	26	Yellow dent
14	Roberts'	State Experiment Station, Baton Rouge, La	73.5	15.5	13.2	21.2	White dent
15	Golden Beauty	R. Frotscher, New Orleans, La.	75.5	14	11.40	21.6	Yellow dent
16	Hickory King	R. Frotscher, New Orleans, La.	75.2	13	11.20	18.8	White dent
17	Improved Leoning	R. Frotscher, New Orleans, La.	76.4	12.8	11.40	13.6	White dent
18	Maryland White	T. W. Wood & Son, Richmond, Va.	74.5	13.8	10.90	25.2	White dent
19	McGuire	Thos McGuire, West Monroe, La.	75.5	12.9	11.80	25.4	White dent
20	St. Charles White Dent	R. Frotscher, New Orleans, La.	75	13.9	10.7	21.6	White dent
21	Brazillian Flour	Alexander Seed Company, Augusta, Ga.	73	14	11.4	19.2	White dent
22	Rily's Favorite Dent	Alexander Seed Company, Augusta, Ga.	74	13.8	10.8	14.4	White dent
23	Mammoth White Surprise	T. W. Wood & Son, Richmond, Va.	73	14.5	11.5	24	White dent
24	Clark's Flour	Alexander Seed Company, Augusta, Ga.	74	15.4	9.4	11.6	White dent
25	Champion White Pearl	Alexander Seed Company, Augusta, Ga.	74.5	13.8	9.8	17.4	White flint
26	Mexican June	R. Frotscher, New Orleans, La.					Total failure
27	Bank's Improved Stock	Jenkins & Trobough, Fayetteville, Tenn.	75	14.2	9.8	23.6	Strawberry dent
28	Holman Yellow	Experiment Station, Calhoun, La.	74.5	13.3	10.9	21.8	Yellow dent

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Inspection of above table shows Virginia White Gourd Seed and Hen Iron's White Bread lead in yields, while Mosby leads in per cent. of grain, followed closely by Stowe, Welborne's Conscience and Virginia White Gourd Seed. The medium late varieties that are good and can be recommended are Broad Grain, Virginia Gourd Seed, Hendron's White Bread, Red Cob, Brinker, Patterson, Bank's Improved Stock, Stowe. The best late varieties are Mosby and Mammoth White Surprise. The best early varieties are Golden Beauty, Holman Yellow and McGuire.

PLAT NO. 13—FORAGE CROPS.

This plat was devoted to forage crops, fertilized with 200 pounds cotton seed meal and 100 pounds acid phosphate per acre.

Below are the results:

PLAT NO. 13—FORAGE CROP.

Number of Experiment.	Name of Variety.	Tons Forage Per Acre.	Bushels Seed Per Acre.
1	Pearl millet	8	
2	Jerusalem corn	4	6
3	Yellow millo maize	11	22.6
4	White millo maize	10	21.5
5	Large African millet	14	28.5
6	Kaffir corn	4	10
7	German millet	3.5	
8	French millet (red)	4.5	
9	Soja bean	2.5	
10	New orange sorghum	6.5	
11	Kansas orange	6.7	
12	Golden rod	10	
13	White India	11	
14	Early Amber	5	
15	Coleman	12	
16	Wild rice	1.5	
17	Upland rice	1	
18	Japan rice	2	

Pearl, or "cat-tail," millet, as it is sometimes called, is used as a "soiling" crop. A few rows planted in rich soil will afford sufficient green feed in spring for several head of horses. It

grows out rapidly after being cut and is one of the best early green feeds of its kind. The next five are non saccharine sorghums. They make excellent forage and may be used as soiling crops or cured as hay. The bushels of grain they yield per acre make them valuable adjuncts to the grain producing crops. Jerusalem corn has large, compact, drooping heads of white grain. The stalk is low, stout and stocky, and not so good as the four following.

Yellow and white millo maize grow large and tall, making large tonnage of forage, large straight heads of yellow and white grain, yielding in favorable years many bushels per acre. Large African millet is very much like the white millo maize, except it grows much larger both in stalk and seed heads. It is equally as valuable for forage and soiling, possessing the advantage over all of greater tonnage and more bushels grain per acre. It will certainly produce more forage per acre than any forage crop ever grown at the station.

The Kaffir corn is low growing, but produces many heads of white grain as well as fair tonnage of forage. The seeds are excellent poultry feed. German millet is too well known to mention any of its charrcteristics. It is a valuable forage and soiling crop and should be more extensively planted. French millet bears a long drooping head of red grain and bids fair to outrival the German variety in production.

Soja bean is a leguminous plant, and aside from its qualities as a forage plant, like others of the leguminous family, it renovates worn land. It resembles the bean, grows tree-like, 18 inches to 2 feet high, and bears a heavy crop of short pods, well filled with small, round, white berries, resembling very much the sweet pea of the garden. If cut just as the pods begin to ripen it cures readily into a good hay.

On account of the prolonged dry spell the three varieties of rice failed almost totally to make grain. The Japan variety matured some grain. Rice is a very valuable forage. Planted on low, wet land, every farmer will be well paid for his trouble in harvesting a valuable hay crop.

Early and New Orange are very similar. They grow me-

dium tall, rather stocky. The seed heads are medium large, compact and well filled with red grain. Valuable for forage, for soiling and syrup making. Medium early.

Golden Rod is tall, growing slender stalks; rather long, straggling small heads, light red grain. Rather late for syrup making; fair forage and soiling. White India is also tall, growing large heads, white grain, fair forage and soiling; fair for syrup making; late.

Early Amber is very early, low growing and small; small, straggling seed heads. Makes best of forage and soiling and good for syrup.

Coleman is a cross between the Early Amber and Orange, and combines the good qualities of both. It is the best variety grown here. It is medium tall growing, stout and stocky; bears a large, compact seed head, resembling the Orange mostly. It is first-class for syrup and sugar making; excellent forage and soiling crop; early.

The Station feels that too little attention is given to raising sorghum. No better feed crop can be raised. It may be cured into excellent forage, it may be fed green to all kinds of stock with best results from the time it is two feet high, the second growth coming out quickly. Cut just as seed heads are in dough state, there is no better or healthier feed for hogs, and it may be so planted as to be ready for feeding during the entire summer, when hog feed is scarce. Plant an acre or two for hogs and forage.

Plat No. 14 was devoted to varieties of field peas and Spanish peanuts. The Spanish peanut is the most desirable variety here in North Louisiana. It is early, very prolific and easily harvested, the pods adhering to the vine. Planted in April they will mature a crop in August, and planted as late as July they will make a crop before frost. They are excellent to follow out a crop. The pea is smaller than other varieties, but they are sweet, fill out well and show fewer "pops" than any. Properly harvested, by pulling the vine up and reversing in the sun for a few hours, and then shocked up in the evening, left shocked the next day, and hauling in at evening, an excellent quality and

quantity of hay may be gotten, which is ravenously eaten by all kinds of stock. The vines should be pulled just as the leaves show change of color, or as pods are formed. Three tons per acre were gathered at the Station this year.

COW PEAS.

Pea of the Backwoods or Old Man's Friend—Was brought to notice several years ago by letters of Mr. Edward Fonville, of Onslow County, S. C., in *Southern Cultivator*. It was recommended as the earliest bunch pea and excellent for table use. It has proved two weeks ahead of any other; a large bearer and a shell pea for table use, tender, marrowy and palatable. Are ripe six weeks after planting. It is a bunch pea strictly, therefore affording not much vine. The seeds are small, cream-colored, slightly pied. Very prolific.

The Unknown Pea—Is a greenish white color, with blue eye; full size; makes much vine; vigorous growth; late; large and continued bearer; pods long and full; a fine pea.

Dwarf Whippoorwill Pea—A bunch pea with but little vines; begins fruiting in fifty or sixty days; berry speckled; pods long and full; yield good.

Clay Pea—Vines and foliage medium; begins fruiting in seventy five days; yield good; berry cream-colored, with white eye; medium in size; pod of medium length and not crowded; keeps well.

Lady Pea—A small white pea; white eye, with considerable vine of medium foliage; begins fruiting in ninety days from time of planting.

Large White Pea—Vines and foliage heavy; very late fruiting; a large white pea and very prolific.

Indian Pea—A large "liver and white pied" with long and crowded pods; very prolific; vines and foliage heavy; begins fruiting in sixty to ninety days; berry soft and does not keep well.

King's Pea—A large black and white pied pea; large and

crowded pod; vines and foliage heavy; very prolific; begins fruiting in sixty to seventy days; berry too soft to keep well.

Red Ripper Pea—A large red pea, with long and crowded pods; vines and foliage medium; bears in seventy five days.

Blue Pea—A small blue pea; medium vine and foliage; very prolific and early; will bear in nine weeks.

Purple Hull Pea—A large white pea; black eye; purple hull; long pods; a great viner; good table pea; renovator of worn soils.

Black Pea—Medium large black pea, white eye; very prolific; long pods; tremendous viner; berry will stay in ground over winter and come up the following spring.

Colvin pea is a medium large, light red pea, resembling some the Red Ripper. It is the bunch kind, very prolific and early, fruiting in 8 or 9 weeks. Not much vine. Much chemical work has been performed, in the laboratory of the Station, upon the different varieties of peas as soil renovators, which is as yet uncomplete. When finished it will be embodied in a special bulletin on Cow peas.

We do not appreciate the value of the Cow pea as a renovator of worn soil in North Louisiana as we ought.

The Chemical Report will throw new light on the pea question, and it is hoped will give farmers a better appreciation of the pea as well as to direct their attention to the variety to plant. These experiments will go forward for several years yet on the same plat. The experiment is a scientific one of the highest order, and most valuable it must prove to farmers everywhere.

GRAINS, GRASSES AND CLOVERS.

Six acres of Rust Proof oats and winter grazing barley, three acres of each, were planted in the fall of 1892, on well prepared land, previously cultivated in corn and peas. The first acre of each was fertilized with the Station's grain fertilizer, consisting of 200 pounds cotton seed meal and 100 pounds acid phosphate, mixed well and scattered and plowed in with the grain.

The second or middle acre was left without fertilizer, while

the third acre was "top dressed" in February following, by scattering the same fertilizer over the oats and harrow passed over. The land was first deeply broken with turnplows. Acme harrow followed, completely pulverizing the soil, oats sown and fertilizer scattered, plowed in with bulltongues and rolled. On account of dry fall, planting was not done until middle of November, a month later than is the custom.

From the first to middle of October is certainly the best time to plant oats here for profitable crop. Below are the results :

FERTILIZER EXPERIMENT WITH OATS AND BARLEY.

No. experiment.	Name of Variety.	Kind and Quantity Manure Used per acre.	Bushels of grain per acre.	Bushels of straw per acre.
1	Red Rust Proof oats	200 pounds cottor seed meal, 100 pounds acid phosphate at planting	48	2,564
2	Red Rust Proof oats	No manure	15	1,050
3	Red Rust Proof oats	200 pounds cotton seed meal, 100 pounds acid phosphate, top dressed in February.	42	2,340
4	Winter barley	200 pounds cotton seed meal, 100 pounds acid phosphate, at planting	10	1,000
5	Winter barley	No manure	4	472
6	Winter barley	200 pounds cotton seed meal, 100 pounds acid phosphate, top dressed in February.	7	642

The Station recommends the planting of grain early in the fall, from middle of September to middle of October. The formula, 200 pounds cotton seed meal and 100 pounds acid phosphate, is recommended as the best grain fertilizer.

CLOVERS.

Red Clover (*Trifolium pratense*). The plat was three years old, grew 2 to 2½ feet high and yielded 2½ tons hay per acre. Red clover can be recommended to grow on soils a little light with good clay subsoil, using gypsum, phosphate and cotton seed meal as a top dressing.

Crimson Clover (*Trifolium incarnatum*) is an annual, planted in October. It grows 12 to 18 inches high and gave 1¾ tons hay per acre. It is a rapid grower, will furnish good early grazing,

and treated like Red, will always grow a good crop on these soils.

Lucerne or Alfalfa, White Clover, Bokhara and Alsike clovers did not, nor have not up to date, succeeded well with us on this soil. Efforts will be continued, however, especially with Lucerne, with intensive care. It is a hay crop well worth continued energy to grow it successfully.

The following grasses have succeeded well here and can be recommended in the order mentioned: Texas Blus Grass (*Poa arachinfera*) is perennial and emphatically the most hardy winter grass. It is the best grazing grass and makes a fair hay; yield 1.2 tons. The great trouble with Texas Blue Grass is getting a stand. The web like seed are difficult to cover and germinate, and while setting the roots is certain it is laborious to get several acres of sod. Still it will pay any farmer handsomely for his trouble in furnishing him a pasture of well sodded winter grazing grass.

Rescue Grass (*Bromus Schroderi*) is an annual but reseeds itself very successfully. It will afford two cuttings of hay and then will form seed and reseed itself. It is hardy and rapid growing, and will afford good grazing during the winter. Cut two tons of hay last season.

Italian Rye Grass (*Lolium Italicum*) is also an annual, but does not reseed itself as successfully as Rescue. It grows 2 to 3 feet high; very tender and nutritious, both as grazing and hay. It is a rapid grower and will please any farmer in search of a quick growing winter grass. It cut two tons per acre.

English Rye Grass (*Lolium perenne*), closely related to above but not so good.

Tall Meadow Oat Grass (*Arrenatherum avenaceum*) is perennial and makes good hay and grazing; cut 1.7 tons. It grows as high with us as 3½ feet. It makes a good grazing grass, but rather woody for hay.

Red Top (*Agrostis vulgaris*) is a perennial. It grows 10 to 14 inches high and affords good grazing and hay; cut one ton per acre. It is well adapted to damp, glady soils and creek and branch bottoms. Not so early as others.

Kentucky Blue Grass (*Poa pratensis*) is perennial and makes good grazing, but hardly grows high enough for good hay purposes.

Orchard Grass (*Dactyllis glomerata*) is perennial and makes good grazing and fair hay. It is hard to get a good sod, and does not stand our hot summers so well as some others.

Velvet Grass (*Holcus lanatus*) is perennial and affords good grazing, but does not reach a good hay growth. It also does not stand our summers well.

Quite a number of other grasses were planted in the spring but germinated badly and were choked out by native weeds and grasses. Experiments in grasses and clovers have been transferred to sandy soil, extensive plantings made in November, and results will be reported during the coming year.

Grasses and grains and clovers should be planted in the fall, September 15th to October 15th, for best results.

ANNUAL WEATHER SUMMARY, 1893.

Month.	Maximum temperature.	Date on which it occurred.	Minimum temperature.	Date on which it occurred.	Mean temperature.	Rainfall.	No. Rainy days.
January	72	30	18	16, 20	44.7°	1.63	2
February	76	20	26	13, 23	52.0°	3.99	11
March	82	22	23	5	54.9°	2.34	5
April	89	4	37	17	68.5°	7.22	6
May	92	26	50	24	69.3°	6.89	10
June	97	26	63	7	78.1°	7.82	12
July	97	26	66	24	82.4°	2.13	10
August	97	3	56	31	77.0°	3.28	8
September	97	15	52	21	74.0°	.28	3
October	91	1	31	3	62.8°	.31	2
November	81	2	26	24	52.1°	4.78	5
December	73	12, 15, 25	23	4	49.1°	2.54	3
Mean and total	87	.....	39	.....	63.9°	43.21	77