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W. H. Smith

E. R. Lloyd

J. R. Ricks

W. F. Hand

J. S. Moore

See next page for additional authors

Authors

W. H. Smith, E. R. Lloyd, J. R. Ricks, W. F. Hand, J. S. Moore, A. B. McKay, R. W. Harned, Daniels Scoates, H. B. Brown, E. M. Ranck, C. F. Briscoe, J. M. Beal, C. W. Tomlinson, H. K. Gayle, E. P. Clayton, N. F. Hanson, S. S. Jerdan, John Wendell Bailey, Sidney Gay, D. W. McIlwain, J. C. Kean, W. C. Gill, Eugene Beverly Ferris, C. T. Ames, and G. B. Walker

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COTTON EXPERIMENTS 1916

Agricultural College, Mississippi
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STATION STAFF

W. H. Smith.....President

E. R. Lloyd.....Director

J. R. Ricks.....Vice-Director and Agronomist

W. F. Hand.....Chemist

J. S. Moore.....Dairy Husbandman

A. B. McKay.....Horticulturist

R. W. Harned.....Entomologist

Daniels Scoates.....Agricultural Engineer

H. B. Brown.....Cotton Breeding

E. M. Ranck.....Veterinarian

C. F. Briscoe.....Bacteriologist

J. M. Beal.....Botanist

C. W. Tomlinson.....Geologist

H. K. Gayle.....Animal Husbandman

E. P. Clayton.....Poultryman

N. F. Hanson.....Assistant Animal Husbandman*

S. S. Jerdan.....Assistant Animal Husbandman*

J. W. Bailey.....Assistant Entomologist

Miss Sidney Gay.....Stenographer

D. W. McIlwain.....Superintendent of Farm

J. C. Kean.....Foreman in Mule Breeding

W. C. Gill.....Herdsman

E. B. Ferris.....Assistant Director, McNeill Station

C. T. Ames.....Assistant Director, Holly Springs Station

G. B. Walker.....Assistant Director, Delta Station

* In co-operation with U. S. Department of Agriculture.

COTTON EXPERIMENTS, 1916

INTRODUCTION.

This bulletin gives suggestions for cotton culture in different parts of Mississippi, and the results of some of the cotton experiments carried on in 1916 at three of the Mississippi Experiment Stations; namely, the Central or College Station, the Holly Springs Branch Station, and the Delta Branch Station.

The experiments at the Central Station were directed by J. R. Ricks and H. B. Brown; at the Delta Station by G. B. Walker and H. B. Brown; and at the Holly Springs Station by C. T. Ames.

Results from other experiments carried on within the past six years are reported in Bulletins 155, 161, 164, 169, and 173. These bulletins may be had by addressing the Experiment Station, Agricultural College, Mississippi.

The weather for the State as a whole was colder than usual during March and April, 1916, and the rainfall was below normal; but during May the temperature and rainfall both were above the average. June weather was about normal. The marked feature of the July weather was the frequence and heavy character of the rainfall over the eastern and southern portions of the State. Measurable rain fell practically every day and on the average for fifteen days at each weather station, although a few stations had twenty or more days. The average amount for the State was 10.23 inches, more than double the normal July rainfall, and the greatest on record for this month. The rainfall was least and generally below normal in the northwest tier of counties. During August and September, temperature and precipitation were both slightly below normal. This description is based on reports of the Vicksburg, Miss., office, U. S. Weather Bureau.

RESULTS FROM THE CENTRAL STATION, 1916

WEATHER.

The weather at the College Station is amply described in the following table compiled from reports made by Dr. Chas. F. Briscoe, keeper of weather records at the A. and M. College:

TABLE 1.—TEMPERATURE AND RAINFALL, 1916.

MONTH.	Maximum.	Average Maximum.	Minimum.	Average Minimum.	Departure from the normal in temperature	Total inches rainfall.	Departure from the normal in rainfall.	No. days on which rain fell.
January	76	59.8	15	40.4	+ 4.9	4.4		6
February	75	59.1	16	33.6	0.0	2.28	— 2.98	6
March	84	67.9	25	44	— 0.1	2.85	— 3.58	2
April	85	73.6	35	51.2	— 1.2	3.47	— 1.13	4
May	96	84.7	49	61.9	+ 1.7	7.02	+ 2.99	5
June	96	88.1	55	65.8	— 1.6	4.02	— 0.26	9
July	94	88.3				12.63	+ 7.92	16
August	97	90.6	59	69.1	— 0.7	2.58	— 1.42	4
September	96	86.4	40	59.0	— 2.9	.55	— 2.36	2
October	93	80.8	33	52.1	+ 1.7	.82	— 1.29	2
Total rainfall for ten months						40.62		

TABLE 2.—VARIETY TEST AT COLLEGE STATION, 1916

VARIETY STUDIES—The main results of the College Station variety tests are shown in the following table:

VARIETY.	Pounds Seed Cotton per Acre.	Pounds of Seed Cotton per acre on basis of a perfect stand.	Per cent lint	Length of staple in inches	Value of lint per pound in cents.	Lbs of lint per acre	Character of staple	Value of Seed per acre at $60 per ton.	Total money value per acre	Rank in money val.	Weight of 100 bolls in oz.	Germination shown by No. of plants up 12 ds. after planting.	Weight of lint on 500 seeds in grams.
Dodds' Prolific (from Dodds)	501	601	31.6	1 1/16	22	189.9	Fair	$12.33	$54.11	15	21.5	1916	25.2
Dodds' Prolific (from Expt. Sta.)	500	639	29.3	Full 1 1/16	22½	187.2	Fair	13.75	55.87	11	21.0	1436	23.2
Trice-266	538	666	29.9	1 1/16	22	199.1	Fair	14.00	57.78	9	21.5	2360	26.1
Trice (U. S. D. A.)	579	707	28.9	Full 1 1/16	22½	204.3	Fair	15.08	61.05	6	21.2	1340	24.9
Wannamaker-Cleveland	346	490	34.5	7/8	20	169.0	Fair	9.63	43.43	26	23.2	1428	33.5
Cleveland Big Boll	388	490	31.2	1	20½	152.8	Fair	10.11	41.43	27	27.5	762	36.4
Cleveland-027-11-24	429	573	30.2	1	20½	173.0	Fair	12.00	47.47	24	28.2	784	32.4
Cook	534	596	34.4	7/8	20	205.0	Fair	11.73	52.73	16	23.0	2754	34.2
Triumph (from Mebane)	339	510	34.1	1 1/16	22	173.9	Fair	10.08	48.34	21	28.0	672	34.1
Triumph (from Expt. Sta.)	318	475	35.0	1 1/8	23½	166.2	Fair	9.26	48.32	22	27.7	618	33.6
Miller	498	596	30.8	1 1/8	23½	183.5	Poor	12.37	55.49	13	28.5	1050	34.8
Lone Star (U. S. D. A.)	440	495	34.5	1 1/8	23½	160.7	Fair	10.03	47.79	23	28.5	1306	36.0
Lone Star-11	429	547	33.3	Full 1 1/16	22½	182.1	Fair	10.94	51.91	17	30.0	750	36.1
Lone Star-15	592	673	34.9	1 1/16	22	234.8	Fair	13.14	64.80	5	27.5	1432	37.1
Holdon	187	252	30.6	Full 1 1/8	25½	77.1	Fair	5.24	24.80	29	31.0	596	25.0
Polk	569	593	28.5	1 3/16	27½	169.0	Fair	12.72	59.20	7	19.0	2514	22.7
Unknown	445	550	30.5	1 3/16	27½	167.0	Fair	11.49	57.42	10	22.7	1468	26.6
Columbia (U. S. D. A.)	415	476	27.2	1 3/16	27½	119.4	Fair	10.69	43.53	25	25.7	976	28.9
Columbia (from Sherard)	303	365	27.3	1 3/16	27½	99.6	Fair	7.96	35.35	28	23.0	1226	24.6
Big Boll Express (from Allen)	524	582	26.9	1 3/16	27½	156.5	Fair	12.76	55.80	12	20.6	1196	22.7
Express-122	533	617	26.5	1 3/16	27½	163.5	Fair	13.60	58.56	8	18.2	2408	19.7
Express-350	674	758	27.3	1 3/16	27½	206.9	Fair	16.53	73.43	2	20.0	1604	21.9
Express-32	626	725	27.3	Full 1 1/8	25½	197.9	Poor	15.81	66.27	4	20.2	1502	24.5
Express-341	672	747	29.3	Full 1 1/8	25½	218.8	Fair	15.85	71.64	3	18.5	1800	23.1
Lone Star X Express A-38	406	500	30.1	Full 1 1/8	25½	150.5	Fair	10.48	48.86	20	22.5	1296	25.6
Foster-120	672	784	30.3	1 3/16	27½	237.5	Fair	16.39	81.70	1	26.2	1478	28.7
Webber-49	419	528	27.8	Full 1 3/16	29½	146.7	Fair	11.44	54.72	14	22.2	1028	28.9
Sunflower (from Schaefer)	446	488	27.7	Full 1 1/4	30½	135.1	Fair	10.58	51.79	18	19.7	2072	23.3
Sunflower (from Expt. Sta.)	433	503	27.5	1 3/16	27½	138.3	Fair	10.94	48.97	19	20.0	1448	23.2

DESCRIPTION OF VARIETY TEST.

Comparative Yields.—The varieties were grown on valley loam of moderate fertility that had been in cotton for several years. No effort was made to secure phenomenal yields; an ordinary yield under conditions common to a large part of the hill district of the State is of more value than large yields secured under unusual conditions. In variety studies the main interest is in comparative yields.

Culture.—The variety cottons were planted on April 17 in rows 3½ feet apart. When the plants were well up they were thinned to 12 inches in the drill. The weather being favorable, a fair stand was secured, but there was considerable difference in the per cent of germination in different varieties. This is shown by column 12, table 2. The figures given there represent the total number of seedling plants in the plats, counted twelve days after planting. Some of the seedlings died later of a fungus disease, probably anthracnose, but all skips were replanted with hoes on May 5. The first squares were observed on June 5, forty-nine days after planting; open blossoms were noticed on June 27, seventy-one days after planting and twenty-two days after squares first appeared. The maximum rate of flowering was reached on July 18, but there was not much difference in rate from July 15 to July 29. Between the latter date and August 2, the rate fell to almost nothing, and after this only a few scattered blossoms put out. This heavy falling off in blossoming rate was due to increase in boll weevil infestation.

Boll Weevil.—The first weevils found in the plats were discovered on June 12. For several days there was little evidence of weevil work, but by June 21 a good many punctured squares could be found. During the week beginning June 19, punctured squares were picked from all the plants in the plats, and the plants were also shaken in a bag to capture mature weevils. A similar search was made the following week. Fewer weevils were caught the second week; because of wet weather, they multiplied rapidly during the month of July. By the last of the month they were numerous enough to stop the blooming; very few of the bolls put on during the last decade of the month made anything, for as soon as the blossoms became scarce, the weevils attacked the young bolls and ruined many of them. The weevil damage at the Central Station was greater this year than ever before, due largely, doubtless to the wet weather during July. The rainy weather of July fostered reproduction of weevils, caused shedding of squares and bolls and prevented proper cultivation. These detrimental factors taken together made the production of a good cotton crop an impossibility.

Diseases.—A fungus disease injured to some extent the young seedlings of most varieties and caused some boll rot during the wet weather in July. Dry weather during August checked the latter disease and prevented serious loss.

Cotton wilt, or blight, attacked several varieties in the test and did considerable damage during the wet weather. The varieties most diseased were Trice (U. S. D. A.), Trice-266, Cleveland Big Boll, Cleveland-027-11-24, Lone Star, Foster-120, and Sunflower.

Yield.—Column 1 of table 2 gives the actual yield of seed cotton per acre. Column 2 gives the acre yields of seed cotton when computed for a perfect stand of plants. Unoccupied spaces in all rows were measured; and yields were calculated on the basis of all skips being occupied by

plants that produced as well as the others in the row. (In measuring skips in rows only open spaces between the outer ends of branches of successive plants were considered as skips.)The yields given in this column are probably of more value than the yields given in column 1 to use in considering the merits of different varieties. For a fair comparison all stands should be the same.

Lint Per Cent.—Column 3 of the table gives the lint per cent of the different varieties. The figures given in this table are mostly two or three per cent lower than corresponding figures given in former years. This difference is due to the fact that a saw gin was used in ginning the samples this year; while a roller gin that took a larger per cent from the seeds was used formerly. The out-turn given here will correspond closely with the out-turn of the varieties when ginned on a large gin in bale lots.

Classing.—The classing and stapling were done by H. L. Eustis, of Greenville, Miss. The samples ranged in grade from strict to good middling. The prices quoted in the table were current in the Greenville, Miss., market on December 2, 1916, for an average of these two grades.

GOOD VARIETIES FOR EAST AND CENTRAL MISSISSIPPI.

As was shown above, several factors having a bearing on cotton production were very unfavorable during the past season. Under these extreme conditions the medium early big boll varieties like Cleveland and Miller did not yield so well as some of the extra early small bolled varieties, like Trice and Express. It is not safe, however, to judge the merits of a variety from one year's testing. The medium early big boll varieties like Wannamaker-Cleveland, Cleveland Big Boll, and Miller have made a good showing in a number of tests each year for several years; consequently we are inclined to think that they are excellent varieties for the hill portion of the State. These varieties are vigorous growers, are fairly resistant to disease, and have a good percentage of lint and a staple of good length for a short cotton. Express has in the past three years made a good showing on valley land; and we are inclined to think no other cotton will do better on valley land under heavy boll weevil infestation. Trice ranks next in value to Express, for the conditions just mentioned. On very rich land that is free from wilt, Trice will probably yield better than Express, Wannamaker-Cleveland, Cleveland Big Boll, or Miller.

Express-350 and some others of our new strains of Express give promise of being considerably better than the parent strain. Express-122 is the only one of the new Express strains that is ready for distribution. Foster-120 is another of our new strains that has made a good showing in several tests. This strain has a slightly longer staple than Express, a larger boll, a better lint percentage, and is a better rich-land cotton. It is, however, not quite so early nor so prolific as Express; it is also rather susceptible to the wilt disease and the staple is somewhat irregular.

CULTURAL METHODS FOR EAST AND CENTRAL MISSISSIPPI.

Preparation of the Seed Bed.—The character of the soil very largely determines the time of breaking. A stiff soil should be plowed in the fall or winter and left rough for the action of the freezes. A light soil should be plowed only a short time before planting, especially if the tendency is to wash badly. On level lands the plowing can be done in

fall or winter, the earlier the better, that the vegetable matter may be more nearly decomposed by spring.

The method of plowing is determined in large part by time and team power. Flat breaking or broad-casting, the land to a depth of eight to ten inches and then ridging it with a middle buster in the spring gives the best seed bed. Planting on a small ridge or bed is better for cotton than planting flat, since the land dries out and warms up earlier, the seed germinate better, and the first cultivation can be made without damaging the young plants. Throwing two furrows together with a turning plow and using a middle buster to split the balks is a common practice, which is all right if done early and the ridges freshened at planting time with a harrow. A method which is followed to some extent is to split the old beds or ridges with a four-mule middle buster. This covers all vegetable matter, which decays by spring. Just before planting, these ridges are freshened with a turning plow and then smoothed with a disc harrow followed by a smoothing harrow.

Planting.—The planting should be done just as early in the spring as weather conditions will permit, after the soil has become warm enough to germinate the seed readily. At the Central Station the best time for planting is usually from the 15th to the 20th of April. South of the Station the planting can be done earlier, and north a few days later. The date of planting is also determined somewhat by the character of the soil. A well drained loam soil can be planted earlier than the stiffer soils. In our experiment plats we have planted earlier than the foregoing dates; but we have failed in getting a stand just about as many times as we have succeeded. The cold may not be severe enough to kill the young plants, but it will retard their growth to such an extent that they will not yield so well as later plantings.

Under boll weevil conditions, if a stand is not secured early in the spring, a second planting of cotton should not be made. Some other crop should be put in. To secure a stand "plenty" of seed should be planted. We prefer to use a bushel or more to the acre and then to chop to the proper stand. With a good seed bed and the surety of proper moisture and temperature, a half bushel per acre would be sufficient for a perfect stand; but, these conditions are so uncertain, and the risk so great that not less than a bushel per acre is necessary. The seed should be planted shallow.

Cultivation.—The first cultivation will necessarily have to be shallow to prevent covering the young plants. A side harrow or a Gee Whiz cultivator is a good implement for this purpose. The succeeding cultivations should be as deep as possible without injury to the plants. When, however, the plants are 8 to 10 inches high, the cultivations should be shallow, but deep enough to make a good mulch. In case of continued rain, which will prevent regular cultivation, it will be necessary to destroy grass and weeds. The implement that you have that will do this best is the one to use. It is a bad practice to turn the soil away from the young plants. If the destruction of grass and weeds make this operation necessary, the soil should immediately be returned to the roots of the young plants.

Cultivations should be continued as long as can be without injury to the plants. In our experiment plats we cultivate till the first week in August.

Spacing of Cotton.—For the past eight years the Central Station has conducted tests in spacing cotton. The tables below give the results for 1916. These results are much like the results of preceding years. Though the yields have always been greater than this year, the plats maintain their relative positions in production.

TABLE 3.—WIDTH OF ROWS.

3 foot rows	620 pounds of seed cotton per acre.
3½ foot rows	540 pounds of seed cotton per acre.
4 foot rows	490 pounds of seed cotton per acre.
4½ foot rows	480 pounds of seed cotton per acre.
5 foot rows	400 pounds of seed cotton per acre.

The plants in the above plat thinned to twelve inches in the drill, grew approximately four feet high.

TABLE 4.—DISTANCES IN THE DRILL.

12 Inches	576 pounds of seed cotton per acre
24 Inches	480 pounds of seed cotton per acre
36 Inches	450 pounds of seed cotton per acre

SINGLE STALK COTTON CULTURE.

What It Is.—In several recent publications of the Bureau of Plant Industry*, United States Department of Agriculture, a method of cotton culture designated as "Single Stalk Cotton Culture" has been advocated. The essential feature of the system is the suppression of vegetative branches by delayed thinning. If plants are allowed to crowd each other in the drill for a time, the development of vegetative branches is prevented to some extent. It is claimed that the suppression of vegetative branches stimulates the fruit branches and an earlier crop is produced; if the vegetative branches are lacking, more plants can grow in a row without crowding each other injuriously and greater yields will be produced.

Unfavorable Conditions.—During the season of 1916 a test of the "Single Stalk" system under Mississippi conditions was made at the College Station. The test was by no means conclusive. The season was very unfavorable for cotton growing and the stand was not all that could be desired for an experiment of this kind. The results, which may be of some interest, are presented for what they are worth.

The cotton used in this experiment was planted on April 17 on moderately fertile valley land. The land was divided into five sections embracing 110 rows. The first section was divided into six plats, each plat containing three rows five feet apart—eighteen rows. The second section likewise divided into six plats, contained nineteen rows 4½ feet apart. The third, also divided into six plats, embraced twenty-one rows four feet apart. Each of the other sections, in which "never thinned" cotton grew, was divided into seven plats; the fourth containing twenty-four rows 3½ feet apart; and the fifth, twenty-eight rows three feet apart. Thus each plat contained three or four rows.

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* "A New System of Cotton Culture," a paper in Circular 115.
"A New System of Cotton Culture and its Application," Farmers' Bulletin 601.
"Single Stalk Cotton Culture," Document 1130.
"Single-Stalk Cotton Culture at San Antonio," Bulletin No. 279.

TABLE 5.—SINGLE STALK COTTON CULTURE RESULTS.

	ROWS.	Number of Plants.	Number of Vegetative Branches.	Number of Vegetative Branches per plant.	Pounds of seed cotton.
	3-foot rows				
1	Never thinned	119	58	.48	1.95
2	Wide spaced	37	69	1.89	1.50
3	Wide spaced	40	54	1.35	1.00
4	Single stalk	80	72	.90	1.62
5	Single stalk	84	76	.90	1.67
6	Wide spaced	48	77	1.60	2.00
7	Wide spaced	53	96	1.81	1.86
8	Single stalk	96	83	.86	2.28
9	Single stalk	106	86	.81	2.10
10	Wide spaced	50	83	1.66	1.27
11	Wide spaced	66	84	1.27	1.55
12	Single stalk	57	72	1.26	1.82
13	Single stalk	127	86	.67	2.63
	3½ - foot rows				
14	Never thinned	168	51	.30	1.65
15	Never thinned	189	73	.39	2.10
16	Wide spaced	48	74	1.54	1.83
17	Single stalk	93	85	.91	2.51
18	Wide spaced	66	82	1.23	2.35
19	Single stalk	83	84	1.01	1.94
20	Wide spaced	52	65	1.25	1.28
21	Wide spaced	55	104	1.89	2.58
22	Single stalk	97	69	.71	2.85
23	Single stalk	86	80	.93	2.00
	4-foot rows				
24	Wide spaced	64	68	1.06	2.08
25	Wide spaced	52	77	1.48	1.87
26	Single stalk	93	104	1.12	2.20
27	Wide spaced	54	90	1.66	1.92
28	Single stalk	92	109	1.18	2.60
29	Wide spaced	50	109	2.18	2.35
30	Wide spaced	66	133	2.01	2.39
31	Single stalk	79	114	1.44	2.35
32	Single stalk	94	111	1.18	2.50
	4½ - foot rows				
33	Wide spaced	53	101	1.90	
34	Single stalk	78	123	1.57	
35	Wide spaced	61	95	1.55	
36	Single stalk	101	135	1.33	
37	Wide spaced	62	107	1.72	
38	Single stalk	90	119	1.32	
39	Single stalk	104	95	.91	
	5-foot rows				
40	Single stalk	131	88	.67	
41	Wide spaced	64	145	2.26	
42	Single stalk	126	102	.81	
43	Wide spaced	50	123	2.46	
44	Single stalk	110	104	.94	
45	Wide spaced	63	103	1.63	

The plants in alternate plats were thinned to eight to twelve inches in the drill on May 20. The plants in the remaining plats grew undisturbed until June 7, when all except those designated in table as "never thinned" were thinned to six inches in the drill. The "never thinned" plants, grown in only two plats, remained, as their name implies, unthinned to the last.

In table 5, only middle rows are compared; this is to say only the second rows of three row plats or the second and third rows of four row plats.

Results.—The main results of the Single Stalk culture experiment are shown in tables 5, 6, and 7.

TABLE 6.—AVERAGES FROM SINGLE STALK COTTON CULTURE EXPERIMENT.

ROWS.	Average number of plants per row.	Average number of vegetative branches per row.	Average number of vegetative branches per plant.	Average number of flowers per row.	Average number of lbs. of seed cotton per row.
Wide spaced rows	54.9	92.3	1.68	539	1.86
Single stalk rows	95.6	95.1	.99	647	2.22
Never thinned rows	158.6	60.6	.32	559	1.90

Superiority of Single Stalk Rows.—Tables 5 and 6 indicate that single stalk rows are best. Though the average yield is in no case great, the yield of the single stalk rows is better than that of the wide spaced or the never thinned rows, and this is true in respect to every width of row—three, three and a half, and four feet. For individual rows, likewise, the yield of the single stalk rows excels that of either the wide spaced or the never thinned. The single spaced rows, it should be noted, contain nearly twice as many plants as the wide spaced rows. Though they have about the same number of vegetative branches, they average per plant considerably less— .99 against 1.68. Per row the single stalk rows produce twenty per cent more blossoms than the wide spaced rows and about sixteen per cent more than the never thinned rows.

The average never thinned row contains far more plants than either the single spaced row or the wide spaced; 158.6 to 95.6 or 54.9. The plants, however, are so close together that apparently they injure one another. The never thinned row also has fewer vegetative branches than either of the others. This comparative absence of leaf branches however did not influence the yield greatly.

Superiority of the Three Foot Row.—The three foot row made the best yield per acre. The three and a half foot row made the next best. The four foot row made the lowest. The weights of the four and a half and the five foot rows are not used in this comparison because of an error made in picking the cotton.

Table 7 gives the flowering record of each row throughout the flowering season. Practically all the blossoming was done in July. The blossoms that opened in the last week of July produced very little fruit—boll weevils destroyed the young bolls.

LONG RECORD OF SINGLE STALK CULTURE COTTON, 1916.

ROWS.	June 29	30	July 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Aug. 1	Total.
3 Foot Rows—																																			
1 Never thinned	0	0	1	4	4	8	6	17	16	12	17	11	18	25	10	18	27	33	38	50	27	34	25	24	35	23	30	19	20	11	8	4	3	0	**578**
2 Wide spaced	1	0	2	2	4	5	9	9	12	9	11	5	16	12	12	6	18	17	35	25	22	19	16	14	26	15	18	24	9	10	6	2	3	3	**397**
3 Wide spaced	3	0	1	1	5	6	2	1	13	5	8	6	8	7	8	10	16	8	31	30	11	26	6	21	23	16	20	25	13	14	5	2	3	2	**356**
4 Single stalk	0	1	7	1	7	9	8	11	12	9	14	10	15	14	22	18	17	29	37	40	17	22	22	24	31	33	20	21	19	5	5	2	2	2	**506**
5 Single stalk	1	3	2	3	7	5	10	9	14	7	13	9	26	15	20	13	33	24	42	28	25	27	40	17	43	38	36	20	28	13	7	4	3	3	**588**
6 Wide spaced	2	1	2	3	6	13	9	14	13	6	11	10	18	16	9	15	20	23	30	38	33	35	24	33	34	6	23	22	23	11	6	5	0	1	**517**
7 Wide spaced	1	0	5	4	6	9	7	8	12	8	12	7	15	12	11	20	24	20	37	40	56	30	28	29	27	30	25	25	22	10	8	3	2	2	**555**
8 Single stalk	0	1	1	3	8	20	15	13	17	13	16	13	28	26	11	25	37	33	50	47	36	35	24	30	29	22	23	15	11	11	2	2	1	5	**623**
9 Single stalk	2	2	3	5	7	17	8	17	12	10	15	11	19	23	22	20	42	21	57	54	31	35	23	20	42	31	26	12	13	8	6	6	1	7	**628**
10 Wide spaced	1	2	0	3	5	7	6	5	10	7	9	11	11	15	11	17	17	25	38	32	19	29	14	17	34	22	17	14	8	5	6	7	3	2	429
11 Wide spaced	3	1	4	3	6	7	6	8	16	9	13	13	19	15	13	14	36	27	51	46	29	32	28	31	55	28	30	15	13	11	5	2	3	3	**595**
12 Single stalk	2	1	0	2	7	4	4	13	19	11	17	15	23	15	15	22	25	26	37	38	40	32	27	23	28	10	18	16	7	8	4	5	2	3	**519**
13 Single stalk	0	3	7	8	4	11	13	25	28	14	21	9	23	24	14	27	51	32	69	65	35	52	38	32	39	32	35	12	22	5	4	4	3	5	**766**
3½ Foot Rows—																																			
14 Never thinned	0	1	2	4	4	8	8	12	15	4	12	10	13	23	12	16	29	34	40	33	27	43	13	18	27	21	19	14	9	10	9	1	5	5	**501**
15 Never thinned	1	4	6	1	3	10	14	22	19	8	13	17	22	26	16	20	41	39	65	39	19	40	13	19	33	15	25	15	11	12	6	2	3	2	**600**
16 Wide spaced	1	3	2	2	5	11	6	14	9	6	12	19	15	11	9	21	22	24	35	25	22	19	46	16	29	25	26	23	23	12	4	4	5	3	**509**
17 Single stalk	2	1	2	3	20	16	13	21	23	14	18	8	25	23	20	23	30	26	55	42	26	28	27	39	34	20	33	17	21	24	10	9	0	4	**677**
18 Wide spaced	1	1	1	3	4	12	8	10	16	8	15	10	24	18	12	23	33	22	43	53	34	31	18	31	20	22	19	10	9	13	10	5	7	2	**548**
19 Single stalk	1	1	0	2	8	12	7	22	19	9	15	10	27	19	15	26	42	23	44	36	28	25	21	22	21	17	24	9	16	10	8	5	1	4	**549**
20 Wide spaced	0	0	2	3	8	11	9	16	21	8	15	8	22	12	15	30	27	17	41	38	26	24	17	15	26	18	34	20	18	11	3	5	3	6	**529**
21 Wide spaced	2	2	4	2	8	6	13	8	13	9	13	11	21	22	15	16	25	38	26	51	27	31	17	29	36	24	32	22	23	10	14	4	8	6	**588**
22 Single stalk	0	1	3	2	7	9	3	15	23	15	15	8	25	24	13	26	37	30	40	37	30	27	20	30	20	22	20	14	5	10	7	4	4	2	**548**
23 Single stalk	1	2	0	3	6	11	13	12	10	4	17	12	16	19	12	20	40	12	53	35	38	37	27	29	26	19	25	14	18	12	4	1	3	3	**554**
4 Foot Rows—																																			
24 Wide spaced	1	2	0	1	9	11	8	14	9	7	17	5	20	13	12	31	26	18	42	34	21	37	26	26	27	22	23	10	10	10	5	2	3	4	**506**
25 Wide spaced	3	0	1	1	3	6	6	9	11	9	8	14	15	21	9	17	25	13	41	36	25	19	13	23	27	22	26	15	16	11	2	6	3	3	**469**
26 Single stalk	1	0	0	5	0	8	5	16	16	7	20	7	22	18	14	21	41	30	45	42	33	34	29	32	51	30	37	13	14	9	3	5	0	1	**603**
27 Wide spaced	1	1	6	0	8	6	7	7	9	7	8	7	19	9	11	17	21	19	36	40	24	23	23	29	31	22	28	17	17	15	5	8	6	4	**491**
28 Single stalk	2	3	3	10	4	19	12	16	16	13	14	13	19	13	15	26	29	25	57	62	41	33	34	40	29	39	41	11	7	11	5	10	2	1	**675**
29 Wide spaced	0	3	3	3	10	12	9	12	15	8	11	13	15	19	12	26	26	27	53	52	27	40	30	46	34	35	38	15	21	10	4	1	1	4	**635**
30 Wide spaced	3	2	2	7	3	13	5	11	17	8	15	10	20	19	16	22	31	32	36	43	31	31	24	38	36	37	27	25	23	20	4	4	1	3	**619**
31 Single stalk	3	2	10	1	7	13	6	14	11	15	19	7	20	19	13	24	36	31	46	51	28	34	27	44	39	31	41	29	13	12	14	4	1	1	**666**
32 Single stalk	5	3	4	4	12	13	19	25	32	15	20	14	21	33	16	22	41	36	54	48	44	46	35	23	27	18	40	32	19	6	4	3	1	0	**745**
4½ Foot Rows—																																			
33 Wide spaced	2	3	6	3	8	13	6	12	15	6	18	11	29	23	10	23	37	25	47	47	34	46	27	44	24	44	30	23	16	10	8	2	2	5	**659**
34 Single stalk	3	5	7	0	7	8	18	14	17	9	20	19	20	20	24	22	38	33	46	52	34	22	28	31	42	40	31	14	15	8	10	2	2	1	**662**
35 Wide spaced	3	1	1	2	7	7	4	9	13	4	12	12	14	12	5	23	32	19	45	39	29	23	21	25	20	23	33	21	21	9	4	2	5	4	**504**
36 Single stalk	1	4	3	6	12	18	10	18	22	16	18	16	22	25	10	29	38	37	48	48	29	47	12	36	36	31	35	20	22	11	7	1	0	1	**689**
37 Wide spaced	5	1	2	4	6	16	12	16	14	10	16	13	13	18	15	18	32	17	27	35	23	30	35	22	35	34	33	27	22	14	5	3	0	2	**575**
38 Single stalk	2	3	3	4	6	10	8	12	18	5	14	9	25	32	7	28	58	32	53	70	27	46	16	38	40	28	33	24	5	13	10	1	0	2	**684**
39 Single stalk	1	1	4	0	11	12	13	16	20	5	17	11	21	14	14	36	36	38	42	56	34	26	34	41	46	34	31	25	15	14	5	2	2	1	**678**
5 Foot Rows—																																			
40 Wide spaced	3	4	2	3	7	11	6	13	15	11	12	9	16	10	13	21	27	34	35	49	27	31	25	27	26	28	16	10	8	6	6	2	1	2	**516**
41 Single stalk	2	1	4	6	13	13	17	22	22	10	21	21	23	29	21	41	45	32	60	42	53	41	28	24	53	25	42	23	8	15	9	2	1	2	**771**
42 Wide spaced	0	2	1	4	7	9	15	17	22	20	12	11	23	20	9	30	42	31	39	42	27	37	34	40	37	35	48	22	19	13	12	8	0	4	**692**
43 Single stalk	0	2	3	7	6	22	11	15	18	16	14	12	25	20	19	28	46	31	50	57	28	53	25	48	41	36	38	21	25	12	5	0	3	0	**737**
44 Wide spaced	2	3	3	2	14	9	11	15	11	11	14	9	10	21	13	24	40	22	42	35	35	31	22	42	50	36	28	17	26	25	9	4	1	3	**640**
45 Single stalk	2	3	3	6	6	8	12	20	24	21	22	20	28	14	17	32	49	28	33	58	25	35	31	43	54	39	31	27	23	9	5	0	0	0	**728**

SUMMARY.

The results of this experiment with the single stalk system agree in general with the results obtained by Cook, Meade, and others of the Bureau of Plant Industry. Meade in his experiments at San Antonio, Texas, secured a considerably higher margin of yield in favor of the single stalk system than was secured in the College test. His results, however, are open to criticism. His wide spaced and single stalk plantings were alternated, in rows or in blocks and the cotton was saved from all the rows. A thick row growing by the side of a thin row is sure to make a greater yield. It has the advantage in that there are more plants, and these plants are not crowded very seriously.

In the College experiment we have not proved, necessarily, that the increased yields were due rather to the delayed thinning than to leaving the plants close together in the drill when thinning, nor do we see that the Bureau of Plant Industry investigators have proved this point. Ricks, of the Mississippi Experiment Station, has shown by a series of experiments extending over a period of eight years, that under conditions prevailing on the College Station farm, close spacing will give higher yields than wide spacing. A further discussion of the subject is given on page 34 of this bulletin.

COTTON WILT EXPERIMENTS.

The experiment work with cotton wilt during the current year was similar to the experiments of the past three years. Prominent wilt resistant varieties were grown on wilt infected soil along with susceptible varieties, and a number of wilt resistant plants selected from an infected plat were tried out in progeny rows.

The plants in this test started out well early in the season and grew well until the heavy July rains came. The rainy weather prevented cultivation, caused a shedding of forms, fostered the reproduction and increase of boll weevils, and favored the spread of the wilt disease. Dry weather began in August and continued the rest of the season. This served to hold the disease in check, otherwise a large part of the plants would have died.

TABLE 8.—COTTON WILT EXPERIMENT, 1916.

VARIETY.	No. plants in plat	Number Plants infected with Wilt.	Per cent. of healthy plants.	Pounds of Seed Cotton per acre.	Pounds of Seed Cotton per plant.	Per cent lint	Length of lint	Value of lint per pound	Total money value per acre
Dixie	471	180	61.8	305	.021	31	1	20½	$25.68
Trice	424	291	31.4	313	.024	29.9	1	20½	25.74
Covington Toole	447	170	61.9	329	.024	33.5	1	20½	29.15
Lone Star (U. S. D. A.)	348	249	25.6	274	.022	34.4	1 1/8	23½	27.22
Wannamaker-Cleveland	282	172	39.0	289	.033	35	7/8	20	25.85

As a consequence of the contrary factors, the yields were extremely low, as shown by table 8. Covington-Toole, as in former years, led in yield and money value per acre. Wannamaker-Cleveland led in yield per plant by fifty per cent and would have led in yield per acre had the original stand been satisfactory.

As is shown in column 2 of table 8, a large per cent of the plants of all the varieties were wilt infected at the close of the season. The infection probably harmed the Dixie and Covington-Toole plants very little, for none gave any external signs of being infected. About five per cent of the Wannamaker-Cleveland died from the effects of the disease and ten per cent were weakened by it; the other forty-six per cent (infected plants) gave no external symptoms of the disease and were not injured seriously. About ten per cent of the Trice plants died and twenty-five per cent were injured; the other thirty-three per cent (infected plants) were not harmed greatly. Out of a total of three hundred and forty-eight of Lone Star plants, two hundred and forty-nine were infected. This variety was injured more than Wannamaker-Cleveland but not as badly as Trice.

Under heavy weevil infestation it is hardly advisable to attempt to grow cotton on land badly infected with wilt, even the best wilt resistant variety known. However, Wannamaker-Cleveland in spite of heavy boll weevil infestation has yielded fairly well, on the College farm on land that is to some extent wilt infected. This is the best variety we have tried for such conditions. Dixie and Covington-Toole are wilt resistant, but they are too late to combat the weevil satisfactorily.

Several wilt resistant varieties that have been tested in Alabama are described in a recent publication of the Alabama Experiment Station. Of the varieties "Tri-Cook," a hybrid between Triumph and Cook, is the most promising, but it has not yet been tried under heavy boll weevil infestation.

CONTROL OF COTTON WILT.

For the State of Mississippi as a whole cotton wilt, or "black root," is not a serious disease, yet there are large areas in the cotton growing district in which it does do much harm. In certain limited areas in Mississippi considerable loss is occasioned by this disease.

The disease is caused by a fungus organism (*Fusarium vasinfectum Atk.*), that lives in the soil and enters the cotton plants through their roots. The action of the organism and the symptoms by means of which diseased plants can be recognized are described in some detail in Mississippi Agricultural Experiment Station Bulletin No. 173. This fungus thrives apparently only in sandy or sandy loam soils. It causes more trouble during rainy than dry seasons. It is carried from infected to uninfected soils in various ways—by flowing water, plows, the feet of mules, etc.

A number of control measures have been tried, but none have proved very satisfactory. The disease cannot be eradicated by the use of fertilizers; and chemical fungicides used in the soil have not reduced the disease. Rotation of crops helps some, because this fungus attacks no plants except cotton; yet it will live in the soil for years, even when no cotton is grown. It seems to be impossible to get entirely rid of it even by using long periods of rotation.

The most promising method of control is by breeding better resistant varieties. Certain varieties have been developed already that are fairly satisfactory in a struggle against wilt alone. It is within the range of possibility to develop a strain that will be wilt resistant and early enough to yield well under weevil conditions. Some of the wilt resistant plants selected by the Mississippi Experiment Station last year

and grown in progeny rows this year, made fifty per cent more cotton than the parent strain, both growing under the same conditions. It must not be inferred that it is an easy matter to develop wilt resistant strains of cotton. It is, in fact, a very difficult matter and requires years of careful work. But we are inclined to think that any planter who will use proper care with persistence, can develop a cotton highly resistant to wilt.

A number of apparently resistant individual plants growing on wilt infected soil should be selected. Seed from these plants should be planted in progeny rows,—plant to row method. Seed from the most resistant and most prolific of these rows may be planted in a further test the following year. Seed from the best rows, as shown by the second year's testing, should be planted in a multiplying patch. From this patch new individual plant selections may be made and so on. All of this testing must be done on wilt infected soil. If such a plan is followed for a number of years, strains more resistant to wilt and better adapted to local conditions are likely to develop.

NATURAL CROSSING IN COTTON.

To all persons interested in cotton breeding and in maintaining the purity of a variety or strain, the subject of natural crossing, or hybridizing, is one of considerable importance. Various opinions are held as to the amount of crossing that takes place when two varieties are planted in close proximity. The results obtained by different investigators vary considerably, due largely, doubtless, to varying conditions in respect to the number and kinds of insects in the locality where the studies were made.

Most recent writers have expressed the opinion that the crossing of plants growing near one another takes place very commonly. Balls* says, "The vast majority of individuals in any cotton crop yet studied are heterozygous in several characters, and the amount of crossing which takes place between cotton plants growing in a field so producing this heterozygous condition, ranges from five to twenty-five per cent, by experimental evidence." Cook† also is of the opinion that cross fertilization takes place very frequently. He says, "The experiments with Egyptian cotton in Arizona confirm the results of our Texas experiments in showing that cross fertilization takes place in a much larger proportion of cases than previous writers on the subject have supposed. The large, showy, open flowers of the cotton plant invite the visits of insects, so that a large amount of cross fertilization has to be expected whenever different varieties or types of cotton are grown in the same vicinity close enough for the same bees to visit the flowers of more than one kind."

Allard‡, in an experiment carried on in northern Georgia, noted a crossing of twenty per cent between different varieties when planted in alternate rows.

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*_Some Cytological Aspects of Cotton Breeding_, by Lawrence Balls, M. A. _Proceedings of American Breeders' Association_, Vol. V, p. 27.

†_A Study of Diversity in Egyptian Cotton_ by O. F. Cook and others. Bul. No. 156, Bureau of Plant Industry, U. S. D. A., July 1909.

‡_Preliminary Observations Concerning Natural Crossing in Cotton_, by H. A. Allard

Vol. VI, American Breeders' Association Report, p. 160.

In the experiments carried on by the Mississippi Experiment rather low percentages of crossing have resulted, but these differed considerably with varieties. In these experiments different green leaf varieties were planted in rows alternating with rows of Willet's Red Leaf cotton. Each green leaf row grew with a red leaf row on each side. 100 bolls were picked from each of the green leaf rows, and the following spring the seed from these bolls were planted in separate plats. In the case of two of the varieties stakes were driven down in the rows so as to keep the plants from one boll separate from the progenies of other bolls. The Red Leaf plants have a deep red color, and when crossed with green leaf varieties produce hybrid plants that show the red color very distinctly, thus making them easily recognizable. By counting the plants of each kind appearing in the plats planted from the hundred bolls, it is an easy matter to determine the per cent of crossing that took place the year before.

The plants grown in 1915 were partly thinned by mistake before counts had been made so the results for that year are not altogether reliable. The "choppers" may have favored one or the other of the two kinds of plants. The results obtained were as follows: Lone Star-132 showed a crossing of 2.8 per cent; Triumph, 4.9 per cent; Cleveland, 13.9 per cent; Trice, 1.6 per cent; Lone Star-15, 10.2 per cent.

In the tests of 1916 all the plants produced were counted. The numbers ran as follows: Cleveland, pure 251, hybrids 13—per cent of crossing 4.9; Lone Star-132, pure 464, hybrids 25—per cent of crossing 5.1; Triumph, pure 224, hybrids 25—per cent of crossing 11.1; Lone Star-15, pure 1194, hybrids 94—per cent of crossing 7.3; Trice, pure 907, hybrids 64—per cent of crossing 6.6; Cleveland, from bolls picked from hills alternating with Red Leaf hills, pure 75, hybrid 17—per cent of crossing 18.5; Cleveland, from bolls picked from the middle of a four row plat that was separated from Red Leaf cotton by ten rows of corn, pure 244 plants, hybrids 2—per cent of crossing .8.

Table 9 shows the number of pure and hybrid plants in individual boll progenies of Trice and Lone Star-15. The first number in column 1 is the number of pure plants coming from a certain boll, and the first number in column 2 is the number of hybrid plants coming from the same boll. It will be noticed that a large number of the bolls produced no hybrid plants and the ones that did produce some hybrid plants produced only a relatively small number per boll. This shows that even where there is cross pollination of a flower, only a small portion of the ovules are affected.—(See table 9 on page 17.)

BOLL WEEVIL.

The boll weevil is at present the chief limiting factor in the production of cotton in Mississippi. Since 1907 it has spread throughout the State and gradually increased in numbers. In 1916 the damage done was greater than ever before, but this was due in part to the rainy weather during July which favored weevil reproduction. Some counties in the northern part of the Delta have not had much damage as yet, and other places have experienced considerable fluctuation in amount of damage; but on the whole there has been a gradual increase. There is at present no good evidence that the worst has been reached.

BOLL WEEVIL CONTROL.

Various methods of weevil control have been suggested and tried, but no thoroughly satisfactory method has been found. Picking weevils by hand during the early part of the season, or capturing them by the hoop and bag method (shaking plant in a bag which has a barrel hoop sewed in it to keep it open), and picking up infested squares have all proved to be of little practical value. Coad, entomologist in charge of Government boll weevil investigations at Tallulah, La., in experiments carried on a year or two ago, secured an apparent increase of about twenty per cent in cotton yield by gathering weevils regularly and systematically, but later experiments failed to verify these results. On the College farm during the past season weevils and punctured squares were collected from certain plats each week for a period of six weeks following June 21. The bag and hoop method was used and in addition punctured squares were collected by hand both from plants and from the ground. The plants were not large and more thorough work was done than ordinary plantation labor would do. This collecting had a tendency to lessen infestation, but enough weevils appeared each week to destroy a large portion of the forms put on. This cotton was planted near a woods which was probably a good hibernating place for the weevils and served as a source of infestation in the spring. Other plats farther away from the woods, from which weevils were collected only twice, made more cotton.

There are a number of weevil catching machines on the market, but we have never yet seen one that is as effective and satisfactory as a hoop and bag.

It may pay to collect weevils early in the season before the cotton begins to square, if labor is cheap and plentiful, but even that is doubted by some.

Hinds, in Bulletin No. 188, issued by the Alabama Experiment Station, makes a number of suggestions for cotton farming under boll weevil conditions. Below is a summary of a part of the recommendations made:

1. Hold farm labor.
2. Raise a variety of crops and rotate.
3. Grow more feed, forage crops, and live stock.
4. Provide markets for new products.
5. Improve soil by keeping live stock, and by growing legumes and green manure crops.
6. Reduce cotton acreage so as to give cotton best of care.
7. Prepare soil better before planting.
8. Grow a good variety and one suited to the soil.
9. Plant as early as conditions will permit.
10. Plant on a uniform date.
11. Give frequent and shallow cultivation.
12. Collect weevils before squaring begins.
13. Destroy cotton stalks as early as possible.
14. Clean ditches, turn rows, and fence lines.

There is evidence indicating that forests and large timber afford excellent hibernating places for boll weevils. Cuts of cotton near a forest are usually infected before cuts farther removed, and weevils are more numerous there during the season. Clearing timber tracts

on plantations devoted largely to cotton farming is to be recommended. Where this is not practicable, cotton should be planted as far from the woods as is possible.

If it were possible to get all growers to destroy their cotton stalks a week or two before frost, the boll weevil problem would probably be largely solved; for under such procedure most weevils would starve before going into hibernation. This year the College Experiment Station cut all the cotton stalks on the farm early in October. Part were cured and stacked for hay, while the rest were cut up and put into a silo. The stalks contain considerable nutriment and give promise of value as feed. Cattle eat about forty per cent of the cured plant with apparent relish.

TABLE 9.—NUMBER OF PURE AND HYBRID PLANTS IN INDIVIDUAL BOLL PROGENIES, NATURAL CROSSING EXPERIMENT.

Trice	Hybrid	Trice	Hybrid	Trice	Hybrid	Trice	Hybrid	Lone Star-15	Hybrid	Lone Star-15	Hybrid	Lone Star-15	Hybrid	Lone Star-15	Hybrid
10	0	16	0	10	2	6	0	4	0	6	0	10	2	3	0
4	0	24	0	2	1	8	0	3	0	10	0	11	0	12	1
1	0	21	0	6	0	14	1	22	1	12	0	13	0	16	0
7	0	17	1	14	0	14	4	19	0	3	0	13	1	2	0
12	1	8	0	12	1	18	0	10	0	4	1	8	0	13	0
10	0	15	1	18	0	1	0	7	1	16	0	4	0	13	4
15	5	15	2	18	0	13	1	9	3	8	1	16	1	9	0
12	0	17	0	13	0	19	0	15	2	8	0	8	0	9	0
6	0	16	0	5	0	18	1	2	3	8	0	15	0	12	1
3	0	12	2	19	1	11	0	2	0	2	0	7	0	6	0
3	1	13	1	15	0	10	1	19	0	5	1	12	1	15	0
12	1	18	0	17	2	11	0	11	2	19	3	14	0	8	0
14	0	8	1	12	1	4	2	17	3	3	0	2	2	6	0
24	0	11	1	20	0	13	0	8	0	13	4	8	0	15	2
14	2	15	2	14	0	16	3	9	4	2	0	7	0	11	0
19	0	16	0	14	0	15	1	3	0	3	1	18	1	11	0
8	0	15	0	5	2	6	5	5	3	13	0	3	0	16	0
7	0	7	3	8	0	5	0	2	0	12	0	17	0		
15	0	5	0	11	0	8	1	10	0	17	0	4	0		
17	3	15	0	15	0	1	0	11	0	15	2	10	0		
14	4	15	0	9	1	6	1	5	0	6	0	12	4		
11	9	9	0	5	0	10	0	10	1	11	1	15	0		
23	4	12	0	12	6	11	2	3	1	12	0	10	1		
8	1	9	0	16	1	17	0	1	0	16	0	8	1		
15	2	12	3	14	3	10	0	11	4	7	0	17	0		
								10	0	3	0	6	0		
				Total		907	64							1194	94

Decrease in Production.—Table 10 shows the number of bales of cotton produced by each county in the State since 1907. These figures are taken from the records published by the Bureau of Census, U. S. Department of Agriculture. Though the figures show a general decrease in cotton production, they do not indicate fully the amount of damage

TABLE 10.—QUANTITY OF COTTON, EXCLUSIVE OF LINTERS, GINNED IN MISSISSIPPI FROM THE CROPS OF 1907 TO 1916.

	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916†
Adams	20,455	14,155	1,700	1,062	2,204	1,246	1,106	1,519	1,200	
Alcorn	6,301	8,611	5,030	7,978	10.553	7.719	10,170	13,379	10,091	3,692
Amite	25,568	25,889	14,063	3,533	1,398	2,736	2,586	2,846	2,947	3,561
Attala	23,387	21,367	13,696	21,122	21,431	12,717	10,710	9,978	6,860	1.319
Benton	7,295	8,445	4,447	6,975	8,253	6,141	8,535	9,787	7,274	2,898
Bolivar	68,593	85,466	56,131	71,175	54,792	77,558	112,755	107,485	92,563	62,369
Calhoun	11,359	13,227	8,671	9,249	14,665	10,750	13,026	11,134	7,901	841
Carroll	20,613	24,564	14,263	19,255	19,705	16,080	16,154	15,287	9,363	2,992
Chickasaw	16,671	23,033	13,825	14,296	20,708	15,579	20,492	16,925	9,782	3,102
Choctaw	8,476	9,263	5,160	7,542	9,345	7,172	5,792	4,477	2,776	524
Claiborne	24,183	21,397	8,970	4,931	4,341	3,760	4,186	4,896	3,807	2,730
Clarke	9,891	12,837	8,674	10,122	12,965	4,883	1,654	2,438	2,097	
Clay	16,807	18,972	9,520	14,455	14,014	10,556	14,695	11,241	4,979	1,837
Coahoma	49,719	67,615	49,811	51,015	43,127	63,865	80,105	87,510	68,350	43,990
Copiah	30,689	32,233	19,448	14,265	5,853	2,545	2,540	3,855	2,482	2,658
Covington	6,670	9,540	7,890	8,924	5,218	2,755	2,166	2,895	2,052	952
De Soto	22,098	29,887	22,740	18,388	29,938	21,100	28,889	30,308	26,465	17,271
Forrest	2,147	3,478	2,803	3,361	2,382	852	979	1,612	873	
Franklin	15,045	15,064	5,451	1,314	690	608	600	1,150	890	
George				270	264					
Greene	383	902	692	414	431					
Grenada	11,911	16,085	8,988	9,901	15,573	12,213	13,706	11,681	8,774	1,715
Hinds	51,767	46,860	31,035	30,797	21,585	17,798	18,641	21,391	16,258	8,337
Holmes	50,802	48,389	29,836	42,406	34,819	30,274	35,789	32,778	23,229	10,027
Issaquena	15,446	11,650	11,925	13,332	9,404	8,853	5,858	6,165	5,535	739
Itawamba	9,097	9,850	7,063	7,528	11,197	8,330	11,014	11,325	9,195	716
Jasper	12,106	16,080	11,259	13,887	12,530	4,628	2,640	3,609	3,314	602
Jefferson	22,955	21,251	8,041	3,593	4,565	3,400	2,986	3,740	3,116	2,870
Jefferson Davis	9,661	14,920	12,124	11,621	6,272	3,698	3,561	5,049	3,169	2,034
Jones	8,501	13,464	10,220	12,163	10,842	5,103	3,540	4,727	3,544	630
Kemper	21,837	19,807	12,843	18,772	21,224	17,823	12,547	9,451	6,198	797
Lafayette	15,176	18,068	12,449	11,834	15,811	12,423	14,537	14,599	11,520	2,037
Lamar	1,647	3,065	2,470	2,693	1,373	231	359	829	301	
Lauderdale	20,322	22,315	14,848	19,257	24,044	16,145	7,035	4,640	3,697	412
Lawrence	8,633	12,053	9,994	6,383	2,495	2,162	3,179	5,020	4,753	3,306
Leake	17,357	14,563	8,523	14,220	13,577	7,653	5,835	6,752	4,912	1,505
Lee	17,032	23,917	16,594	19,869	22,561	20,297	29,426	25,934	20,553	2,862
Leflore	41,988	61,395	38,061	45,592	43,693	50,884	71,631	55,331	38,183	26,163
[illegible]	10,231	22,222	14,712	6,552	2,157	2,791	4,237	7,629	6,132	4,244

Lowndes	22,009	22,394	13,881	21,426	20,946	17,754	24,069	20,877	8,826	1,150
Madison	35,306	29,749	20,780	30,626	25,027	18,214	16,234	18,229	13,233	†6,434
Marion	7,171	9,732	7,816	5,884	2,380	1,131	913	1,168	1,803	
Marshall	20,607	23,935	14,967	21,123	23,624	19,725	22,912	26,270	20,459	10,501
Monroe	27,657	31,402	18,044	22,505	26,856	19,361	30,829	29,045	15,106	3,052
Montgomery	16,869	19,199	11,338	17,087	16,579	11,119	11,070	10,667	6,971	1,068
Neshoba	13,766	15,205	10,176	16,119	18,318	11,140	6,165	4,991	4,706	974
Newton	17,899	20,475	12,507	17,698	19,462	6,948	2,526	2,714	3,602	926
Noxubee	28,613	27,697	17,165	27,489	21,688	18,218	24,503	18,806	8,492	3,813
Oktibbeha	11,443	13,045	7,625	12,927	12,221	9,918	13,312	8,556	3,258	1,023
Panola	31,478	40,026	25,502	20,799	33,102	29,019	35,360	34,846	28,548	14,764
Pearl River	539	1,223	862	396	53					
Perry	1,016	1,577	1,360	1,439	1,524	466	697	1,047	356	
Pike	22,047	26,845	21,234	9,121	3,742	3,835	4,182	5,383	4,562	3,823
Pontotoc	12,147	15,826	10,777	10,889	16,062	13,788	16,812	19,444	13,791	1,436
Prentiss	11,533	13,513	8,662	10,832	12,813	11,166	14,440	16,627	13,103	3,883
Quitman	9,260	15,775	11,110	11,792	14,475	16,244	19,881	20,797	19,715	14,754
Rankin	18,338	18,472	12,878	16,117	7,807	2,608	2,073	2,999	2,539	1,393
Scott	12,039	11,933	7,921	11,018	8,658	2,058	1,290	1,868	2,021	
Sharkey	20,581	19,671	18,849	22,136	15,944	13,224	20,178	17,194	18,208	4,363
Simpson	11,416	14,545	10,758	12,277	5,479	2,791	3,362	4,679	3,076	2,010
Smith	11,029	13,716	10,702	13,358	8,743	3,659	2,827	3,699	2,592	1,310
Sunflower	41,786	55,374	37,653	50,715	48,003	59,047	89,770	78,064	58,877	42,623
Tallahatchie	27,531	39,394	26,155	32,467	37,808	39,086	49,176	50,203	36,038	23,175
Tate	16,679	21,894	14,862	11,954	17,673	14,814	20,800	23,406	19,116	12,137
Tippah	7,658	9,856	5,500	8,969	10,726	8,403	10,684	12,720	12,245	4,119
Tishomingo	4,366	5,544	4,013	5,730	8,209	6,593	8,191	10,895	7,216	2,059
Tunica	23,148	38,534	27,073	24,084	29,519	25,826	35,338	37,679	34,883	18,854
Union	12,177	12,974	7,915	10,669	13,098	10,867	13,238	14,973	13,897	2,416
Walthall*								3,454	3,433	2,405
Warren	19,002	11,702	11,329	8,395	8,177	5,684	7,602	9,130	7,640	2,481
Washington	65,197	60,523	60,522	63,485	45,441	50,818	87,412	68,966	52,647	26,871
Wayne	5,577	6,135	4,414	4,221	5,643	2,773	2,217	3,385	1,934	149
Webster	9,943	11,504	8,059	11,086	13,698	10,533	11,342	9,283	6,072	586
Wilkinson	23,128	17,720	4,358	1,186	1,628	936	1,075	1,795	1,398	
Winston	13,410	13,773	7,736	13,438	14,385	11,750	8,346	5,484	3,480	552
Yalobusha	15,265	19,471	12,265	11,127	18,594	14,819	18,394	15,842	11,306	1,335
Yazoo	52,609	46,531	32,181	40,950	24,767	16,437	30,469	31,344	24,709	9,741
All other	163	442	186	524	195	276	491	1,262	516	2,742
The State	1,442,881	1,620,325	1,073,105	1,212,104	1,169,066	1,004,376	1,251,841	1,217,883	925,509	448,649

*Walthall County organized from parts of Marion and Pike. †Number of bales ginned prior to October 18.

done by boll weevils for cotton acreage has been increased. Hinds*, using average yields per acre for five-year periods both before and after the advent of the weevil, estimates that there has been an average decrease of 37.8 per cent in production per acre in States or regions wholly infested. This decrease holds in spite of the two facts that better cultivation is now given cotton than formerly and that better varieties are grown. In the future, as in the past there will, doubtless, be fluctuation from year to year in damage done. Areas favored with dry weather during July or low temperatures during the winter, will produce better crops than the average, but with the advent of unfavorable weather, will produce poor crops.

HOLLY SPRINGS STATION RESULTS 1916.

During the past season the Holly Springs Station carried on variety tests with cotton on both hill and valley land, and certain spacing experiments. The weather as a whole was fairly favorable for growing cotton, but the yields were lower than those of several years because of damage done by boll weevils. They began damaging cotton considerably about the middle of August and were plentiful enough by the middle of September to stop flowering. No top crop was made.

VARIETY TESTS.

On Valley Land.—The cotton in the test on valley land was planted on crimson clover sod turned on April 17. The first planting was made April 25, but it was found necessary to plant over on May 12. One thousand pounds of rock phosphate was applied before turning under the clover. In addition to this, two hundred pounds of fertilizer consisting of a mixture of three parts acid phosphate and one part cottonseed meal was applied at the time of first planting. One-thirteenth acre of each variety was planted in 6 one row plats, rows 4 feet apart; and plants were 12 inches in drill. Yield for this test and various other data are given in table 11, page 21. (See College Station variety test discussion for note on stapling, prices, lint per cent, etc.)

On Hill Land.—The results of the Hill variety tests conducted in the past three years are shown in table 12. These results will probably be of considerable interest to planters farming hill lands.—(See table 12 on page 22.)

Six one row plats of each variety, occupying approximately one-twentieth acre, were planted each year. In 1914 and 1915, one hundred pounds of cottonseed meal and two hundred pounds of acid phosphate were used on each acre. In 1916 one hundred pounds of meal and three hundred pounds of phosphate were used. The same tract of land was used in 1915 and 1916. The difference in yields is due mainly to weevil damage. Boll weevils were numerous the latter part of the season of 1916.

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* *Boll Weevil Effect upon Cotton Production*, by W. E. Hinds. Bulletin No. 178, Ala. Agr. Expt. Sta., July 1914.

TABLE 11.—VARIETY TEST ON VALLEY LAND, 1916.

VARIETY.	Plat Yields at Different dates of picking.				Total lbs.seed cotton per acre	Per cent lint.	Length of staple in inches.	Value of lint per lb. in cents.	Lbs.of lint per acre	Character of staple.	Value of seed per acre at $60 a ton.	Total value per acre.	Rank in value per acre.
	Sept. 20	Oct. 12	Nov. 1	Nov. 28									
Dodds' Prolific	18	51	38	16	1599	32.5	Full 1 1/16	22½	519.6	Good	$ 29.38	$ 146.29	11
Trice	35	58	39	12	1872	28.9	1 1/16	22	540.8	Good	39.93	158.90	8
Wannamaker-Cleveland	11	51.5	39.5	15	1521	34.4	7/8	20	523.2	Fair	29.93	134.57	14
Cleveland Big Boll	6	39	42	10	1261	31.7	1	20	399.7	Good	25.83	107.76	19
Cleveland-027-11-24	12.5	54.5	50.5	15	1723	30.8	1 1/16	22	531	Fair	35.76	152.58	9
Cook	7	53	39	17	1508	34.2	1	20	515.7	Good	29.76	135.48	13
Triumph	10	55	41	19	1625	35.5	1 1/8	23½	574	Good	31.53	166.42	4
Miller	12	53.5	42	18	1632	31.7	Full 1 1/8	25½	517	Fair	33.45	164.28	5
Lone Star (U. S. D. A.)	8.5	46	46	15	1502	34.4	Full 1 1/8	25½	516	Good	29.58	161.16	7
Lone Star-15	18	61	29	16	1612	34.7	1 3/16	27½	559	Wasty	31.59	185.31	1
Holdon	5	33	24	14	995	33.5	1 3/16	27½	333	Fair	19.86	100.33	20
Polk	16	49	34.5	7	1385	27.6	Full 1 3/16	29½	382	Good	30.09	142.78	12
Unknown	22	50	35	14	1573	29.1	1 1/4	30	457.7	Good	33.45	170.76	3
Columbia (U. S. D. A.)	4	42	32	15	1209	28.1	Full 1 1/4	30½	339	Fair	26.10	129.49	16
Express	29	48.5	31.5	7	1508	26.5	1 3/16	27½	398.7	Good	33.27	122.91	17
Express-122	31	51	34	6	1586	26.3	1 3/16	27½	416	Good	35.10	149.50	10
Express-350	25	77	33.5	5	1827	26.4	Full 1 3/16	29½	481.3	Good	40.37	182.35	2
Express-341	31	57	32	7	1573	30.1	1 3/16	27½	474	Good	32.97	163.32	6
Sunflower	9.5	32.5	43.5	7	1203	26.1	1 3/8	34	315	Fair	26.64	133.74	15
Panther Burn	3	35	41.5	5	1105	27.1	Full 1 1/4	30½	299	Good	24.18	115.37	18

TABLE 12.—VARIETY TESTS ON HILL LAND.

1914 RESULTS.

VARIETY.	Plat yield Sept. 10	Plat yield Oct. 12	Plat yield Nov. 5	Total lbs. seed cotton per acre	Money value per acre	
Trice	80	39	6.2	1024	33.75	
Wannamaker-Cleveland	82.5	62	8	1247	46.23	
Cleveland Big Boll	54	57	11.2	1000	41.16	
Sproull's Big Boll	64	82	14	1309	53.11	
Express	42.5	55	6.6	852	35.59	

1915 RESULTS.

VARIETY.	Plat yield Sept. 4	Plat yield Oct. 11	Plat yield Dec. 6	Total lbs. seed cotton per acre	Money value per acre	
Trice	16	37	10.5	1270	59.35	
Wannamaker-Cleveland	10	37	16.5	1270	65.52	
Cleveland Big Boll	10	38	24.8	1450	72.20	
Sproull's Big Boll	4.5	31	34.5	1400	79.29	
Express	9	33	15	1140	55.85	

1916 RESULTS.

VARIETY.	Plat yield Sept. 23	Plat yield Nov. 21		Total lbs. seed cotton per acre	Money val. ue per acre	Three-year average of money value
Trice	30	9		780	66.21	53.13
Wannamaker-Cleveland	28	15		860	76.08	62.61
Cleveland Big Boll	23.5	16		790	66.26	59.87
Sproull's Big Boll	16	14		600	59.54	63.98
Express	28	8		720	78.34	56.59

GOOD VARIETIES FOR THE HOLLY SPRINGS DISTRICT.

For hill land, Wannamaker-Cleveland, Miller, Triumph, and Cleveland Big Boll are recommended. For valley land Wannamaker-Cleveland, Trice, Express, and Unknown are good varieties. Express and Unknown are staple varieties and require rather fertile soil.

SPACING TESTS, 1916.

In the spacing tests on hill land ten tons of stable manure, three hundred pounds of acid phosphate, and one hundred pounds of cotton-seed meal per acre were used as fertilizer. There were two rows of each variety in each of the three six row plats. Triumph came up to a poor stand. Boll weevils appeared about the time cotton began to form. Squares were picked up once a week for three weeks.

TABLE 13.—SPACING EXPERIMENTS, 1916.

VARIETY.	Width of row.	Distance in drill.	Plat Yield Sept. 20.	Plat Yield Nov. 8.	Total lbs. seed cotton per acre.
Triumph	3 ft.	9 in.	22	22	1135
Cleveland Big Boll	3 ft.	9 in.	27	23	1290
Sproull's Big Boll	3 ft.	9 in.	20	25	1161
Triumph	3½ ft.	12 in.	30	29	1304
Cleveland Big Boll	3½ ft.	12 in.	43	30	1632
Sproull's Big Boll	3½ ft.	12 in.	30	30	1326
Triumph	4 ft.	16 in.	32	34	1274
Cleveland Big Boll	4 ft.	16 in.	44	32	1467
Sproull's Big Boll	4 ft.	16 in.	30	30	1158
Sproull's Big Boll	4 ft.	9 in.	40	25	1255
Sproull's Big Boll	3½ ft.	12 in.	37	22	1304
Sproull's Big Boll	3 ft.	16 in.	32	21	1367

As may be seen from table 13, the best yields were secured from the 3½ foot rows with plants spaced 12 inches in the drill. Spaced in this way there are approximately 12,000 plants on an acre. The varieties used in this test are all rather leafy and growthy. The land, too, was rather highly fertilized. On poorer land and with less growthy plants the results would probably have been different.

CULTURAL METHODS FOR HOLLY SPRINGS DISTRICT.

New Methods Needed.—Now that the boll weevil has reached the northern boundary of the State, our methods of growing cotton will have to be changed.

1. The lands must be improved. Soil washing should be checked. The fertility of the soil should be increased.

2. No more late varieties of cotton should be planted; and no more late plantings of cotton made.

3. The maturing of the crop should be hastened in every way possible. Two hundred pounds of acid phosphate per acre would do much to enrich the soil, and frequent shallow cultivations are necessary to bring about very satisfactory results in the northern hill section of the State.

4. The acreage per horse power should be reduced at least one-third. More attention should be paid to the growing of crops to supply farm and home needs.

Turning of Soil.—Contrary to the teachings of agriculture, we have found fall plowing on rolling hill lands not advisable in this section unless a cover crop is planted or a heavy crop of vegetable matter is turned under. On slightly rolling or valley land this will not apply, though the winter cover crops will not be less profitable. The damage from washing is, of course, much less where the soil is properly terraced.

In the spring turn, disc, and harrow the land. In case any soil has been turned and left barren in the fall, discing is all that is necessary. With a shovel plow or marker lay off rows the width desired. Apply the fertilizer to the furrows. Run a middle breaker between the furrows,

to cover the fertilizer and to complete the rows. Harrow the rows with a section harrow until they are only slightly elevated. Do this, if possible, ten days or two weeks before planting time, which in the Holly Springs District is about the 20th of April. The seed bed should be fine. If thorough breaking and fertilizing is done early enough, the rains will settle the soil firmly by planting time. Ahead of the planter run a section harrow to break the crust. Sow about a bushel of seed to the acre; this is the amount the Holly Springs Station has found advantageous.

Spacing.—According to the spacing test described on page 23 of this bulletin, cotton should be spaced as follows:

On thin land the rows should be barely three feet wide, and the plants should be about ten inches apart in the row.

On medium fertile soil the rows should be three and one half feet wide, and the plants about twelve inches apart in the row. Where double horse cultivators are used, this is the most desirable width, as the cultivator will cover the entire middle.

On rich valley land where the stalks grow tall, the rows may be four feet wide, and the plants sixteen inches apart in the row.

Cultivation.—The first cultivation may be made with a section harrow or a weeder. A side harrow gives very satisfactory results. Any tool, in fact, that will break the soil shallow and cover the widest space between the rows is desirable. Cultivations should be shallow and frequent; if practicable, once a week, certainly as soon as possible after each rain. Cultivations should be continued late into the season to encourage top growth to furnish food for the weevil; otherwise the weevil will do greater damage to the large bolls. Frequent shallow cultivations preserve moisture and destroy grass while young, but they do not injure the roots of the plants. Shallow culture, furthermore, is less expensive and more effectual than the old method in the cultivation of any crop.

How to Combat the Weevil.—In combating boll weevils it should be remembered that their sole food is cotton. The first weevils attack the young cotton in the bud. They can be picked by hand if cheap labor is available. Others emerging, then, from winter quarters for the next month or six weeks, attack the crop. When the infested parts of the field are located, picking by hand may be restricted to those parts. This work should be done twice a week. On large plantations where the hibernating places are few and labor is expensive, the managers have abandoned hand picking, and depend on early planting of early maturing varieties and frequent cultivation.

The weevils spend the winter in many places—in straw stacks, on ditch banks, around houses, in stumps and old logs, in woods, and in any rubbish on the farm. Since under favorable conditions, few survive the winter, the destruction of hibernating places would naturally decrease the number of these farm-wrecking pests.

Destruction of Cotton Stalks.—All the cotton stalks should be destroyed as early in the fall as possible—certainly before frost. Where the weevil gets the top crop and harvesting is rushed, this can be done easily. Live stock parked on the land in sufficient numbers will destroy the stalks in a very short time. Where hay is scarce, the stalks

can be cut or uprooted and ricked for forage for cattle. The stalks may be cut and turned under four or five inches, and the land seeded to some winter crop. The stalks may be cut and left upon the ground. This will cut off the food supply of the weevil but will not prevent the thousands of immature weevils from maturing. It will also assist in preventing soil washing and will hasten the decay of the stalks where fall plowing will not be done.

To cut and burn the stalks should be the last resort; this will destroy from five to seven dollars worth of nitrogen per acre. This practice should have been abandoned long ago; our soils are far too low in both nitrogen and organic matter. If the cotton middles were seeded to crimson clover in September, the practice of burning the stalks would not be so injurious.

Winter Cover Crops.—The practice of planting winter cover crops, not only on cotton lands but also on other cultivated lands, will be conducive to grain growing and live stock growing, which is the hope for the cotton states.

Crimson clover, or oats, or oats and vetch, or rye may be planted between the cotton or corn rows from September to October 15th. Rye should be put on the thinnest land.

Oats, or oats and vetch, or rye can be planted on land turned before October 15.

Wheat or rye may be sown on land turned between the 15th of October and the 15th of November.

RESULT FROM THE DELTA STATION, 1916.

During the season of 1916, the Delta Station carried on several experiments with cotton. Among the experiments were those in spacing, acclimatization, variety testing, and breeding.

VARIETY TEST.

The variety cottons were planted on April 11th and 12th, on soil of moderate fertility. They came up to a fair stand and made good growth during the first part of the season. Continued rainy weather in July caused much shedding and damaged the crop considerably. Boll weevils appeared during July and by the middle of August were numerous enough to stop flowering. Many of the forms put on during the preceding ten days failed to make anything on account of the weevils attacking the young bolls. Because of bad weather and weevils, the yields were low.

Column 1 of table 14 gives actual yields of seed cotton per acre; column 2 gives yields based on a perfect stand of plants. (See College Station discussion, page 5 of this bulletin, for an explanation of methods used in determining weights for a perfect stand. The notes given there in reference to lint per cent, stapling, prices, etc., are applicable also to this test.)

TABLE 14.—VARIETY TEST AT DELTA STATION, 1916.

VARIETY.	Lbs. of seed cotton per acre	Pounds of Seed Cotton per acre on basis of a perfect stand.	Per cent lint	Length of staple in inches	Value of lint per lb. in cents	Lbs. of lint per acre	Character of staple	Value of seed per acre at $60 a ton	Total money value per acre	Rank in money value	Weight of 100 Bolls in oz.	Weightingrams of lint on 500 seeds.
Dodds' Prolific (from Ky.)	723	786	32	Full 1	21	251.5	Good	$16.03	$68.84	26	25	28.5
Trice-22	879	648	28.5	1 1/8	23½	273.8	Good	20.61	84.95	14	21.6	23.2
Trice U. S. D. A.	850	898	27.8	Full 1 1/16	22½	249.6	Good	19.45	75.60	20	21.7	21.4
Calhoun (Georgia)	596	636	32.6	Full 1 1/16	22½	207.3	Fair	12.86	59.50	32	21	22.4
Wannamaker-Cleveland	798	923	35.6	1	20½	328.5	Fair	17.83	85.17	13	25	32
Cleveland Big Boll	759	823	31.3	1 1/16	22	257.5	Good	16.96	73.61	21	31	32.4
Cleveland-027-11-24	823	1023	30.8	1 1/16	22	315	Good	21.24	90.54	7	27.7	30.2
Cook	730	780	33.6	7/8	20	262	Fair	15.54	67.94	30	25.2	29.2
Triumph (from Tex.)	584	680	34.5	Full 1 1/16	22½	234.6	Good	13.36	66.14	31	31.4	35.4
Triumph (from Expt. Sta.)	628	680	34.3	1 1/8	23½	233.2	Good	13.40	68.20	29	31.4	35.4
Miller	797	905	30.6	1 1/8	25½	276.9	Good	18.88	89.48	8	30.3	31.4
Lone Star U. S. D. A.	535	582	34	1 1/8	23½	197.8	Fair	9.96	57.44	33	31.1	37.1
Lone Star-11	634	736	31.4	1 1/8	23½	230.1	Good	15.17	69.24	24	36.5	36.1
Lone Star-15	770	842	34.2	1 3/16	27½	287.9	Fair	16.65	94.53	4	30.3	32.8
Lone Star-132	992	1154	26.3	1 3/16	27½	303.5	Good	25.51	108.97	1	27	21.1
Holdon	292	402	29.2	1 3/16	27½	117.3	Fair	8.54	40.79	38	31.8	37.4
Polk	763	830	27.3	Full 1 3/16	29½	226.5	Good	18.10	84.91	16	21.7	19.9
Unknown	841	898	28	Full 1 3/16	29½	251.4	Good	19.39	92.55	5	23.8	24.3
Darden	732	798	29.6	Full 1 1/8	25½	236.2	Good	16.85	77.08	19	24.5	24.3
Columbia U. S. D. A.	589	661	27.2	Full 1 1/4	30½	178.7	Good	14.55	69.05	25	25.2	25.1
Columbia (Sherard)	507	576	26.8	1 3/16	27½	154.3	Good	12.65	55.08	34	23.6	24.8
Columbia X Express B-32	800	867	28.6	1 3/16	27½	247.9	Fair	18.60	86.77	11	25.6	24
Express-122	769	835	26.1	1 3/16	27½	217.9	Good	18.54	78.46	18	21.3	21.5
Express-350	961	1073	26.8	Full 1 3/16	29½	287.5	Good	23.56	108.37	2	22.8	22.9
Express-314	892	973	28.9	1 3/16	27½	281.1	Fair	20.75	97.05	3	21.5	21
Express-341	799	867	28.4	1 3/16	27½	246.2	Good	18.62	84.94	15	21.2	22.5
Express (Low)	855	935	26.2	1 3/16	27½	244.9	Fair	20.73	87.87	9	19.5	18.7
Express (Allen's Big Boll)	716	786	27.1	Full 1 3/16	29½	213	Fair	17.19	80.02	17	23	21
Lone Star X Express A-311	870	955	29.4	Full 1 1/8	25½	280.7	Poor	20.31	91.88	6	26.6	29
Foster-120	694	767	31	Full 1 3/16	29½	237.8	Good	15.87	86.02	12	25	27.8
Sunflower X Express A-312	679	736	24.8	Full 1 3/16	29½	182.5	Good	16.60	70.43	22	20.6	18.7
Sunflower (from Schaefer)	526	566	26.6	1 3/16	27½	150.5	Fair	12.46	53.84	35	20.5	18.4
Sunflower (from Expt. Sta.)	578	630	25.2	1 3/8	34	163.8	Fair	14.04	69.73	23	19.8	19.9
Panther Burn	643	680	25.7	Full 1 1/4	30½	174.7	Good	15.24	68.52	28	19.8	18.4
Hartsville-9	407	459	27.3	Full 1 1/4	30½	125.3	Good	10.01	48.22	37	25.7	26.7
Webber-82	710	773	29.2	1 5/16	31½	225.7	Good	16.50	87.59	10	27.2	28.1

GOOD VARIETIES FOR THE DELTA DISTRICT.

Express continues to rank first as a profitable cotton for Delta conditions in general. It is fairly resistant to disease, extra early and prolific, and a good premium is paid for its staple. Some of our new strains, like Express-350, give promise of being considerably better than the parent strain. Allen's Unknown, which every year ranks near the first, is an excellent cotton. Polk has done only fairly well in our tests the two years we have tested it, yet we have seen fields of excellent Polk cotton. This cotton is lacking in uniformity and type. Foster-120 is a good cotton for rich land that is free from cotton wilt disease. Lone Star-132 has made a good showing in our tests the past two years. (Seed of Express-350, Express-314, and Lone Star-132 are not available for distribution.)

Preliminary Variety Test.—The main results from the preliminary variety experiment, conducted at the Delta Station, in 1916, appear in table 15.

The land on which this test was conducted was better for cotton growing than the land on which the regular variety test was carried on and consequently the yields were somewhat better. Wannamaker-Cleveland and Express-122 were used as checks in the test.

TABLE 15.—PRELIMINARY VARIETY TEST, DELTA STATION, 1916.

VARIETY.	Lbs. of seed cotton per acre.	Lbs. of seed cotton per acre on basis perfect stand.	Per cent lint.	Length of staple in inches.	Value of lint per lb. in cents.
Wannamaker-Cleveland	1098	1190	35	1	20½
Calhoun (Banks)	813	869	29.7	1 1/8	23½
Gholston	716	765	27.9	1 3/16	27½
Express-122	1043	1091	26.8	1 3/16	27½

VARIETY.	Lbs. of lint acre.	Character of staple.	Value of seed per acre at $60 a ton.	Total money value per acre.	Rank in money value per acre.
Wannamaker-Cleveland	416.5	Fair	$23.20	$108.58	1
Calhoun (Banks)	258.0	Fair	18.33	78.99	3
Gholston	213.4	Fair	16.54	75.11	4
Express-122	282.3	Good	24.26	101.89	2

Spacing Experiment.—A cotton spacing experiment was made at the Delta Station, in 1916. The cotton was planted on Delta loam soil that was in a high state of fertility, having grown a crop of legumes the year before. Each of the four varieties was planted in four plats of five rows each. All plants of each plat were spaced alike. All rows were 3 feet, 9 inches wide. The rows marked "unthinned" were left just as spaced by the planter and were consequently very thick. All varieties made rank growth and attained a height of from 4 to 6 feet. Lone Star and Columbia are rather leafy varieties and only medium early. Boll weevils damaged this cotton very little prior to the first of August. Only the three middle rows were weighed, the average weights of these rows being the weights given in table 18.

TABLE 18.—COTTON SPACING EXPERIMENT, DELTA STATION, 1916.

VARIETY.	Distance in drill.	Average number pounds of seed cotton per row.	Pounds of seed cotton per acre.
Express-41	Unthinned	19	1330
Express-41	6 inches	21	1470
Express-41	12 inches	20	1400
Express-41	18 inches	21	1470
Trice	Unthinned	24½	1715
Trice	6 inches	25	1750
Trice	12 inches	24	1680
Trice	18 inches	23	1610
Lone Star	Unthinned	11	770
Lone Star	6 inches	11½	805
Lone Star	12 inches	16	1120
Lone Star	18 inches	15	1050
Columbia	Unthinned	13½	945
Columbia	6 inches	13½	945
Columbia	12 inches	14½	1015
Columbia	18 inches	15½	1085

Though the results from this experiment are not conclusive, it appears that with the early dwarf varieties, like Trice, close spacing will give the highest yields, especially where only the early fruit can be counted on. The later, large leaved varieties appear to yield better if given more space.

COTTON CULTURE IN THE DELTA UNDER BOLL WEEVIL CONDITIONS.

Cotton growers in the Delta are eager to learn how to farm under boll weevil conditions. An urgent demand for information is constantly reaching the investigators at the Delta Station. The opinion of these investigators, based on experience during the past five years, may be of some value to the cotton growers.

This opinion, expressed in the following paragraphs, is unfortunately, though necessarily composed of generalizations. Fixed rules are impossible; too many factors over which man has no control play important parts in the production of a cotton crop; and the judgment of the individual farmer makes success or failure in the cultivation of the crop. These factors operate—weevil or no weevil. The investigators can only offer the cotton growers their opinion of the best methods to follow under average boll weevil conditions.

To make the greatest success possible under boll weevil conditions the planter must do two things: First, he must fight the weevils; that is, he must do all possible to destroy the hibernating places, from which the weevils issue into the cotton fields in the spring. Secondly, the planter must put into practice the methods of cultivation that promise a heavy, early crop.

How to Fight the Weevil.—To decrease the number of weevils that live through the winter, we should strive to bring about two conditions, more or less within our control. First, in the fall we should remove the food of the weevils; second, we should destroy the hibernating places.

In the southern part of the Delta, where the crop usually light is harvested early, it is now both possible and practicable to control the supply of weevil food in the fall. The cotton stalks should be destroyed before frost. When it is possible the stalks should be grazed by the cattle. When grazing is not practicable, especially on lands low in organic matter, the stalks should be plowed under.

In the part of the Delta where yields are still too heavy to pick before a killing frost, the stalks, of course, cannot be destroyed in time to cut off the source of food supply. Under such conditions, there is, so far as we are aware, no practicable way of cutting the weevils' food supply short before frost time.

In all parts of the Delta it is possible to destroy many of the hibernating places. If hibernating places were destroyed whenever practicable, the boll weevil acreage would be continually lessened. Evidence shows that dead timber of all kinds is our greatest menace in the fight against the boll weevil. Some weevils, it is true, spend the winter in cotton seed, in hay, and in buildings. These, however, are few in comparison with those hibernating in hollow trees and dead timber. Whenever practicable, all such timber should be destroyed.

In the early summer, when the weevils first appear, a persistent picking of the weevils and the punctured squares will tend to reduce multiplication and lessen damage to the crop. How long this picking of weevils and punctured squares should continue, it is impossible to say; the picking should be governed by local conditions, such as supply and cost of labor and extent of infestation. Constant alertness against the early weevils is one of the most satisfactory means of weevil control.

Practical Methods.—Careful selection should be made of the land on which cotton is to be grown under weevil conditions. The growing of cotton should be undertaken only on that land which is well drained and separated farthest from timber. Under weevil conditions it is impossible to grow a crop of cotton on poorly drained, cold land.

Soils that are old and worn should, if drainage allows, be broken flat and thoroughly as early in the fall as possible. In the late winter the land should be "thrown" into beds at one furrow with a middle buster. In this condition it should stand until planting time. This method ensures thorough breaking of the soil; but, in an extremely wet winter, it necessitates very late bedding, and prevents the thorough draining that fall bedding gives. Soils that are in good condition should be bedded at the first operation in the fall. Just before planting time the beds should be run over with a disc harrow to freshen them up. The putting of land into beds in the fall aids drainage and allows the soil to warm up earlier in the spring. It also ensures a firm seed bed when planting time comes. Since cotton is a hot weather plant, any

reasonable effort to make the land warm early in the spring, will be well repaid in an early cotton crop. Since cotton is a tap rooted plant, it should have a firm seed bed.

At planting time harrows should go ahead of planters, to pull the beds down to the desired height and to scratch up enough loose dirt to cover the seed. The following directions are useful:

1. Plant plenty of seed. It is false economy to use less than enough for a good stand. Under boll weevil conditions it is highly important that a stand be secured as early as possible; not less than a bushel to the acre should ordinarily be planted.

2. When possible plant delinted seed. They can be planted more uniformly; and much better stands are secured. Delinted seed absorb moisture more quickly and consequently germinate more quickly than ordinary seed. In recent tests at the Delta Station, delinted seed surpassed undelinted seed in per cent of germination, and produced a stand in only half the time required by the undelinted seed.

3. Plant only the earliest and most productive variety of cotton adapted to your locality. At the Delta Station during the past season the highest yielding variety surpassed the lowest yielding by more than $50.00 per acre. Fifty dollars an acre is a good deal. Every planter should, therefore, look well to the variety of cotton he plants.

4. Use fertilizers discriminatingly. So far as experiments at the Delta Station indicate and so far as the investigators are aware, no form of commercial fertilizer makes cotton fruit early. Plenty of decayed vegetable matter in the soil, it is true, not only aids drainage, but warms the soil, and thus promotes early fruiting. Early fuiting is a quality inherent in the plant; it can be got only by careful selection.

Fertilizers in some instances increase the yield. The numerous tests made at the Delta Station, with fertilizers on old worn soil, indicate that nitrogen in some form materially increases the yield. Nitrate of soda, for example, applied lightly—25 to 50 pounds per acre before planting and 50 to 75 pounds per acre when the first forms appear—increased the results considerably. The growing and plowing under of legumes is the best method of improving old, worn soils. This method the Delta planter should employ.

Cultivation.—The cultivation of the cotton crop is very important. No fixed rule can be followed The season and the farmer's judgment must determine the distinctive method. Since cotton is a hot weather plant, any method that aids in making the soil warmer is desirable. Since the cotton plant has few lateral or feed roots until it has attained some size, it can without injury be cultivated closer and deeper than most plants. On old, worn soils it is not a bad idea to cultivate deep early in the spring in order to liberate as much food as possible for the plant later on. Cultivations should, however, become shallower as the season advances and the plant grows larger. On soils that are fertile, the cultivations should be as shallow and as few as possible—only those necessary to keep the weeds down. The last cultivations of a cotton crop are the most critical. They should be frequent enough to keep up soil moisture, and shallow enough not to disturb the cotton roots.

A number of good cultivators are on the market. It is impossible to say which is best. On the Delta Station farm, for early cultivations,

preference is given to the two-horse cultivator, used in the first weeks with the spring tooth attachments, and later with the small buzzard wing sweeps. When the cotton gets too large for a two-horse cultivator, preference is given either to the one-horse Planet Junior cultivator with the small buzzard wing sweeps or to the one-horse spring tooth cultivator. The implements used at the Delta Station will not suit all conditions. The farmer should use the implements which suit the conditions under which he farms. When grass is bad and where considerable one-horse cultivation is done, the double shovel, with solid sweeps or with buzzard wing sweeps, is a good implement. Like all other implements, it should be used with good judgment.

Spacing of Cotton.—Great diversity of opinion obtains in regard to the proper spacing of cotton under boll weevil conditions. From recent tests, made at the Delta Station and at other places in the boll weevil territory, it is evident that too much space is commonly given for best yields. Recent tests made at the Delta Station indicate that on the average worn soils of the Delta the best spacing to be this: for the early maturing, dwarfy cottons, from three and a half to four foot rows, with the cotton thinned to six or ten inches in the drill; for the late big boll varieties, from four to four and a half foot rows, with the cotton thinned to 12 or 18 inches in the drill.

Under boll weevil conditions, only the earliest and most prolific varieties should be planted and only the most advanced methods of cultivation should be employed.

GENERAL DISCUSSION.

TABLE 16.—VARIETY AVERAGES FROM THE THREE STATIONS.

VARIETY.	Lbs. of seed cotton per acre.	Per cent lint.	Lbs. of lint per acre	Val. of seed at $60 per ton.	Total money val. per acre.	Rank money value.
Dodds' Prolific	941	32	320.3	$ 19.24	$ 89.74	11
Trice U.S.D.A.	1100	28.5	331.5	24.82	98.51	6
Wannamaker-Cleveland	888	34.8	340.2	19.13	87.72	13
Cleveland Big Boll	802	31.4	270	17.63	73.63	17
Cleveland-027-11-24	991	30.6	339.6	23.00	96.86	7
Cook	924	34	324.2	19.01	84.52	14
Triumph (Mebane)	849	34.2	327.5	18.32	93.63	10
Miller	975	31.3	325.8	21.53	103.48	5
Lone Star (U. S. D. A.)	825	34.3	291.5	16.52	88.78	12
Lone-Star-15	991	34.6	360.5	20.46	113.89	2
Holdon	491	31.1	175.8	11.21	55.30	18
Polk	905	27.8	255.5	20.30	95.63	8
Unknown	953	29.9	292	21.44	106.91	3
Columbia (U. S. D. A.)	737	27.5	212.3	17.11	80.69	15
Express-122	962	26.3	265.4	22.41	95.50	9
Express-350	1154	26.8	325.2	26.82	121.38	1
Express-341	1014	29.2	313	22.48	103.30	4
Sunflower (Schaefer)	725	26.8	200.2	16.56	79.79	16

TABLE 17.—RANK OF VARIETIES GROWN THE LAS T SIX YEARS ON BASIS OF MONEY VALUE PER ACI

VARIETY.	College Station						Holly Springs Station						Delta Station				
	1910	1911	1912	1914	1915	1916	1911	1912	1913	1914	1915	1916	1911	1912	1913	1914	191
Allen Long Staple	13																
Ashcraft Double Jointed			23					15	22					4	23		
Acala															20		
Broadwell's Double Jointed		15					12						20	4			
Brandon			8					6	21					34	19		
Brown's No. 1														35			
Black Rattler															45		
Bates																16	
Cook (Cook's)	3	4	3	9		16	18	14	2	8		15	18	30	5	13	
Cook's Improved No. 7	7																
Cook's Improved No. 9	1																
Cook's Improved No. 8	2																
Cook (Miss. Exp. Sta.)		9	4				19	13	16				11	32	39		
Cook's Improved No. 11	6																
Cook (Ala. Exp. Sta.)				5	10					6	23		20			12	5
Crawford's Big Boll														25			
Covington-Toole	5	5	12				8	26					8	41			
Cleveland No. 2	9																
Cleveland No. 1	10																
Cleveland No. 3	14																
Cleveland (Delta Sta.)														21			
Cleveland-027-11-24		19	5		17	24		12			20	9	16	15			21
Cl'v'd Big Boll(J. R. Cleveland)		18	2	12	12	27	9	9	11	9	5	19	9	13	14	10	11
Cleveland (Wannamaker)			1	8	5	26		3	1	11	7	13		6	2	7	14
Columbia		3	19	1		25	2	19	27	2		16	15		40	8	
Columbia (Sherrard)						28									16		
Columbia X Express																	
Christopher			15					11						26			
Calhoun									10						13		
Dixie		12	13				13	24	26				19	28	10		
Dodds' Prolific			9	13	14	15		4	19	13	22	11		2	32	5	19
Davis' Long Staple															36		
Dalrymple														10		9	
Day														29			
Dodds' Favorite															30		
Durango				10	13				18	1	16			14	17	17	18
Dodds' Long Staple														16	36		
Dat So											17						
Darden																	
Excelsior	15																
Express				3	1				6	3	13	17	1		3	1	15
Express-15					3						8						9
Express-122					2	8					2	10					6
Express-32						4											
Express-350						2						2					7
Express-341						3						6					
Express (Allen's B. B.)						12											
Express (Low's)																	
Express-314																	
Foster			11					21						11	28		
Foster (Haaga)									4						38		
Foster (College)									12								
Foster-11					7						12						
Foster-120					9	1					14						12
Fondren																	2
Gold Coin	20																
George																	37
Hite			17					25						40			
Hawkins			25					23						37			
Half and Half				6					9	7					1	11	
Haaga No. 2									23						24		
Hartsville															9		
Haaga No. 1															35		
Harris																	1
Hartsville-9																	
Holdon						29						20					
King		16					14						12				
Keenan														42	42		
Keno															22		
Kentucky Bender															33		
Kentucky Favorite																	2
Lone Star		7	7			23	20	7	14			7	4	43	25		
Lone Star-11					4	17					9						
Lone Star-15					16	5					11	1					
Lone Star-132					11						15						
Lone Star Express A-311																	
Magruder																	
Mexican Big Boll	21																
Money Maker		6	20				1	20					21	17			
Mississippi Silk													22				

VARIETY	College Station						Holly Springs Station						Delta Station					
	1910	1911	1912	1914	1915	1916	1911	1912	1913	1914	1915	1916	1911	1912	1913	1914	1915	1916
[illegible]				4	8	13				5	4	5			8	4	12	
alf															15			
Mac Special															37			
plier (Allen)									28						43			
Cain			26					17						12				
y Day															44			
er Burn												18						28
of Georgia														19				
ss															27			
					6	7						12					15	16
proved King	19																	
en-116		2	22				5	16					7	31				
en			21					18	3					38	18			
ond Bender															12			
e		11					10		15				3	20	26			
ll			24					22						36				
ond Long Staple															29			
ins	17	17	14	14			16	2	20	17			17	24	41	16		
ns' Ideal				16	19					16	23					6	25	
Loaf	16																	
wer		1	18	2	21	18	1	27	25	10	3	14	13	3	34	14	20	36
A-312																		22
ll		20					15						23					
rough														7				
ph	4		6	11	18		6	10	7	12	10				4	15	7	
ph (Gholston's)														8				
ph (from Jas. Wade)	8	8					11						6					
ph(from Excel. S. Farm)	12																	
ph(from Central Station)														39				
ph (from Mebane)	4	14				21	6					4	2					31
		21	10	15	15	6	4	1	5	15	21	8	5	1	31	2	17	20
(from Central Station)										14								
's 90 Day		10	16				3	5	24				14	23	44			
ton								33										
ny															7			
266						9												
22																		14
Sam	18								8				11		11			
own (Allen's)				7	6	10			13	4	1	3		5	6	3	10	4
s Early Prolific	11																	
's Wonder		13	27				17	8					10	27				
er														18	21			
lerful (Haaga's)					20						18						20	
er-49						14												
er-82																		10

Comparative Length of Staple of Varieties Grown at the Three Stations.—A very general belief among the cotton growers of the State is that the Delta lands will grow a longer staple than lands in other parts of the State. Evidence gathered by the Experiment Stations goes to show that the staple of a variety grown in the Delta (on the Station farm at Stoneville) is no longer than the staple of the same variety grown elsewhere in the State. For example, the Delta staple averages slightly shorter than the Holly Springs station staple, as will be seen by noticing table 19.

TABLE 19.—AVERAGE LENGTH OF LINT OF CERTAIN VARIETIES GROWN AT ALL THREE STATIONS FOR SIX YEARS.

STATION.	1911	1912	1913	1914	1915	1916	Six-year average	Av. length of fibers measured with rule 1915 cotton
	inches	inches	inches	inches	inches	inches	inches	inches
College	1.034	1.053	.973	.987	1.000	1.100	1.024	1.16
Holly Springs	.962	1.055	1.013	1.025	1.026	1.147	1.037	1.28
Delta	.940	1.046	1.031	1.025	1.010	1.130	1.028	1.17

About twenty of the standard commercial varieties of cotton are each year planted at each of the three experiment stations In most cases the seed is bought from the originator and in all cases the source is the same for three stations. Samples from the varieties grown at each station are ginned at the Central Station. Table 19 shows the average length of staple of the varieties grown at all three stations for the past six years. The length of staple each year was determined by professional classers. Some years the different sets of samples were stapled by different men; other years all the samples were classed by the same classer or classers. In 1916 all the samples were stapled by H. L. Eustis, of Greenville, Mississippi.

The staple of a part of the 1915 samples was measured accurately with a rule. The plan used was as follows: one hundred individual fibers of all lengths were drawn from each sample, wet, straightened out on a glass side, and measured carefully. The slide was held over a black velvet background so that the fiber might be seen to better advantage. The averages from these measurements are given in column 8 of table 19. It will be observed that the averages in this column run slightly higher than the ones in other columns; wetting the fibers and straightening them made them measure somewhat longer. The relative lengths for the three stations remain about the same..

Although the evidence presented here indicates that the staple of varieties in general is as long as when grown in the Hill Region of the State as in the Delta, it does not show that the staple cottons grow so well in the Hill District as in the Delta. They yield better when grown under Delta conditions.

Spacing Work with Cotton.—During the past season each of the three experiment stations did some distance work with cotton. The results, which are printed elsewhere in the bulletion, differ to some extent. See tables 4, 13 and 18.

At the College Station best yields were secured with the closest spacing; with three foot rows in the width-of-row test, and with twelve inch spacing in the drill in the distance-in-the-drill test. Close spacing has invariably given the best yields in tests conducted at this Station during the past eight years. The land was valley land of medium fertility. At the Delta Station the results secured were not conclusive. Different varieties were used. For Trice, a variety that produces small plants, a six-inch spacing in the drill seems to be the best. For larger growing varieties, like Lone Star and Columbia, greater distances appeared to be best. In no cases did the unthinned rows lead in yield, yet they bore well. The land on which the test was conducted was very fertile, being Delta land on which a crop of legumes was grown the year before.

At Holly Springs, best results were secured with medium close planting,—plants spaced twelve inches in three and a half foot rows. The different varieties used in the test were all of similar type and rather leafy and growthy. The land on which this cotton was grown was highly fertilized.

Considerable distance work with cotton was carried on by some of the southern experiment stations several years ago. Though the results are interesting and valuable, they are not altogether reliable, for the tests were conducted before the advent of the boll weevil and under

conditions different from the present. The results, moreover, differed so considerably that from them it is hardly possible to formulate any general rules for cotton spacing. The factors having a bearing on the question are numerous—type of soil, fertility of soil, variety of cotton, amount of rainfall, degree of weevil infestation, etc. Since some of these factors vary from year to year and can neither be foreseen nor controlled, it would be difficult to apply the laws even if they were known.

It is the consensus of investigators that close planting hastens maturity, at least produces greater yields at first picking; that increasing the width of rows over four feet decreases yields; that increasing the distances in the drill beyond twenty inches decreases yields; that cotton on thin land should be spaced more closely than on rich land.

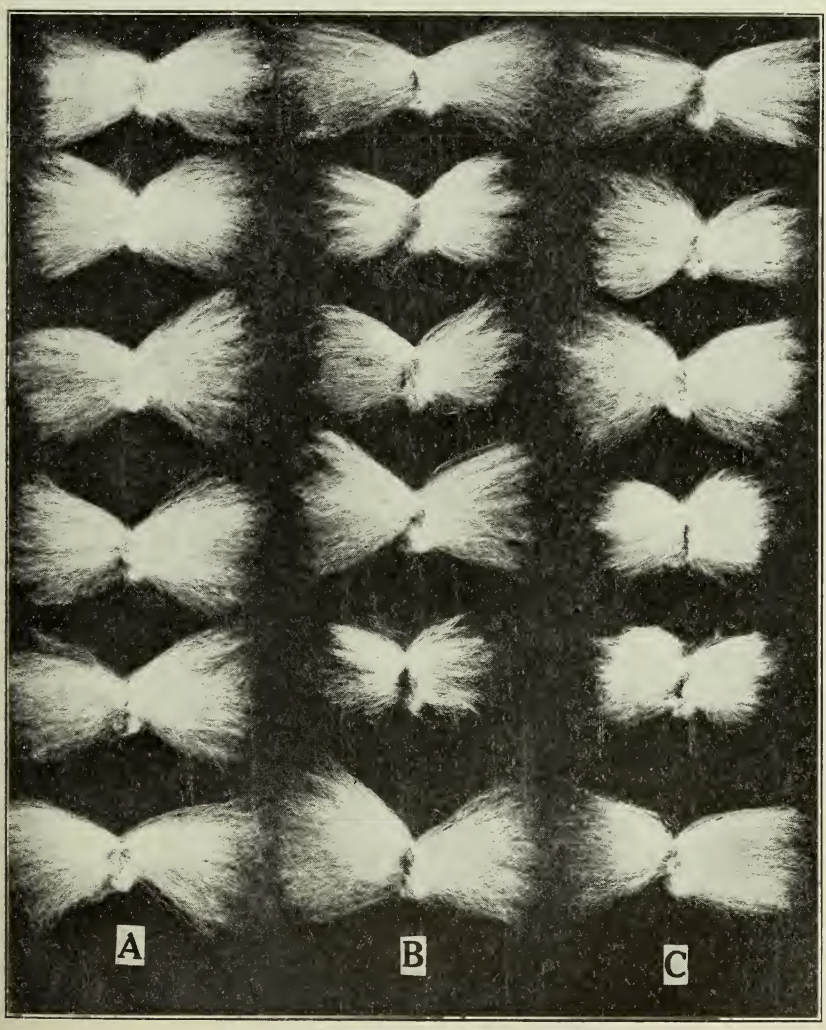

FIG. 1. COTTON SEED WITH LINT ATTACHED.
A. EXPRESS. B. DARDEN. C. TRICE.

What Constitutes a Desirable Variety of Cotton.—The answer to the question, What constitutes a desirable variety of cotton? depends to some extent on the locality. Some varieties are desirable in one locality and not in others. The variety that a planter will grow will be determined by its money value per acre, but this will vary with the season, rainfall, etc.

To be desirable a variety should be early, fairly disease resistant, vigorous in growth, uniform in type, uniform in lint length, storm proof, prolific, and productive of a fair lint percentage and length. It may not be possible to get a variety that measures up to all of these requirements fully, but it must in the main if it is to be satisfactory.

The lint length of many of the commercial varieties being grown at the present time is not uniform. Figure 1 shows the length of lint on six seeds of each of three varieties. These seeds were selected at random. Variety "A" is a pedigreed strain that has been carefully selected. "B" and "C" are impure commercial varieties. In using fiber of irregular lengths like "B" or "C", spinners are sure to suffer considerable loss; and if a part of the fiber will be lost, the spinners are sure to protect themselves by paying a lower price for the cotton.

Warning Against Planting Inferior Varieties of Cotton.—A variety of cotton that has a staple less than seven-eighths inch should not be grown. The United States Department of Agriculture has issued warning against varieties that produce short lint, especially such varieties as are said to be half seed and half lint. The following reasons are given:

"1 Cotton of less than seven-eighths inch staple is of approximately the same spinning value as the bulk of the cotton of India. On economic principles, the American product should be maintained on a higher level of intrinsic worth than that of India in order that the American crop may not be forced to compete in the markets of the world with the cotton of India.

"2 Cotton of less than seven-eighths inch staple is inferior to the average American quality. Localities that produce such cotton in appreciable quantities soon establish reputations for an inferior product. The price of all cotton from such markets will suffer because of the poor reputation of the markets.

"3 Competent buyers discriminate against extremely short staple whenever such cotton is discovered. They should be equally careful to discriminate in favor of cotton of good staple. The farmer who produces inferior cotton is likely to find that his product brings a price materially lower than quotations would indicate as its true value. The seller commonly looks upon such discrimination as a penalty, while the buyer considers that he is paying the full value for an inferior commodity.

"4 Under the common practice of the cotton trade, the price of spot cotton is governed largely by future quotations. In order that future quotations might more accurately reflect the value of spot cotton, Congress, in the United States Cotton Futures Act, provided a form of contract, exempt from the tax imposed by the Act, on which cotton of extremely low grade or which is less than seven-eighths inch in length is not deliverable. This action of Congress was intended primarily for the benefit of producers. One of its results was the adoption by the New York and New Orleans Exchanges of the exempted form of future contract, so that cotton of less than seven-eighths inch in length

of staple cannot be delivered thereon. This legislation in no way affects any sale of spot cotton.

"5 As the variety of seed planted is the primary factor in determining length of staple, and as there are early maturing prolific varieties which produce a staple of at least an inch in length, no farmer or community is justified in planting an inferior variety, or in expecting the full market price for a debased article of commerce."

HOW TO SECURE A GOOD VARIETY OF COTTON.

A good variety of cotton produces plants of uniform type. Types vary with varieties, of course, but within a variety uniformity of type should exist. Figure 2 illustrates a good type for growing under boll weevil conditions. This plant, belonging to the strain Foster-120, is rather low, compact, and not leafy, is fairly prolific, and has large bolls.

Every cotton grower who has seen a pure strain of a good variety planted by the side of a mixture of nameless varieties, need not be told that it pays to plant good seed. Grown under the same conditions, the pure seed may nearly double the yield of the other and also produce cotton of greater value per pound.

FIG. 2. A TYPICAL FOSTER 120 PLANT

A good strain may be developed by almost any planter that is willing to follow the suggestions for cotton breeding given in Bulletin 173*. A start of a desirable strain may be secured from an experiment station or from the Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C. Considerable seed is distributed in small lots, but, unfortunately, a large part of it serves little purpose because the growers do not give the new cotton sufficient isolation. If the small lot of seed is planted some distance from other cotton, separated from it by, say twenty rows of corn, and if sufficient care is taken in ginning, enough pure seed to plant several acres may easily be secured. (See page 38 for discussion of care in ginning seed for planting.)

Experiment stations and professional cotton breeders usually distinguish new strains developed from old varieties by numbers, as Express-350. Growers should pay attention to these numbers and

*Cotton Experiments, 1915.
Bulletin No. 173, Miss. Agr. Expt. Sta., p. 26.

use them in connection with the name. Express-32 is a very different cotton from Express-350. If both are called simply "Express," confusion is apt to result.

Good pure seed may also be secured from certain seed dealers that employ a professional breeder, or that carefully maintain the purity of their varieties. As a rule, seed grown locally will, if properly selected and handled, produce better than varieties brought in from a distance. In all cases, no matter what the source of the seed, a variety will soon deteriorate if measures are not taken to prevent mixing in the field and at the gin.

GIN MIXED COTTON SEED.

Though there are several causes of deterioration of cotton varieties, the chief cause is the mixing of seed of different varieties at the public gin. Ordinarily the seed roll is not removed nor the gin cleaned between different lots or bales of cotton; consequently one lot of seed contains several punds of seed from the preceding lot.

Saunders and Cardon* by an ingenious experiment secured some good data on the amount of seed mixing at a public gin. Their experiment was as follows: "The seed roll which was left in a 70-saw gin after one lot of cotton had been ginned was removed and the seeds stained red with ordinary dye in order to mark them distinctly. They were then thoroughly sun-dried and finally returned to the roll box. The roll was packed as near as possible to the density it had before being removed. When the next bale was ginned, samples of the seed were taken every five minutes from the gin containing the colored roll as the seed dropped into the conveyor. The proportion of red seeds in each sample was then determined. For several minutes after starting only stained seed appeared. After the gin had been running five minutes the sample taken showed 52 per cent colored seed. At the end of the first ten minutes the sample showed 17.1 per cent stained seed (See fig. 3), and after fifteen minutes 7.4 per cent. At the end of twenty minutes 2.8 per cent stained seed appeared in the sample; at the end of twenty-five minutes 0.5 per cent appeared; and the samples taken at the end of thirty minutes showed 0.1 per cent, or one seed in a sample of 801 seeds."

"After the bale was ginned, the roll left in the gin was carefully examined and 32 stained seeds were found. Not until ten minutes after the second bale had been started did these pass out of the gin. No stained seeds were found in the roll box after the ginning of the second bale.

"These results indicate that the exchange of seeds in the roll takes place very rapidly, practically the entire roll being replaced during the ginning of a single bale. Most of the red seed passed out of the roll box during the first few minutes the gin was in operation.

"These results were obtained from only one gin. It is evident that in a battery of four or more gins the chance of mixing seed is greatly increased. However, taking these results as a basis, rather dependable calculations can be made for the purpose of showing in round numbers about how much mixing may occur. Each roll contains from 35 to 40

*Custom Ginning as a Factor in Cotton Seed Deterioration, by D. A. Saunders and P. V. Cardon. Bulletin 288, Bureau of Plant Industry, U. S. Dept. Agr., 1915.

pounds of seed, or slightly more than a bushel. The four rolls in a 4-gin battery, therefore, would contain from 140 to 160 pounds, or from 4 to 5 bushels of seed."

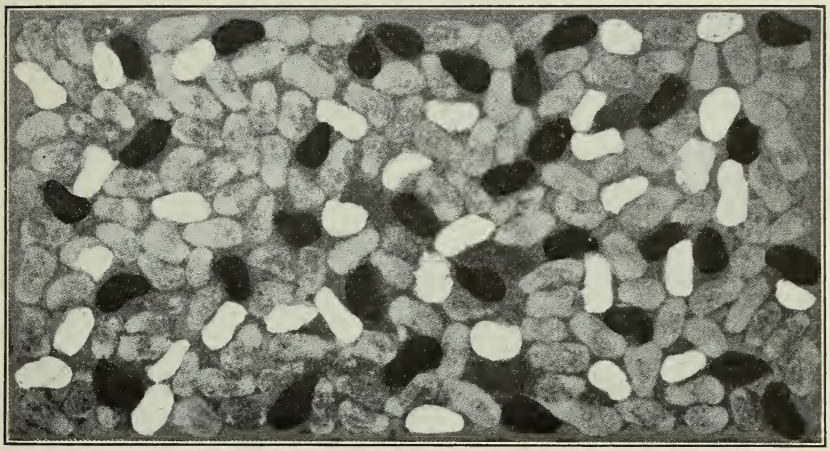

Fig. 3. Sample of cotton seed taken 10 minutes after the ginning of the second bale had begun, showing 17.1 per cent of red seed from the stained roll of the first bale. (After Saunders and Cardon.)

Seed may be mixed also in the pipes or flues that carry the seed cotton to the saws and in the conveyor that carries them from the gin. The amount of mixing that takes place in these places is small in comparison with the mixing in the roll box.

WAYS OF REDUCING SEED MIXING TO A MINIMUM.

By taking a few precautions it is usually possible to prevent seed mixing at the gin. To have his seed ginned properly the farmer should wait until the busy season is over. Then the ginner will have time to take the care necessary in keeping seed pure. The farmer should pay the ginner for the extra trouble. The owner should follow the cotton to the gin and see that the feed pipes are cleaned and that roll box is emptied and cleaned. Seed had best be caught on the floor and not allowed to fall into the conveyor. If the lot of cotton seed is small, it should be fed into the gin by hand rather than by the regular feeder.

The ideal way of preventing mixing of varieties is to grow but one variety in a community. This prevents mixing in the field as well as at the gin.

COTTON STILL A GOOD CROP.

Although the yields made by many of the cotton farmers the past year or two are very discouraging, we do not believe that in most of the northern and central part of the State cotton growing should be abandoned altogether. With the spread of the boll weevil over the rest of the cotton-producing States—they will probably all be covered in two or three more years—the total yield will be less; and since the demand is likely to increase, prices will be good. A good price per pound will give a fair money return from the crop even if a large crop is

not raised. If lands are kept fertile and good cultural methods followed, a fair crop can be produced if the season is at all favorable. In order to keep the soil fertile, live stock must be kept, legumes and other crops grown, and rotation practiced. The other crops will keep labor and teams employed at all seasons of the year if things are properly managed. The most prosperous farms are the farms on which all forces are kept busy.

SOURCE OF SEED.

Below is a list of the sources from which seed of the varieties tested were obtained.

Dodds' Prolific	S. L. Dodds, Hickman, Kentucky.
Trice	Bureau of Plant Industry, Washington, D. C.
Trice-22	College Experiment Station.
Trice-266	College Experiment Station.
Calhoun (Ga.)	N. L. Willet Seed Co., Augusta, Georgia.
Calhoun (Banks)	N. L. Willet Seed Co., Augusta, Georgia.
Wannamaker-Cleveland	Wannamaker and Sons, St. Matthews, S. Carolina.
Cleveland Big Boll	J. R. Cleveland, Decatur, Mississippi.
Cleveland-027-11-24	College Experiment Station.
Cook	J. R. Cook, Ellaville Georgia.
Triumph	A. D. Mebane, Lockhart, Texas.
Miller	T. M. Clark, Verona, Mississippi.
Lone Star	Bureau of Plant Industry, Washington, D. C.
Lone Star-11	College Experiment Station.
Lone Star-15	College Experiment Station.
Lone Star-132	College Experiment Station.
Holdon	Bureau of Plant Industry, Washington, D. C.
Polk	M. L. Neal, Paradise, Mississippi.
Unknown	J. B. Allen. Port Gibson, Mississippi.
Darden	Magee, Dean and Co., Leland, Mississippi.
Columbia (U. S. D. A.)	Bureau of Plant Industry, Washington, D. C.
Columbia (Sherard's)	J. H. Sherard, Sherard, Mississippi.
Columbia **X** Express B-32	College Experiment Station.
Express-122	Delta Experiment Station, Stoneville, Mississippi.
Express-350	College Experiment Station.
Express-32	College Experiment Station.
Express-314	College Experiment Station.
Express-341	College Experiment Station.
Express (Low's)	D. D. Low, Nitta Yuma, Mississippi.
Express (Allen's Big Boll)	J. B. Allen, Port Gibson, Mississippi.
Lone Star **X** Express A-311	College Experiment Station.
Foster-120	Delta Experiment Station, Stoneville, Mississippi.
Sunflower **X** Express A-312	College Experiment Station.
Sunflower (Schaefer's)	Marx Schaefer, Yazoo City, Mississippi.
Panther Burn	J. W. Johnson, Panther Burn, Mississippi.
Hartsville-9	Coker Seed Co., Hartsville, South Carolina.
Webber-49	Coker Seed Co., Hartsville, South Carolina.
Webber-82	Coker Seed Co., Hartsville, South Carolina.
Magruder	T. B. Magruder, Port Gibson, Mississippi.
Gholston	J. D. Gholston, Inverness, Mississippi.
Lone Star **X** Express A-38	College Experiment Station.