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Cotton experiments 1919 and 1920

H. B. Brown

C. B. Anders

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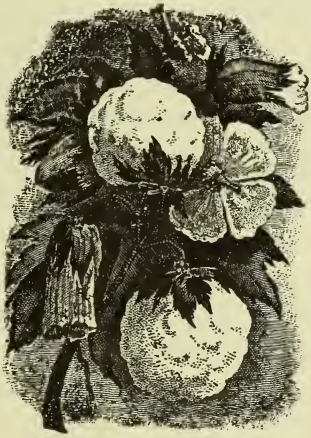
BY
H. B. BROWN AND C. B. ANDERS



Mississippi Agricultural Experiment Station
AGRICULTURAL COLLEGE, MISSISSIPPI

J. R. RICKS,
DIRECTOR

SUMMARY AND RECOMMENDATIONS

The Weather. In many parts of the State, wet weather during June and July, 1919, made the proper cultivation of cotton impossible and thus reduced yields materially in 1919. Unfavorable weather during the spring of 1920 was also a hindrance to the 1920 production.

Boll Weevil Damage. Boll weevils did much damage over the State as a whole during both 1919 and 1920. The crop was completely ruined in places in the southern part of the State.

Rank of Varieties. Early varieties made the best yields on account of the short fruiting period; long staple varieties led in money value due to extra premium paid for staple cotton.

Good Varieties. For thin hill land, Cleveland and Miller; for rich hill land that is not infected with wilt, Trice; for Delta and valley land, free from wilt, if weevil infestation is heavy, Express, Trice, and Foster; for valley land with light wilt infection and light weevil infestation, Cleveland, Express, and Columbia; for heavy wilt infection and few or no weevils, Tri-Cook and Lewis-63; for heavy wilt infection and heavy weevil infestation, no variety; grow some other crop.

Oil Content of Cotton Seed. An analysis of the seed of twenty-five different varieties of cotton grown in the same field showed a wide variation in oil content, some containing more than twelve gallons per ton more than others.

Weevil Control. Experiments with calcium arsenate powder in poisoning boll weevils showed that under certain conditions this poison could be used profitably in controlling weevils in cotton on valley land in the Hill section of the State.

COTTON EXPERIMENTS, 1919

By H. B. BROWN and C. B. ANDERS

INTRODUCTION.

The field covered by this report is similar to that covered in other annual cotton bulletins. Variety study results from tests conducted on different soils are reported and an effort made to give the main environmental conditions under which the cotton was grown, as soil fertility, rainfall, temperature, weevil infestation, plant diseases, etc.

In addition to the variety work, results from certain other experiments and other data of general interest to cotton growers are included.

The season of 1919 was abnormal in respect to weather conditions, weevil infestation, etc., and consequently results are more or less abnormal. Some varieties that commonly do well failed to make a good showing. Certain types fit one set of conditions and do well, while other types are adapted to other conditions. In general a variety of certain type, if pure, will perform approximately the same under similar conditions wherever grown. If it were possible to predict what conditions were going to prevail any particular year, it would be easy to say what would be the best variety to plant. Extra early varieties best suited conditions during the 1919 season. The unusual premium paid for staple cottons made them leaders in money value.

Differences of a few dollars in total money value or a few places in rank are without significance since they come within the range of experimental error. A duplicate test conducted under similar conditions might show slightly different ranking.

Seed of the best of the new strains developed by the Experiment Station will be distributed as soon as they can be multiplied in quantity.

The Weather.

Over the State as a whole, the weather during the growing season of 1919 was unfavorable for the growing of cotton successfully under boll weevil conditions. Eight of the ten months from January to October had more than average rainfall. The rainfall during October was 4.52 inches above the average. The frequency of moderate to heavy precipitations hindered picking during October, and much cotton was damaged in the field. Killing frosts did not occur until the middle of November. This delay gave late cotton a good chance to develop, but it was also favorable to boll weevils, allowing many to go into hibernation late in the season.

Boll Weevils.

Except in the extreme northern counties, boll weevils appeared rather early over most of the State. In a few northern counties, none were seen during the entire season. Several southern counties reported weevils when cotton first came up. Continued wet weather over the southern half of the State favored the weevils, and as a consequence they did more damage than during the two preceding years. Boll weevils are largely the limiting factor to cotton production in Mississippi, and precipitation is the chief factor which influences weevil

production. In localities where the weather is dry during July and August, the crop is usually good, but where it is wet during these months, a partial to total failure results.

The cotton in the tests at the four experiment stations was subjected to weevil injury ranging from very heavy infestation to none. At the South Mississippi Station the crop was practically ruined; at the Delta Station damage was less than at the College Station; at the Holly Springs Station there was no weevil damage at all.

Cotton Leafworm.

The Cotton Leafworm (*Alabama argillacea*), also called cotton army worm, appeared in most of the cotton fields of the State during August or September. This insect in its adult form is a small, tawny colored moth. It is a native of tropical regions and is known to fly long distances. This accounts for its sudden appearance certain seasons, and its widespread distribution over the State.

Except in some of the northern counties, the cotton leafworm in 1919 was an aid rather than a hindrance. Cotton had about stopped fruiting in most regions, due to the ravages of the boll weevil before the advent of the leafworm. The leafworms were helpful in that they stripped the foliage from rank plants allowing the sun to reach the bolls, dry them out, stop boll rot, and bring about earlier opening. They were harmful in sections where plants bearing immature bolls were stripped of foliage.

Classing.

Classing was done by the New Orleans Cotton Exchange and prices fixed by the John M. Parker Company, of New Orleans. The prices are based on the spot market at New Orleans for December 31, 1919, strict middling, white cotton of good character. The Experiment Station is greatly indebted to these firms for this service.

TABLE 1. VARIETY STUDIES ON VALLEY LAND, COLLEGE STATION, 1919

VARIETY	Pounds of seed cotton per plat	Pounds of seed cotton per acre	Per cent lint	Pounds of lint per acre	Length of staple	Value of lint per pound in cents	Value of lint	Value of seed at $75 a ton	Total money value	Rank in money value	Weight of 100 bolls in ounces
Simpkins	82.25	990.9	33.2	329.0	7/8	41	134.89	21.82	159.71	17	20
Trice (Ark. Sta.)	80.50	969.8	30.0	290.9	15/16	41½	120.72	25.46	146.18	23	25
Trice–271–43	98.75	1189.7	30.0	356.9	15/16	41½	148.11	31.23	179.34	12	22
Vandiver's Heavy Fruiter	67.75	816.3	32.2	262.8	1	42	110.37	20.76	131.13	28	27
Lewis' Prize	77.00	927.7	32.5	301.5	1	42	126.63	23.48	150.11	22	20
Half &Half*	57.25	689.7	34.1	235.2	7/8	41	96.43	17.04	111.60	32	23
Cook–588	79.75	960.8	36.5	350.7	3/4	40	140.28	22.88	163.16	15	27
Wannamaker–Cleveland	76.25	918.6	35.5	326.1	7/8	41	133.70	22.22	155.92	20	26
Cleveland–37W–54	79.50	957.8	35.0	335.2	7/8	41	137.43	23.35	160.78	16	25
Cleveland Big Boll	63.50	765.0	33.3	254.7	15/16	41½	105.70	19.14	124.84	29	29
Cleveland (Smith)	79.75	960.8	33.8	324.7	7/8	41	133.12	23.85	156.97	19	25
Mexican Big Boll	75.25	906.6	31.5	285.6	1	42	119.95	23.29	143.24	24	25
Sunbeam	73.75	888.5	32.0	284.3	7/8	41	116.56	22.66	139.22	25	24
Miller	65.50	789.1	33.1	261.2	1 1/16	45	117.54	19.80	137.34	26	34
Triumph	53.25	641.5	37.2	238.6	1 1/16	45	107.37	15.11	122.48	31	36
Lone Star–132–48	87.00	1048.2	31.2	327.0	1 1/8	50	163.50	27.04	190.54	9	26
Polk	65.12	784.6	28.3	222.0	1 3/16	60	133.20	21.10	154.30	21	20
Magnolia	77.75	936.7	27.6	258.5	1 3/16	60	155.10	25.43	180.53	11	21
Marshall	84.50	1018.0	27.2	276.9	1 3/16	60	166.14	27.79	193.93	8	20
Express–122–433	86.75	1045.1	27.5	287.4	1 3/16	60	172.44	28.40	200.85	5	21
Express–350	86.50	1042.1	28.3	294.9	1 3/16	60	176.94	28.02	204.96	3	21
Express–432	72.87	878.0	33.7	295.9	1 1/8	50	147.95	21.83	169.78	14	22
Foster–120–6102	93.37	1124.9	30.8	346.5	1 1/8	50	173.25	29.19	202.44	4	23
Foster–120–631	85.80	1033.7	30.4	314.2	1 3/16	60	188.52	26.98	215.50	1	25
Foster–120–698	87.00	1048.2	32.6	341.7	1 1/8	50	170.85	26.49	197.34	7	24
Foster–120	85.25	1027.1	30.2	310.2	1 3/16	60	186.12	26.88	213.00	2	26
Foster–11	80.75	972.9	29.7	288.9	1 3/16	60	173.34	25.65	198.99	6	24
Foster–120–66	75.75	912.6	30.0	273.8	1 3/16	60	164.28	23.95	188.23	10	26
Webber–49	65.30	786.7	29.1	228.9	1 3/16	60	137.34	20.92	158.26	18	25
Columbia	69.37	835.7	30.0	250.7	1 3/16	60	150.42	21.94	172.36	13	23
Sunflower	37.50	451.8	25.8	116.6	1 1/4	78	90.94	12.57	103.51	33	19
Allen	50.00	602.4	25.6	154.2	1 1/4	78	129.27	16.81	137.08	27	21
Meade	44.00	530.1	24.7	130.9	1 5/16	83	108.64	14.97	123.61	30	23

*Seed planted were not Half and Half probably, although bought for that.

Variety Studies on Valley Land, 1919.

The varieties in this test were planted April 22 on rather fertile soil, a part of the plats being on Houston clay and the rest on light sandy loam. There were six one-row plats of each variety. The weather following planting was favorable and an excellent stand secured. Unfavorable weather about the middle of May caused a good many of the young plants to die. This trouble was much worse on the loam plots than on the warmer Houston clay soil. There seemed to be some difference, too, in the resistance of different varieties. Miller and Triumph appeared to be resistant while certain other varieties, namely, Simpkins, Trice, Vandiver, and Half and Half, appeared to be unusually susceptible.

The first squares were observed on June 14, 53 days after planting, and the first blossom on July 2, which was 71 days after planting. The cool wet weather prevailing during part of May and June retarded the growth of cotton plants, making the blooming period later than usual.

Boll weevils were found in the plats June 20 and became rather numerous for an initial infestation, but they did not multiply as rapidly as was expected, maximum infestation not being reached until August 15 to 20. Weevils, however, did considerable damage, more in fact than during any year since 1916. This was a year when extra early varieties made a good showing. Seven of the ten best yielding varieties were among the ten ranking varieties in respect to number of open bolls August 27. The varieties flowering most, also, were in the majority among the leaders in yields.

VARIETY	Per cent. of seedlings damped off on sandy loam soil	Per cent. of seedlings damped off on Houston clay soil	Number of blooms on 200 plants in 1919	Number of bolls open Aug. 27 on 200 plants	Number of blooms on 100 plants in 1918
Simpkins	47.7	4.0	3514	40	.....
Trice, Ark. Sta.	17.0	2.3	3612	82	5367
Trice–271–43	.....	.....	3678	60	.....
Vandiver's Heavy Fruiter	20.7	4.6	2333	1	.....
Lewis' Prize	.....	.....	2612	15	.....
Half and Half	32.9	3.4	2407	4	.....
Cook–588	14.6	1.1	2317	6	.....
Wannamaker–Cleveland	15.2	3.1	2435	0	3820
Cleveland–37W–54	18.6	1.5	2735	14	.....
Cleveland Big Boll	.....	.....	2419	2	3654
Cleveland Smith	.....	.....	2817	22	.....
Mexican Big Boll	7.2	1.6	3321	20	4545
Sunbeam	.....	.....	2542	4	4395
Bennett	.....	.....	2091	3	.....
Miller	1.3	2.0	2243	2	2953
Triumph	0.9	2.6	1890	1	3005
Lone Star–15	7.8	1.8	2886	36	3623
Lone Star–132–48	7.5	1.2	3403	90	4140
Lone Star–132–48–61	.....	.....	3272	80	.....
Foster–120–61	.....	.....	2563	9	.....
Polk	1.5	1.1	3456	31	.....
Magnolia	.....	.....	3813	102	4925
Marshall	.....	.....	4961	62	.....
Express–122–433	3.6	1.3	3834	57	4391
Express–350	2.6	0.9	4047	194	4464
Express–350–630	.....	.....	2583	100	.....
Express–432	2.9	1.0	3784	85	4371
Foster–120–64	.....	.....	3350	56	.....
Foster–120–6102	.....	.....	4235	128	.....
Foster–120–631	.....	.....	3165	9	.....
Foster–120–698	.....	.....	4141	62	.....
Foster–120	1.4	1.5	3760	44	3980
Foster–11	3.9	1.3	3895	55	4521
Foster–120–66	.....	.....	3264	76	.....
Webber–49	6.9	3.8	3292	14	4336
Columbia	2.0	0.8	3251	28	4506
Sunflower	4.5	1.3	2977	26	5592
Allen	3.6	1.1	3034	11	.....
Meade	5.2	1.8	3464	3	.....

It was observed that less than half as many blossoms were produced in 1919 as in 1918. This difference was due largely to weevils destroying squares.

Cotton Variety Studies on Hill Land College Station, 1919.

Table 3 gives results from variety studies on hill land. The land used in this test was thin hill land that had been in cotton for four years. No fertilizer was used. Rainfall was rather heavy, and boll weevils did much damage. Low yields were to be expected from cotton grown under such conditions. The test is of some value in that it shows the type of varieties that do best when grown under such conditions. The big boll varieties, as in most other years, are the ranking varieties and are undoubtedly the best for this type of soil.

TABLE No. 3.—VARIETY STUDIES ON HILL LAND, COLLEGE STATION, 1919.

VARIETY	Yield per Plat.	Pounds of seed cotton per acre.	Lint per cent.	Pounds of lint per acre.	Length of staple in inches.	Value of lint per pound in cents.	Value of lint.	Value of seed at $75.00 a ton.	Total money value.	Rank in Money Value.
Simpkins	12.87	268.1	33.2	89.0	7/8	41	36.49	6.72	43.21	9
Trice (Ark. Sta.)	12.12	252.5	30.0	75.7	15/16	41½	31.42	6.63	38.05	12
Vandiver's Heavy Fruiter	9.75	203.1	32.2	65.4	1	42	27.47	5.16	32.63	13
Half & Half	9.50	197.9	34.1	67.5	7/8	41	27.67	4.89	32.56	14
Cook-588	12.25	255.2	36.5	93.1	3/4	40	37.24	6.08	43.32	8
Wannamaker-Cleveland	12.12	252.5	35.5	89.6	7/8	41	36.74	6.11	42.85	10
Cleveland-37W-54	16.75	348.9	35.0	122.1	7/8	41	50.06	8.51	58.57	4
Cleveland Big Boll	16.37	341.0	33.3	113.6	15/6	41½	47.14	8.53	55.67	5
Mexican Big Boll	18.37	382.7	31.5	120.6	1	42	50.65	9.83	60.48	2
Miller	17.37	361.8	33.1	119.8	1 1/16	45	53.91	9.08	62.99	1
Triumph	10.50	218.7	37.2	81.4	1 1/16	45	36.63	5.15	41.78	11
Lone Star-15	12.75	265.6	38.1	101.2	1 1/16	45	45.54	6.17	51.71	7
Express-432	12.87	268.1	33.7	90.3	1 1/8	50	45.15	6.67	51.82	6
Express-350	14.50	302.0	28.3	85.5	1 3/16	60	51.30	8.12	59.42	3

Study of Wilt Resistant Varieties, College Station, 1919.

Table 4 shows the yields and other data from the test of wilt resistant varieties conducted at the College Station in 1919. The test was made on the same land as in 1918 and conducted along the same lines. Most of the varieties used were standard resistant varieties; Trice, Express-432, and Wannamaker-Cleveland are susceptible varieties that were used as checks. The leader, Express-350-64, is a new strain of Express that was selected for wilt resistance. If this new strain, which now shows some promise, proves valuable, seed will be distributed as soon as available in quantity.

TABLE 4.—STUDY OF WILT RESISTANCE, COLLEGE STATION, 1919.

VARIETY	Pounds of seed cotton per plat.	Pounds of seed cotton per acre.	Lint per cent.	Pounds of lint per acre.	Length of lint.	Value of lint per pound in cents.	Value of seed at $75.00 a ton.	Value of lint.	Total money value.	Rank in money value.
Tri-Cook	22.50	703.1	34.3	241.2	15/16	41½	17.32	100.10	117.42	7
Cook-1110	20.75	648.4	39.4	255.5	7/8	41	14.73	104.75	119.48	5
Wannamaker-Cleveland	20.75	648.4	34.6	224.3	7/8	41	15.90	91.96	107.86	10
Council-Toole	26.50	828.1	31.7	262.5	15/16	41½	21.21	108.94	130.15	2
Express-432	22.00	687.5	31.0	213.1	1 1/8	50	17.79	106.55	124.34	3
Dix-Afifi	19.75	617.2	26.0	160.5	1 3/16	60	17.13	96.30	113.43	8
Express-350-64	27.25	851.5	26.9	229.0	1 1/8*	55	23.34	125.95	149.29	1
Cleveland x Cov. Toole	25.00	781.2	30.2	235.9	15/16	41½	20.45	97.90	118.35	6
Lewis-63	25.75	804.7	29.6	238.2	15/16	41½	21.24	98.85	120.09	4
Improved Dixie	12.75	398.4	34.1	135.8	7/8	41	9.85	55.68	65.63	13
Express x Cov.-Toole	21.75	679.7	30.6	208.0	1 1/16	45	17.69	93.60	111.29	9
Covington-Toole	16.00	500.0	32.4	162.0	15/16	41½	12.68	67.23	79.91	12
Trice (Ark. Sta.)	22.75	710.9	28.4	201.9	15/16	41½	19.09	83.79	102.88	11

*full.

Selection Pays.

A strain of cotton cannot be kept at the apex of its yielding capacity unless new selections are made frequently and propagation made from the choice plants selected. Unselected strains tend to deteriorate due to the mixing of seed at gins, to the crossing of different varieties in the field by means of insects, and to the appearance of sports, reversions, and other undesirable forms among the good plants. No variety of cotton is purebred in the sense that pedigreed stock is purebred. There is hybridism in its ancestry not far back, and on account of this some hybrid forms are sure to appear in all fields. When these forms have a chance to multiply and cross with the better plants, there is sure to be deterioration. The Experiment Station does considerable selection work each year, and the gains made are well shown in the variety test results the past season. In the College Station test, nine of the ten ranking varieties were station selections; in the Delta Station test, nine of the ten ranking varieties were station selections; and in the Holly Springs Station test with only seven selections in the test, three of the ten ranking varieties were station selections. The station selections did not make as good a showing in the Holly Springs test as in the others, probably on account of the fact that the selections were made to meet boll weevil conditions while the crop at Holly Springs was grown without weevils. The plants there had a long growing period.

Preliminary Studies on the Oil Content of Cotton Seed.

It has been the commonly accepted notion for some years that seed from cotton grown in the Delta has a higher oil content than seed from cotton grown in the Hill part of the State. Analyses of miscellaneous samples of seed collected in the Delta usually show a higher oil content than similar samples collected in the Hills. On the basis of these analyses and on the basis of practical results obtained by milling seed from the two sections, oil mills have paid a premium for Delta grown seed amounting to several dollars a ton.

Recent analyses made by Dr. Hand, of the Department of Chemistry, of Mississippi Agricultural and Mechanical College, have shown a variation of more than twelve gallons per ton in the oil content of seed from different varieties grown on the same plot of ground at the College Station. There probably is some difference due to the soil on which the plants were grown, but we are inclined to believe that the differences are small in comparison with the difference in content of different varieties when grown on the same land. Some experiments now being made by Dr. Hand and the writer will probably give additional information on this subject.

Professor Rast, of the University of Georgia, has made a careful study of the oil content of the seed of different varieties of cotton grown in Georgia. He also has found that there is a wide range in oil content of different varieties grown in one field.

TABLE 5—OIL AND PROTEIN CONTENT OF SEED OF VARIETIES OF COTTON, GROWN COLLEGE STATION 1917.

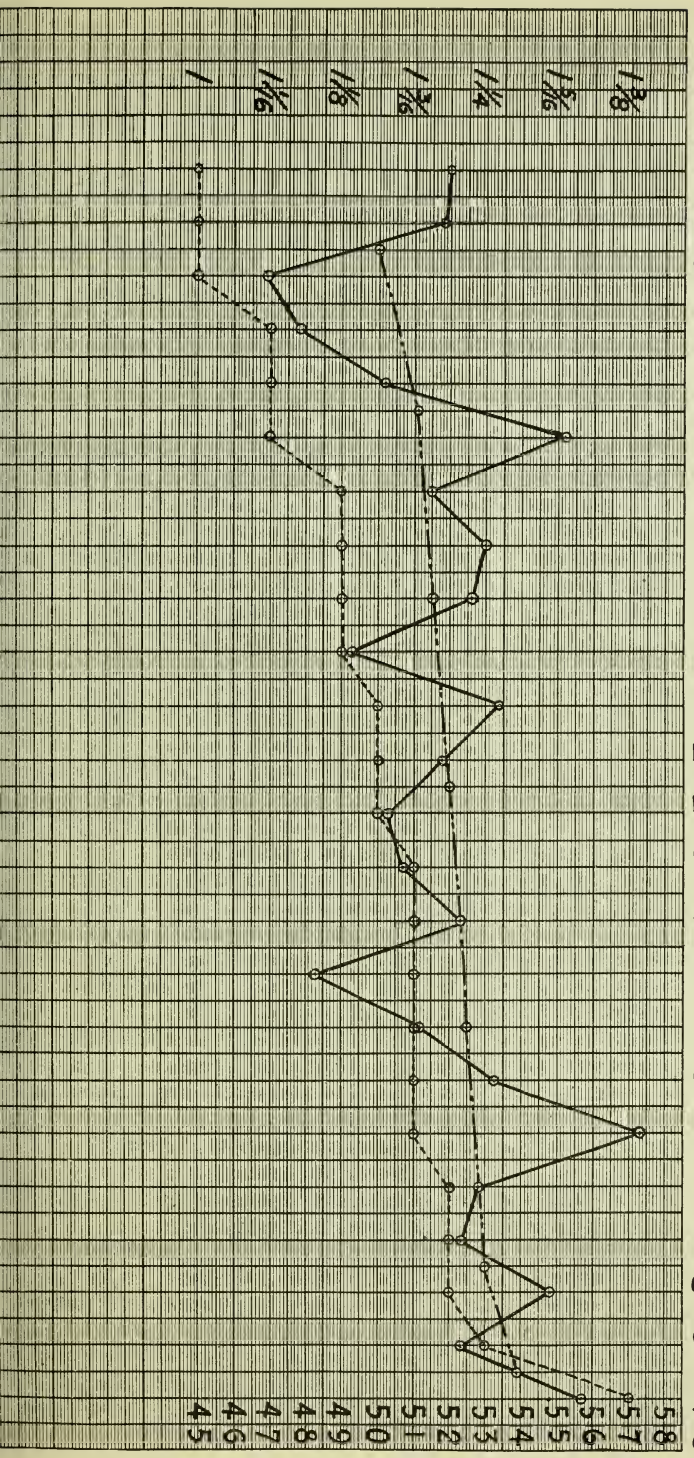
VARIETY	Per cent of meats or kernels.	Per cent of hulls.	Per cent of moisture in seed.	Per cent of oil in meats	Per cent of oil in seed.	Total gallons oil per ton.	Per cent of ammonia in meats.	Per cent of ammonia in seed.	Available oil per ton in clean seed. (gallons.)	Pounds of cake per ton from clean seed.	Pounds of hulls and linters per ton from clean seed.	Length of lint.	Per cent of lint.
Dodd's Prolific	59.06	40.94	7.89	35.19	20.78	55.40	6.68	3.95	47.98	1128.52	511.63	1 1/16	30.4
Trice 271–43	55.50	44.50	7.45	34.00	18.87	50.31	6.64	3.69	42.45	1054.23	627.40	1 1/16	29.0
Trice 270–41	57.00	43.00	7.79	33.90	19.32	51.51	6.85	3.90	43.20	1114.23	561.77	1 1/8	30.6
Wannamaker Cleveland	51.74	48.26	7.94	33.91	17.55	46.79	6.98	3.61	39.10	1031.38	675.37	1	35.6
Cleveland Big Boll	54.64	45.36	7.92	32.80	17.92	47.77	7.25	3.96	39.33	1130.37	573.65	1 1/16	33.2
Cleveland 641	56.50	43.50	7.21	34.29	19.37	51.64	6.99	3.95	43.22	1128.52	547.33	1	34.3
Cleveland 43	56.73	43.27	8.16	35.14	19.93	53.13	6.71	3.81	45.00	1089.50	572.86	1 1/8	32.6
Cook 919	55.74	44.26	7.67	35.06	19.54	52.09	6.72	3.75	44.10	1071.38	597.87	1	38.4
Miller	53.31	46.69	7.26	31.91	17.01	45.35	6.93	3.69	37.49	1054.23	664.58	1 1/8	33.4
Rowden	55.50	44.50	6.91	35.43	19.66	52.41	6.54	3.63	44.67	1037.09	627.88	1 1/8	33.4
Lone Star 15	54.50	45.50	7.83	33.93	18.49	49.29	7.19	3.92	40.94	1119.94	573.01	1 1/8	35.8
Lone Star 132	57.50	42.50	7.78	34.90	20.07	53.51	6.69	3.85	45.30	1099.95	560.30	1 1/8	28.4
Lone Star x Express	54.00	46.00	7.57	36.06	19.47	51.91	6.25	3.38	44.71	965.67	699.00	1 1/8	31.5
Express 412	53.60	46.40	7.99	33.81	18.12	48.31	6.89	3.69	40.45	1054.23	642.39	1 3/16	28.3
Express 122–433	56.00	44.00	7.39	35.11	19.66	52.41	6.71	3.75	44.42	1071.38	595.47	1 3/16	28.9
Express 314	55.50	44.50	7.74	34.04	18.89	50.36	6.83	3.79	42.28	1082.80	600.10	*1 1/8	29.0
Express 432	55.66	44.34	7.70	34.19	19.03	50.73	6.62	3.68	42.89	1051.38	626.94	1 3/16	31.7
Express 350	57.50	42.50	7.30	33.84	19.46	51.88	6.81	3.92	43.53	1119.94	553.58	1 3/16	28.0
Polk	59.17	40.83	7.75	36.63	21.67	57.77	6.07	3.59	50.12	1025.66	598.44	1 3/16	29.4
Kekchi	55.00	45.00	6.76	36.07	19.84	52.89	6.84	3.76	44.88	1074.23	589.17	*1 3/16	31.8
Foster 120	55.80	44.20	7.52	35.02	19.54	52.09	6.61	3.69	44.23	1054.23	614.04	1 3/16	30.9
Foster 120–449	57.50	42.50	7.67	34.69	19.95	53.19	6.88	3.96	44.75	1131.37	533.00	1 3/11	31.7
Columbia (U. S. D. A.)	56.00	44.00	6.89	34.94	19.57	52.17	6.69	3.75	44.19	1071.38	597.19	1 1/4	28.1
Columbia (Sherard's)	57.50	42.50	7.56	35.84	20.61	54.95	6.28	3.61	47.26	1031.38	614.17	*1 3/16	28.2
Sunflower	58.00	42.00	7.38	36.04	20.90	55.72	6.46	3.75	47.73	1071.38	570.64	1 3/8	28.0

*full.

Table 5 gives the moisture, oil, and protein content of the seed of twenty-five different strains of cotton grown at the College Station in 1917. The seed of Polk ranked highest in oil content and that of Miller lowest. Polk is a variety with small seed, low lint per cent, long staple, and rather small bolls, while Miller on the other hand, has large seeds, medium high lint per cent, medium length lint, and large bolls. It seems that, in general, varieties having the characteristics of Polk tend to have high oil content, while the shorter big boll cottons with higher lint per cent tend to have low oil content. There are certain more or less marked exceptions to the general rule as, for instance, Cook 199 and Dodds' Prolific, but even these varieties are in accord with the rule in certain respects. They both have small seeds, and Dodds' Prolific has rather low lint per cent in addition.

Figure 1 contains curves showing the relation of oil content of cotton seed and length of staple. The varieties are arranged in order of length of staple, the shortest being placed first. The two curves both rise and follow the same general course showing that as the length of staple increases the oil content of seeds does also, there being a positive correlation. Probably the analyses of samples of seed collected in the Delta have usually shown a higher oil content on account of the fact that most of the cotton grown there has been long staple cotton. Delta samples did not show as high an oil content in 1919. This condition was doubtless due to the fact that only a small per cent of the crop planted in the Delta in 1919 was long staple cotton.

Figure 2 contains curves showing the relation of oil content of seed and lint per cent. The varieties are arranged in order of lint per cent, starting with the lowest. It will be seen that the two curves run in different directions; as the lint per cent curve rises, the oil content curve falls, indicating in general a negative correlation, or that with the increase in lint per cent there is a decrease in oil content of seeds.



1. Curves showing relation of length of lint and oil content of cotton seed.
length, dotted line - - - - - - - - - - .
ons oil per ton, solid line ——————————.
othed curve for oil content, dots and dashes - - —— - - —— - - ——.

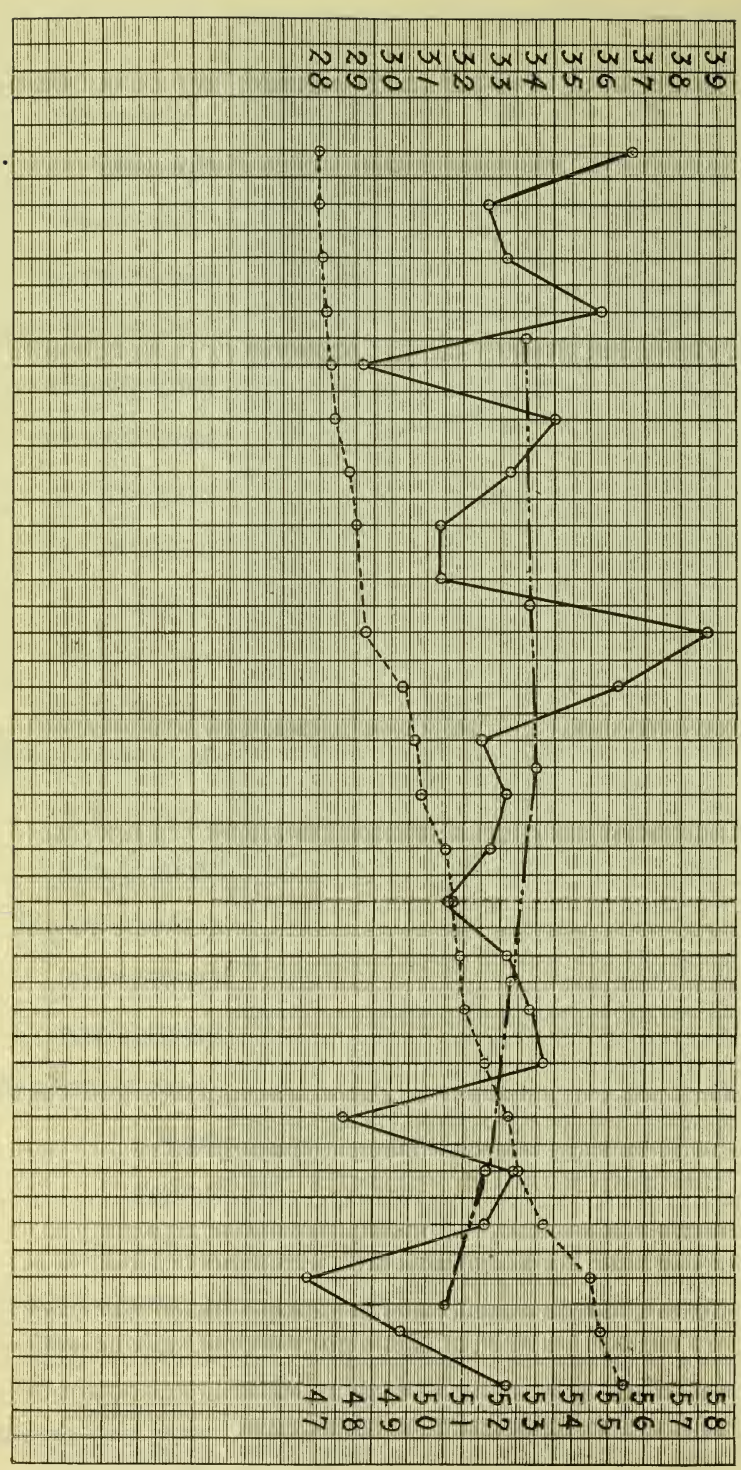
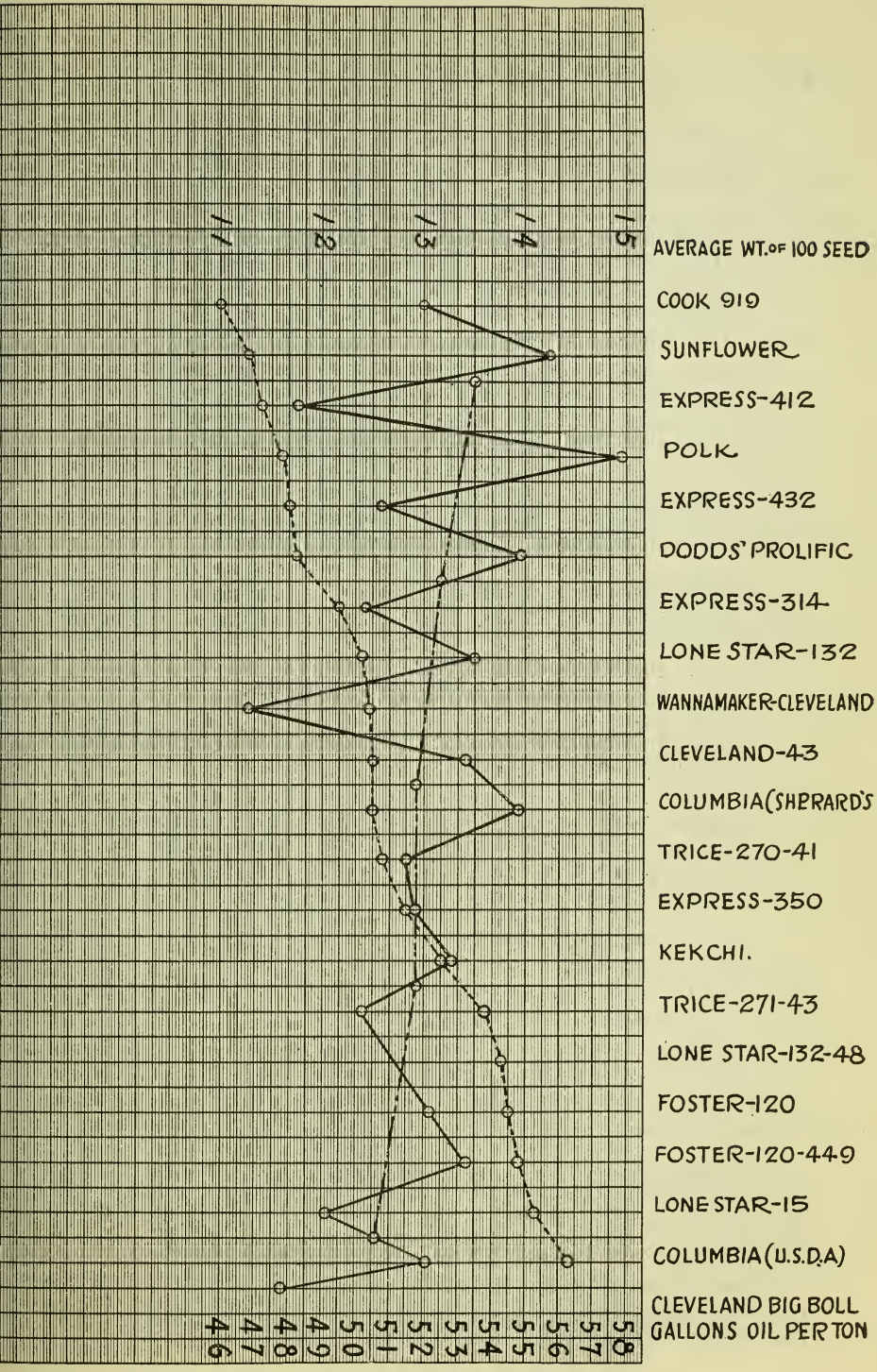


Fig. 2. Curves showing relation of lint per cent. and oil content of cotton seed.
Lint per cent, dotted line - - - - - - - -.
Gallons oil per ton, solid line ————————.
Smoothed curve for oil content, dots and dashes - - - —— - - —— - - ——.



3. Curves showing relation of size of cotton seed and oil content. ght of 100 seed in grams, dotted line - - - - - - - - - - ons oil per ton, solid line ——————— othed curve for oil content, dots and dashes - - —— - .—— - - ——.

Figure 3 contains curves showing the relation of oil content and size of seed. The weight of one hundred seed was taken as the basis for size. (The smaller seeds were probably heavier than the larger seeds, bulk for bulk, but the seeds with greatest volume totaled the greatest weight and were, therefore, the largest both in volume and in weight.) The varieties are arranged in order of size of seed, starting with the smallest. The two curves in this figure also run in different directions; in general, as the size of the seed increases, the oil content falls. Wannamaker-Cleveland is a rather marked exception to the general rule. The seeds of this variety are rather small, but the oil content is very low.

Figure 4 contains curves showing relation of nitrogen and oil content of cotton seed. The different varieties are arranged in order of rank in ammonia content of seeds, starting with the lowest. The two curves in this case also show negative correlation. In general, as the ammonia content increases, the oil content falls. Polk, the lowest in ammonia, is the highest in oil. Kekchi seems to be an exception. It ranks medium high in ammonia content and is one of the highest in oil content. Some of these exceptions are probably due to varietal peculiarities, but others may be due to experimental error.

It appears from these preliminary studies of the oil content of seed of different varieties of cotton that the variety of cotton should be considered when seed are graded or bought and sold, rather than the locality where seed was grown.

DESCRIPTION OF VARIETIES.

Below is a brief description of the principal varieties grown in the tests the past season. The descriptions in most cases are based on several years' observation.

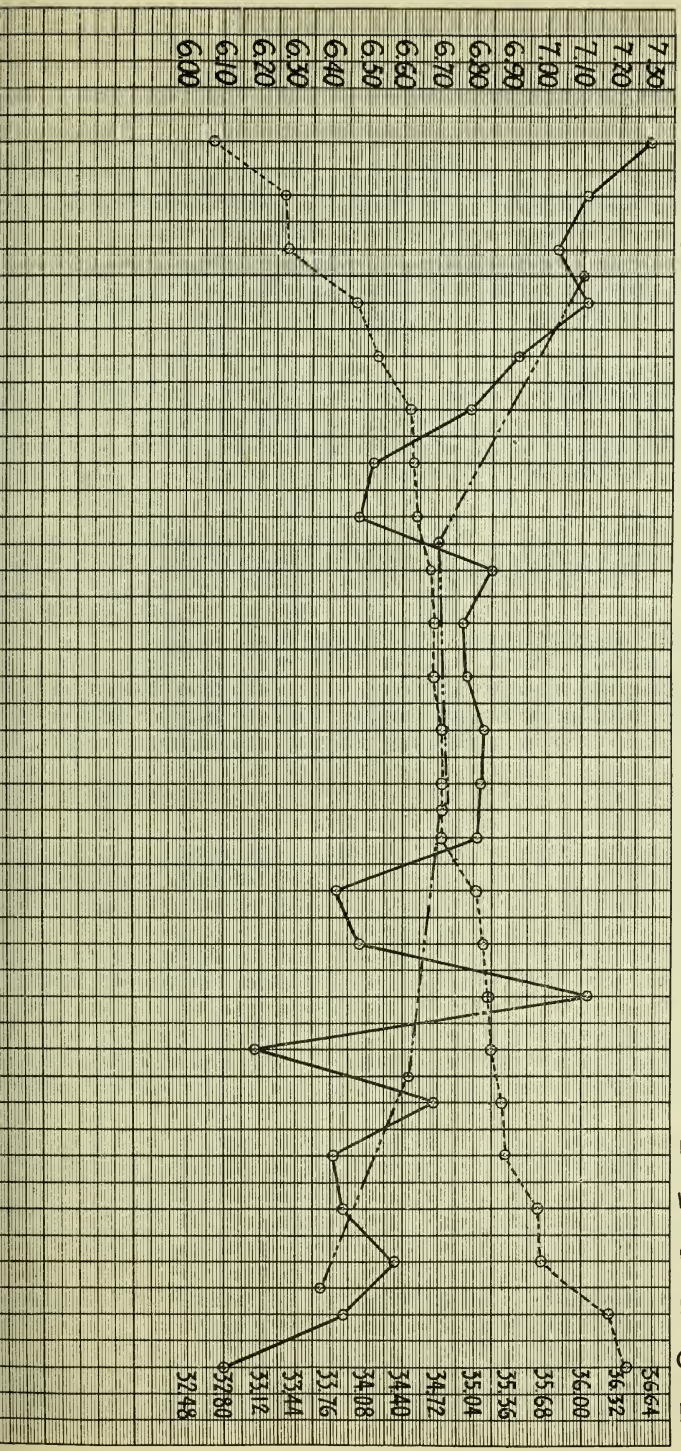
Simpkins. King type; extra early and prolific; plants, small, slender, open, and foliage light. Bolls small, 80 to a pound; bolls open well and are medium stormproof; 31 to 33% lint; staple 3-4 to 7-8 inches; very susceptible to cotton wilt; not a suitable variety for planting on thin hill land.

Trice. Plants small to medium sized, very early and prolific, foliage light; bolls medium sized, 64 to a pound, open well, and medium stormproof; 30 to 32% lint; staple 1 to 1 1-16 inches; plants very susceptible to cotton wilt; not suitable for planting on sandy, thin, or hill land.

Trice-270-41. Differs from the original strain of Trice in having slightly more compact plants, smaller bolls, 70 to 75 per pound; and longer staple, 1 1-16 inch or better. This strain is very early and a good yielder; adapted to rich lands that are free from wilt; selected by Mississippi Experiment Station.

Vandiver's Heavy Fruiter. Semi-clustered type, medium late, not prolific; plants rather stocky with heavy foliage; bolls medium large, 58 to 60 to a pound, open well; 31 to 33% lint; staple 1 to 1 1-16 inch. Probably best adapted to hill land.

Lewis' Prize. Plants compact, and of medium height; leaves small but numerous; medium early and rather prolific; bolls rather small and blunt pointed; about 80 to a pound; 32 to 34% lint; staple 1 inch.



. Curves showing relation of nitrogen and oil content of cotton seed meats.
ent of ammonia in meats, dotted line - - - - - - - -
ent of oil in meats, solid line ————————.
hed curve for oil content, dots and dashes - - —— - - —— - ——.

Cook-588. Plants medium height, foliage medium heavy; medium early and prolific; bolls rather large, ovate and blunt pointed, 58 to 60 to a pound; 36 to 38% lint; staple 7-8 inch. Moderately wilt resistant but susceptible to anthracnose. Originated by the Alabama Experiment Station.

Cook-1010. This strain differs from Cook-588 in having small bolls, 66 to 70 per pound, higher lint per cent (40 to 42), and shorter staple)3-4 inch). It is very prolific and a good yielder; originated by the Alabama Experiment Station.

Wannamaker-Cleveland. Plants medium height with medium heavy foliage; mostly with 3 or 4 vegetative branches; medium early and prolific; bolls rounded, with very blunt tip, 60 to 62 to a pound; 35 to 37% lint; 7-8 to 1 inch staple; semi-resistant to wilt and anthracnose; adapted to both hill and Delta regions.

Cleveland-37W-54. Plants of medium height, rather compact; medium early and fairly prolific; bolls rounded, blunt pointed; 62 to 64 to a pound; 35 to 36% lint; 7-8 to 1 inch staple; somewhat resistant to wilt and anthracnose; adapted to hill land and soils somewhat wilty. This is a selection from Wannamaker-Cleveland made by the Mississippi Experiment Station.

Cleveland Big Boll. Plants slightly taller than Wannamaker-Cleveland, and medium leafy; medium early and medium prolific; bolls rather large, ovate, and blunt pointed; 54 to 56 to a pound; 33 to 35% lint; 1 inch staple.

Cleveland (Smith's). Plants similar to those of Wannamaker-Cleveland; slightly more prolific but with lower lint per cent.

Mexican Big Boll. Plants of medium height, and medium light foliage; slightly earlier and more prolific than Wannamaker-Cleveland; bolls medium sized, 60 to 65 to a pound, ovate, blunted; 31 to 33% lint; 1 inch staple; fairly disease resistant and apparently a good hill land cotton.

Miller. Plants of medium height, and rather heavy foliage; medium early but not quite as early as Wannamaker-Cleveland; not prolific; bolls large, 45 to 50 to a pound, ovate with blunt tip; 33 to 35% lint; 1 1-16 inch staple; is somewhat resistant to wilt but rather susceptible to anthracnose; best adapted to hill land; originated by A. D. Miller, Blue Springs, Miss.; is a selection from Rowden.

Triumph (Mebane's). Plants rather low and stout, with heavy foliage; medium early but considerably later than Cleveland; not prolific; bolls very large, 42 to 48 to a pound, ovate and blunt pointed; 35 to 38% lint; 1 to 1 1-16 inch staple; somewhat resistant to wilt; a good hill land cotton where boll weevils are not numerous.

Triumph (Ferguson's). General characteristics similar to Mebane's Triumph but has slightly lower lint per cent and shorter staple.

Lone Star-132-48. Plants of medium height and somewhat slender; foliage, rather light with edges of leaves raised, commonly, so as to make the leaf concave

above; rather early and prolific for a big boll cotton; bolls rather large, 58 to 62 to a pound, elongated, ovate, and blunt pointed; 30 to 32% lint; 1 1-8 inch staple; susceptible to wilt and anthracnose; adapted to rich land that is free from wilt; originated by the Mississippi Experiment Station.

Polk. Plants tall and slender, foliage light; early but not quite as early as Express; very prolific with mostly short fruit branches; bolls rather small, 80 to 84 to a pound, narrowly ovate and sharp pointed; 28 to 30% lint; 1 3-16 inch staple; somewhat resistant to wilt and anthracnose; adapted to Delta lands; is more resistant to disease and has a better character of staple than Express but is not so good a yielder. Tradition has it that it originated as a chance seedling in a negro's yard near Clarksdale, Mississippi, about 1910.

Magnolia. Plants medium tall and somewhat spreading, foliage light; very early and prolific; bolls rather small, 70 to 75 to a pound, narrowly ovate and sharp pointed; 26 to 28% lint; 1 1-8 to 1 3-16 inch staple; but slightly resistant to wilt; adapted to Delta lands. Originated by J. B. Allen, of Port Gibson, Mississippi.

Express-350. Plants medium tall, rather spreading, with light foliage; very early and very prolific; bolls medium small, 72 to 76 to a pound, narrowly ovate, and sharp pointed; 27 to 29% lint; 1 1-8 to 1 3-16 inch staple; rather susceptible to wilt and anthracnose; adapted to Delta and valley lands. Originated by the Mississippi Experiment Station.

Express-122-433. Similar to Express-350 except that plants are somewhat smaller and more compact; bolls are more storm resistant but harder to pick, and plants are more disease resistant.

Express-432. Differs from Express-350 in having larger and more spreading plants; higher lint per cent (31 to 33); shorter staple (1 1-8 inch); and more disease resistance; plants are probably also better adapted to withstand dry weather conditions, but are not quite as early.

Foster-120. Plants rather low with medium slender stems and rather light foliage; early and prolific but not quite as early as Express-350; bolls rather large, 56 to 62 to a pound, pyriform and long taper pointed; 30 to 32% lint 1 3-16 to 1 1-4 inch staple; rather susceptible to wilt and anthracnose; well adapted to rich lands that are free from wilt; originated by the Mississippi Experiment Station; selection from Foster; plants are earlier and smaller than those of the original strain.

Foster-120-6102. A selection from Foster-120, which differs from it in having earlier and more prolific plants, slightly smaller bolls, and shorter staple (1 1-8 inch). Originated by the Mississippi Experiment Station.

Foster-11. A Foster selection resembling Foster-120 but differing from it in having larger plants, slightly longer staple, slightly lower lint per cent, and in being somewhat later. If the fruiting season is moderately long, this strain will outyield Foster-120.

Webber-49. Plants rather low and medium stocky; foliage rather heavy; medium early and rather prolific; bolls rather large, 64 to 68 to a pound, ovate, and medium pointed; lint per cent 29 to 31; 1 3-16 to 1 1-4 inch staple; somewhat susceptible to wilt and anthracnose; adapted to Delta and valley lands.

Columbia (Sherard's). Plants rather tall and spreading; foliage heavy; medium late; rather prolific; bolls rather large, 66 to 70 to a pound, broadly ovate and sharp pointed; 28 to 30% lint; 1 3-16 to 1 1-4 inch staple; somewhat resistant to wilt but rather susceptible to anthracnose or pink boll rot; adapted to medium fertile lands where weevils are not numerous.

Sunflower. Plants tall and spreading with medium foliage; rather late but, perhaps, a little earlier than most of the old long staple varieties; moderately prolific; bolls rather small, 80 to 85 to a pound, somewhat blunt pointed; 26 to 28% lint; 1 1-4 to 1 5-16 inch staple; rather resistant to diseases; a good long staple cotton for Delta and valley lands where boll weevils are not troublesome.

Allen's Long Staple. Similar to Sunflower in general characteristics; is probably somewhat later, less prolific, and has a slightly lower lint per cent, but has slightly longer staple.

Mississippi Silk. Very similar to Allen's Long Staple in all respects.

Meade. Plants of medium height, medium stout, and with medium foliage; begins blooming rather early and blooms right freely but does not seem to be very prolific in respect to the production of mature bolls. Bolls appear large, but the mass of seed cotton inside is rather small (68 to 72 to a pound), ovate, and long pointed; 23 to 26% lint; 1 5-16 to 1 1-2 inch staple; somewhat susceptible to wilt and anthracnose. This variety was introduced by the United States Department of Agriculture to be used as a substitute for Sea Island cotton when that variety could no longer be grown profitably. Its bolls open like Sea Island bolls, but its lint and seed characters are similar to those of upland varieties. This variety does not appear to be adapted to Mississippi conditions.

SOURCE OF SEED.

Below is a list of the sources from which seed of the varieties tested in 1919 was obtained:

Allen's Long Staple	J. B. Allen, Port Gibson, Mississippi
Boykin	Ferguson Seed Farms, Sherman, Texas
Cleveland–43	Mississippi Experiment Station
Cleveland (Wannamaker)	W. W. Wannamaker Seed Co., St. Mathews, S. C.
Cleveland Big Boll	J. R. Cleveland, Decatur, Mississippi
Cleveland Covington–Toole	Mississippi Experiment Station
Cleveland 37 W–54	Mississippi Experiment Station
Cleveland (Smith's)	Piedmont Seed Farm, Commerce, Georgia
Cook 588	Alabama Experiment, Auburn, Alabama
Cook 1110	Alabama Experiment Station, Auburn, Alabama
Cook 1010	Alabama Experiment Station, Auburn, Alabama
Columbia	J. H. Sherard, Sherard, Mississippi.
Council–Toole	State Board of Entomology, Atlanta, Georgia
Covington–Toole	J. E. Barr, Clio, Alabama
Cook 307–6	Alabama Experiment Station, Auburn, Alabama
Dixie Improved	State Board of Entomology, Atlanta, Georgia
Dix Afifi	State Board of Entomology, Atlanta, Georgia
Express 432	Mississippi Experiment Station
Express 350	Mississippi Experiment Station
Express 122–433	Mississippi Experiment Station
Express 350–64	Mississippi Experiment Station
Express 350–630	Mississippi Experiment Station
Foster 120	Mississippi Experiment Station
Foster 11	Mississippi Experiment Station
Foster 120–64	Mississippi Experiment Station
Foster 120–6102	Mississippi Experiment Station
Foster 120–631	Mississippi Experiment Station
Foster 120–698	Mississippi Experiment Station
Foster 120–66	Mississippi Experiment Station
Half & Half	Willett Seed Co. Augusta, Georgia
Lewis–63	State Board of Entomology, Atlanta, Georgia
Lewis Prize	W. B. F. Lewis, Lewiston, Louisiana.
Lone Star (Ferguson)	Ferguson Seed Farms, Sherman, Texas
Lone Star 132–48–61	Mississippi Experiment Station
Lone Star 132–48	Mississippi Experiment Station
Lone Star 15	Mississippi Experiment Station
Marshall	C. K. Marshall, Greenwood, Mississippi
Meade	Bureau of Plant Industry, Washington, D. C.
Magnolia	J. B. Allen, Port Gibson, Misisssippi
Miller	A. D. Miller, Blue Springs, Mississippi
Mexican Big Boll	O. H. Bales, R. R. No. 12, Charlotte, N. C.
Mississippi Silk	Alex Scott, Rosedale, Mississippi
Sunbeam	Willett Seed Co., Augusta, Georgia
Sunflower	Marx Shaefer, Yazoo City, Mississippi
Sunflower x Express–61	Mississippi Experiment Station
Simpkins	W. A. Simpkins, Raleigh, N. C.
Tri–Cook	Alabama Experiment Station, Auburn, Alabama
Triumph	A. D. Mebane, Lockhart, Texas
Trice–270–41	Mississippi Experiment Station
Trice (Ark.)	Arkansas Experiment Station, Fayettville, Arkansas
Trice–271–43	Mississippi Experiment Station,
Triumph (Ferguson)	Ferguson Seed Farm, Sherman, Texas
Triumph (Mebanes)	A. D. Mebane, Lockhart, Texas
Vandiver's Heavy Fruiter	Vandiver Seed Co., Lavonia, Georgia
Webber–49	Coker Seed Co., Hartsville, S. C.

COTTON EXPERIMENTS, 1920

INTRODUCTION.

In 1920 rather extensive cotton experiments were carried on by the College Experiment Station and the several branch stations. Due to the high cost of printing and the scarcity of funds for publications, but brief reports covering only a part of the experiments carried on will be made at this time. This bulletin mentions only certain results from the College Station.

The Weather. During March and April, the temperature was below normal and rainfall excessive; 22.67 inches of rain fell; this was 12.05 inches above normal. May was warmer, but the rainfall continued excessive. The weather the rest of the year was fairly seasonable. Killing frosts did not occur until the middle of November.

Boll Weevils. Weevils were found on the College farm June 17. Following this many came out of hibernation, producing a heavy initial infestation. They increased much more rapidly in some fields than in others, but on the whole damage was great. By the last of July weevils were numerous enough to destroy all forms, and much injury was done prior to this date. In the east central part of the State weevil damage was considerably worse than in 1919. The same was true for all parts of the State. In the southern part the crop was almost ruined; in the Delta, damaged considerably in places; in the northern part there was little or no injury.

Classing. The stapling and classing was done by C. W. Willis, Government cotton grader, stationed at Pontotoc, Mississippi. The staple lengths given are based on commercial standards and are somewhat longer comparatively than others published the last two years. The prices used are based on the New Orleans market for November 29, white cotton, of good character and strict middling grade. The John M. Parker Cotton Company, of New Orleans, kindly quoted us market prices for the various staple lengths.

Variety Studies.

The cotton in the main variety test was planted April 24, on Houston clay valley soil of moderate fertility. Rains following planting favored germination, and an excellent stand was secured of all varieties except Triumph, Foster-120-6102, and Foster-120-631. The skips in the rows of these varieties were replanted with hoes May 5. No fertilizer was used. Boll weevils appeared in the plats about the middle of June. The weather favored their multiplication, and much injury resulted. No control measures were used. Rust and fungus diseases did practically no damage.

Table No. 6 shows the comparative yields of different varieties in the test. The yields are rather low in all cases. Foster-120-6102, Trice-270-41, and Smith's Cleveland led in yield of seed cotton per acre, but the differences in lint per cent and length of staple made some other varieties rank higher in money value.

TABLE 6.—COTTON VARIETY TEST, COLLEGE STATION, 1920.

VARIETY	Plat yield of seed cotton.	Plat yield for perfect stand.	Yield seed cotton per acre.	Lint per cent.	Pounds lint per acre.	Length of staple in inches.	Value lint per pound in cents.	Value lint per acre.	Pounds seed per acre.	Value of seed at $25.00 a ton.	Total money Value.	Rank in money value.	Weight of 100 bolls in ounces.
Simpkins Ideal	86.5	87.4	874	33.2	290	1	16¼	47.12	584	7.30	54.42	20	20
Trice–270–41	103.7	109.4	1094	29.4	321	1 3/16	23	73.83	773	9.66	83.49	5	22
Cleveland–Wannamaker	74.0	92.7	927	35.3	327	1 1/16	17	55.59	600	7.50	63.09	15	27
Cleveland (Coker)	91.5	92.9	929	35.2	327	1 1/16	17	55.59	602	7.52	63.11	14	25
Cleveland–37W–54	92.0	97.4	974	33.4	325	1 1/16	17	55.25	649	8.11	63.36	13	26
Cleveland Big Boll	83.2	87.4	874	33.1	289	1 1/16	17	49.13	585	7.31	56.44	19	29
Cleveland (Smiths)	101.0	102.7	1027	33.2	341	1	16¼	55.41	686	8.57	63.98	11	26
Cook–1010	99.0	100.8	1008	36.3	366	1	16¼	59.47	642	8.02	67.49	10	24
Mexican Big Boll	80.0	83.5	835	37.9	316	1 1/16	17	53.72	519	6.49	60.21	16	26
Miller	85.5	86.0	860	31.6	271	1 1/8	19	51.49	589	7.36	59.12	17	32
Triumph	64.0	74.7	747	35.6	266	1 1/8	19	50.54	481	6.01	56.55	18	33
Lone Star–132–48	93.0	93.6	936	32.4	303	1 3/16	23	63.69	633	7.91	71.60	8	26
Acala No.5	80.7	84.3	843	35.4	298	1 1/8	19	56.62	545	6.81	63.43	12	26
Express–432	88.5	89.7	897	30.6	274	1 3/16	23	63.02	623	7.79	70.81	9	22
Express–122–433	95.5	97.5	975	27.8	271	1 1/4	27	73.17	704	8.80	81.97	6	22
Foster–120–6102	104.0	108.5	1085	30.7	333	1 3/16	23	76.59	752	9.40	85.99	2	20
Foster–120–631	86.0	99.5	995	30.5	303	1 5/16	32.5	98.47	692	8.65	107.12	1	24
Webber–49–3	57.2	63.9	639	29.0	185	1 3/8	37.5	69.37	454	5.67	75.04	7	22
Columbia	81.0	82.7	827	28.4	235	1 5/16	32.5	76.37	592	7.40	83.77	4	21
Hartsville–12	72.5	74.0	740	28.3	209	1 3/8	37.5	78.37	531	6.64	85.01	3	31
Hartsville–14	40.0	41.8	418	25.7	107	1 3/8	37.5	40.12	311	3.89	44.01	21	30

In the hill land variety test, Miller and Cleveland Big Boll made the best yields. Cleveland-37W-54 made the best yield in the test conducted on soil infected with cotton wilt or blight.

CULTURAL METHODS FOR EAST AND CENTRAL MISSISSIPPI.

Preparation of 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. If the soil is light, plowing may be deferred until a few weeks before planting. It is necessary to plow late if the soil has a tendency to wash badly. On level lands the plowing can be done in the fall or early winter, the earlier the better, so 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 burster in the spring gives the best seed bed. Planting on a low 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 furrow slices together with a turning plow and using a middle burster 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. Another method that is followed to a considerable extent in places is to split the old beds or ridges of the preceding year with a 4-mule middle burster. This covers most of the vegetable matter which decays by spring. Just before planting, the ridges made by the buster are freshened with a disc harrow and smoothed with a drag harrow or drag. This method is speedy, but more work is required to cultivate the following crop than where flat breaking is practiced. In all cases the bed should be made some time before planting so that it will have a chance to become firmed or packed.

Planting. Cotton should be planted as early in the spring as weather conditions will permit, but it is not advisable to plant until the soil has become warm enough to germinate the seeds readily and produce good growth in the young plants. At the College Station, the best time for planting is usually from the 15th to the 20th of April. South of the Station planting can be done a few days 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 can be planted earlier than the stiffer soils. In our experimental plats we have planted earlier than the dates mentioned, but have failed to get 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 should not be made, but some other crop planted instead. To secure a stand, "plenty" of seed should be planted. The germination per cent of cotton seed is low unless temperature and moisture conditions are just right. We find it to be economy to use a bushel or more to the acre and then 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 is so great that not less

than a bushel per acre is best. Cotton seed should be planted shallow. The young plants are not vigorous and cannot get out of the ground if the seed is planted very deep. A depth of one-half to one inch is usually best.

Cultivation. The first cultivation will necessarily have to be shallow to prevent covering the young plants. A spring-tooth 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 rains, which interfere with regular cultivation, it may be necessary to destroy grass and weeds by some drastic method. The implement at hand that will do this best with the least injury to the plants is, of course, the one to use. It is a bad practice to "bar off" or to turn the soil away from the young plants. If this is necessary to destroy grass and weeds, the soil should be returned to the plants as soon as possible. Cultivation should be continued until the first of August.

Fertilizer for Cotton. On the basis of the fertilizer experiments that have been carried on at the College Station, the only fertilizers that can be recommended for cotton in this section are nitrogen and kainit. On land that has not had a heavy crop of legumes turned into it recently, the use of 100 pounds of nitrate of soda per acre, or 200 pounds of cottonseed meal, or the equivalent of readily available nitrogen in other forms of nitrogen carriers, will probably prove profitable. Cottonseed meal should be distributed in the drill before planting. Nitrate of soda may be put in the row before planting or used as a side dressing about the time cotton begins to square. On land on which cotton rusts, the use of 200 pounds of kainit per acre is advisable. The kainit should be applied in the drill before planting.

BOLL WEEVIL CONTROL.

One of the most important matters in connection with cotton production in Mississippi is that of boll weevil control. Over much of the State weevils are the chief limiting factor. The Experiment Station has carried on some experiments looking toward weevil control every year since 1914, when weevils first began to damage seriously cotton in this part of the State.

Various methods of control have been tried, such as picking adult weevils by hand, picking up punctured squares, shaking plants in a bag held open by a hoop, etc. Various types of weevil catching machines have been tried also. Many weevils were destroyed by each method, but none of them gave an effective control.

Poisoning was started in 1917. That year and also the year following, lead arsenate powder was applied to some small plats without an appreciable effect.

In 1919 calcium arsenate was used on thirty-seven different plats and fields. ranging in size from one-twentieth of an acre to six acres. On the small plats the poison proved ineffective; on the small fields profitable, gains being secured in two cases out of three.

In 1920 poisoning tests with calcium arsenate were made on four different fields of cotton on the College farm, ranging from 3 1-4 to 8 acres in size. In addition to this, poison was used on twenty-one multiplying patches and small cuts of cotton planted for various other experiments.

TEST I.

Test I was made with 3 1-2 acres of cotton growing on red clay hill land of rather low fertility. No other cotton was in close proximity. Boll weevils appeared during June but multiplied slowly. On July 12, the infestation was only a fraction over one per cent. Following this they multiplied somewhat more rapidly, reaching 14% July 26. On July 29, 6.9 pounds of poison per acre was applied with a cart type cotton dusting machine to one-half the cut. The poison was applied while heavy dew covered the plants. Following this, four other similar applications were made at intervals of a week or less. Weevil infestation increased in both poisoned and unpoisoned areas averaging about 20% more in the unpoisoned. The following table shows the main results of the test:

Yield Per Acre in Poisoned Plat—
- First picking, Sept. 24 ..... 396 lbs.
- Second picking, Oct. 20 ..... 142 lbs.
- Total ..... 538 lbs.

Yield Per Acre in Unpoisoned Plat—
- First picking, Sept. 24 ..... 414 lbs.
- Second picking, Oct. 20 ..... 58 lbs.
- Total ..... 472 lbs.

Increase due to poisoning ..... 66 lbs. per acre.
Value of increase (lint 15c, seed 1 1-4c per lb.) ..... $ 3.85 per acre.

Cost of Poisoning—
- 37 lbs. calcium arsenate (28c per lb.) ..... 10.36 per acre.

Number of applications, 6.
- Cost of labor and team ..... 1.23 per acre.
- Total cost of poisoning ..... 11.59 per acre.
- Loss due to poisoning ..... 7.74 per acre.

TEST II.

Test II was made on a field of about eight acres of black valley soil. The soil in this cut appeared uniform and the cotton also when the poisoning was done. Later rust damaged badly the cotton in parts of the field and was especially bad on the poisoned area. Four applications of poison were made about as in Test I. This reduced the infestation in the poisoned areas half or more, but the final yield was 365 lbs. per acre greater on the unpoisoned plats. The expense of poisoning was, therefore, a total loss.

TEST III.

Test III was made on 4 3-5 acres of valley loam soil of medium fertility. The cotton was not planted until late, about May first, and was damaged considerably by wet weather and grass. Probably the unpoisoned plats were damaged more than the others. Weevils appeared in June, but multiplied slowly, not reaching 13% infestation until August 2; 5 3-5 lbs. poison per acre was applied to one-half the cut on August 6. Five other applications were made at intervals from four to seven days. Rains interfered considerably by washing

off the poison and making the ground so soft that it was difficult to run the machine. After the poisoning work was started weevils increased slowly in the poisoned part of the field and about twice as rapidly in the rest, reaching maximum infestation in the unpoisoned areas about August 30.

The cost and yields for Test III were as follows:

39.5lbs. calcium arsenate per acre	$11.06
Labor per acre, team and man	1.76
Total cost of poisoning	12.82

Yield Per Acre in Poisoned Plats—

First picking	786.0 lbs.
Second picking	195.0 lbs.
Total	981.0 lbs.

Yield Per Acre in Unpoisoned Plats—

First picking	524.0 lbs.
Second picking	22.5 lbs.
Total	546.5 lbs.
Gain per acre for poison	434.5 lbs.
Value of seed and lint of increase	$21.57
Profit per acre	8.75

TEST IV.

Test IV was made on 3 1-4 acres of hill land that varied considerably in fertility in different parts but was divided so that the fertility was divided between poisoned and unpoisoned areas. This cotton was not planted until May 5, and suffered from lack of proper cultivation while young. Weevil infestation was light during July, attaining 5 1-2 per cent August 2. Six pounds per acre poison was applied August 6. Other applications were made August 13, 17, and 24. Here as in other plats, infestation increased about twice as fast in unpoisoned plats. Weevils destroyed all forms put on after August 30.

Cost and yields for Test IV were:

27.5 lbs. calcium arsenate per acre	$ 7.72
Labor per acre, team and man	1.64
Total cost of poisoning	9.36

Yield Per Acre from Poisoned Plats—

First picking	478.5 lbs.
Second picking	99.0 lbs.
Total	577.5 lbs.

Yield Per Acre from Unpoisoned Plats—

First picking	375.0 lbs.
Second picking	32.5 lbs.
Total	407.5 lbs.
Gain per acre from poison	170.0 lbs.
Value of lint and seed of increase	$ 9.96
Profit per acre	.60

As was stated above, poison was used on a number of other cuts and small fields on the College farm. On these, whole areas were poisoned, no unpoisoned parts being left; it is impossible, consequently, to say just how much effect the poison had but apparently there was considerable gain in amount of cotton produced, due to the poison. But whether there was enough to yield a net profit was somewhat doubtful. These plats were compared with a few plats on the farm that received no poison.

Rains during July and August interfered with the poisoning work considerably by washing off the poison and by making the ground too soft, at times, for the dusting machine to run. The high cost of labor and the rather high cost of poison made the work less profitable than it might be under other conditions.

From the foregoing results, and from others published by different experiment stations and by the U. S. Department of Agriculture, it will be seen that gains to be obtained from boll weevil poisoning are somewhat uncertain. Profit will not result except where certain conditions obtain. It will probably not pay to poison unless the plants are young and vigorous, the soil fertile enough to produce half a bale to the acre, and a heavy weevil infestation expected. Poison which does not conform to the government specifications should not be used. Approved types of machines for applying the poison are necessary. This work requires much care and effort and must be done regularly if good results are to be expected. A single application will likely do but little good; neither will two or more if two weeks apart.

Any one that is thinking of trying boll weevil poisoning the coming season had better write the Experiment Station, Agricultural College, Mississippi, or to the Boll Weevil Laboratory, Tallulah, Louisiana, for further information regarding the work.

TABLE SHOWING COTTON ACREAGE AND PRODUCTION IN MISSISSIPPI IN 1918 AND 1919

Table 7—Cotton Acreage and Production in Mississippi in 1918, 1919 and 1920.

The following table shows the number of acres planted in cotton in the various counties of the State in 1918, 1919, and 1920, and also the number of bales produced. The yields for 1918 and 1919 are based on ginning reports secured by the Census Bureau. The acreage for 1918 1919, and 1920, and the yields for 1920 are taken from reports made by J. A. Ramey of the Bureau of Crop Estimates.

COUNTY.	ACRES.			BALES PRODUCED.		
	1920	1919	1918	1919	1918	1920
Adams	12,006	12,506	12,893	1,928	5,386	2,800
Alcorn	20,000	17,694	18,823	8,379	7,969	7,694
Amite	35,690	35,132	37,375	6,375	10,604	8,093
Attala	27,060	24,369	7,354	7,354	8,130	4,095
Benton	14,400	15,920	16,936	6,529	6,577	6,078
Bolivar	248,000	234,919	288,799	106,898	124,936	114,000
Calhoun	13,500	14,160	10,261	5,218	4,815	2,454
Carroll	25,060	27,757	26,186	7,526	9,927	4,481
Chickasaw	26,400	27,759	27,215	9,337	10,272	6,851
Choctaw	7,070	7,373	6,956	2,524	2,273	1,331
Claiborne	20,270	23,746	22,833	3,030	6,858	4,453
Clarke	8,700	9,270	9,088	2,794	3,596	2,238
Clay	16,000	18,776	20,409	6,178	8,190	5,017
Coahoma	173,000	180,037	232,263	70,098	83,056	80,057
Copiah	21,000	28,408	24,281	5,358	8,348	5,427
Covington	21,250	14,567	15,834	4,805	5,765	7,147
DeSoto	60,200	67,467	77,548	26,272	31,879	18,891
Forrest	8,300	3,032	2,888	1,848	1,950	1,690
Franklin	16,600	9,634	12,677	2,961	5,335	3,580
George	2,220	2,105	1,986	----------	1,500	469
Greene	1,740	1,681	1,528	----------	1,100	437
Grenada	22,000	25,565	24,118	8,106	8,817	2,682
Hancock	470	450	154	----------	150	137
Harrison	850	782	460	----------	210	213
Hinds	73,700	77,639	82,584	20,317	29,664	17,460
Holmes	74,500	81,769	91,875	23,644	24,694	22,599
Issaquena	15,000	23,628	25,683	5,706	10,527	3,281
Itawamba	17,100	17,013	16,203	3,875	4,518	3,577
Jackson	340	309	300	----------	150	135
Jasper	17,040	17,094	16,126	3,896	6,538	3,449
Jefferson	23,400	22,845	23,797	4,009	10,354	5,234
Jeff. Davis	31,370	24,744	24,740	6,543	8,754	10,500
Jones	19,700	18,848	20,051	4,473	7,853	4,039
Kemper	18,000	18,804	20,439	3,719	7,673	3,386
Lafayette	11,800	12,571	10,837	6,969	4,557	3,580
Lamar	1,840	1,762	1,874	1,549	2,274	423
Lauderdale	14,000	13,940	13,500	4,488	6,483	2,654
Lawrence	26,900	25,621	25,981	6,920	9,060	7,946
Leake	25,000	27,115	27,688	6,007	7,077	5,276
Lee	33,500	37,894	38,667	15,235	16,108	11,316
Leflore	98,400	108,920	137,220	45,399	63,614	38,025
Lincoln	34,440	27,258	29,310	7,710	9,916	9,844
Lowndes	23,160	37,514	32,340	7,892	10,263	3,892
Madison	80,000	58,103	61,812	16,923	21,140	20,117
Marion	23,110	23,742	18,405	5,249	5,392	5,335
Marshall	51,000	56,538	58,895	20,573	19,828	18,672
Monroe	37,500	44,224	45,127	13,194	15,087	7,050
Montgomery	10,700	19,304	17,549	5,819	6,534	2,032
Neshoba	16,000	18,418	18,794	5,373	7,749	3,682
Newton	19,400	19,091	18,357	4,382	7,800	2,950

COUNTY.	ACRES.			BALES PRODUCED.		
	1920	1919	1918	1919	1918	1920
Oxubee	39,800	43,594	45,410	8,477	16,751	10,326
Oktibbeha	12,700	18,731	16,875	3,558	5,029	2,263
Panola	72,000	79,248	79,248	27,070	22,514	19,100
Pearl River	2,710	2,440	2,000	.....	1,200	482
Perry	3,790	3,570	3,400	1,027	1,599	634
Pike	30,700	30,772	30,169	8,772	9,157	8,865
Pontotoc	22,500	30,947	25,576	9,322	7,111	7,540
Prentiss	18,800	24,804	22,346	5,882	6,429	8,236
Quitman	70,300	70,410	80,835	26,666	34,515	30,950
Rankin	15,900	16,286	15,967	4,804	6,360	3,660
Scott	20,000	20,562	18,648	5,533	5,468	4,066
Sharkey	33,000	58,758	62,509	13,801	25,365	11,396
Simpson	21,900	18,130	20,144	5,158	7,286	5,733
Smith	27,400	27,085	22,955	5,237	8,038	6,019
Stone	1,700	1,392	1,200	.....	510	249
Sunflower	181,000	187,839	205,673	62,814	89,690	70,839
Tallahatchie	84,200	92,948	99,519	36,979	46,529	28,422
Tate	56,060	59,014	64,146	17,888	19,526	17,349
Tippah	18,500	19,991	18,683	8,468	5,952	8,053
Tishomingo	13,400	20,438	21,290	5,844	5,994	5,160
Tunica	70,100	69,430	86,388	36,625	34,175	29,331
Union	16,200	16,591	16,619	8,478	6,169	7,770
Walthall	19,900	20,126	18,464	5,546	6,825	5,600
Warren	18,500	28,961	31,825	6,140	12,906	3,085
Washington	126,000	143,081	168,702	44,097	72,233	31,697
Wayne	12,100	11,898	13,520	2,165	3,814	1,578
Webster	18,100	14,670	15,606	5,886	5,538	3,029
Wilkinson	8,100	16,251	15,778	1,786	5,896	1,597
Winston	8,700	9,861	9,861	3,595	3,854	2,147
Yalobusha	23,100	24,908	18,451	7,579	7,050	2,833
Yazoo	75,700	85,608	97,455	18,203	28,618	22,963
Humphreys	51,000	43,500	50,000	17,733	24,694	17,224
State	2,792,546	2,950,000	3,132,000	960,886	1,226,051	884,925

STATE COTTON CROP REPORT.

	1920	1919	1918	1917	1916
Number of acres	2,793,000	2,950,000	3,132,000	2,788,000	3,110,000
Average yield per acre, pounds of lint	151	154	187	155	125
Average price per pound, Dec. 1—cents	14.8	37.5	27.8	28.5	20.5
Number of bales, 500-lbs. gross weight	885,000	961,000	1,226,000	905,000	812,000
Average gross value per acre, basis Dec. 1 price	$ 22.35	$ 58.12	$ 51.99	$ 44.18	$ 25.62
Total Value of Crops, basis Dec. 1 price, dollars	62,418,000	177,375,000	170,421,000	129,041,000	83,209,000

SOURCE OF SEED IN 1920

In 1920 seed was obtained from about the same sources as in 1919. Varieties not included in the 1919 list or obtained from other parties are given below.

Acala No. 5	Nunn Seed Co., Porter, Oklahoma.
Cleveland (Coker's)	Pedigreed Seed Co., Hartsville, S. C.
Cook-1010	J. T. Williamson, Auburn, Ala.
Hartsville-12	Pedigreed Seed Co., Hartsville, S. C.
Hartsville-14	Pedigreed Seed Co., Hartsville, S. C.