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Report, Raymond Branch Experiment Station, 1928

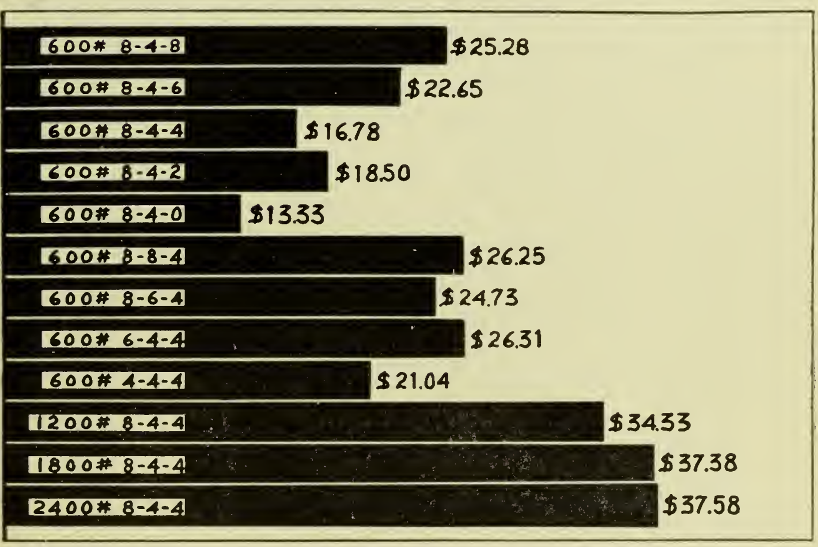
H. F. Wallace

J. L. Cooley Jr.

REPORT
RAYMOND BRANCH EXPERIMENT STATION, 1928.

By

H. F. Wallace and J. L. Cooley, Jr.



Net gains over no fertilizer treatment by the use of various amounts and analyses of fertilizer— Four year averages

Graph showing a four year average net gain of various fertilizer analyses over checks with cotton.

Mississippi Agricultural Experiment Station
A. and M. College, Mississippi.
J. R. Ricks, Director.

Report of Work at The Raymond Branch Experiment Station, 1928.

By H. F. Wallace.

INTRODUCTION

This report contains a summary of the work conducted on the Raymond Branch Experiment Station for the year of 1928. Many tables herein will give averages for a period of years, whereby results with various fertilizers and varieties will be more accurate. Other publications from this station may be secured upon request from the Mississippi Experiment Station, A. and M. College, Mississippi.

Experiments were expressly conducted to determine the kinds and quantities of fertilizers, varieties and cultural methods of cotton, corn, legume and truck crops best suited for the southern section of the Brown Loam soil area of Mississippi. Various inoculating materials for legumes have been tested and found to give about equal results. Lime has been applied to non-lime soils and good cuttings of alfalfa have resulted when planted to this crop. Beneficial results have been secured upon fertilizing fruit trees and grapes. Success has been attained in grafting paper-shelled varieties on the native seedling pecan trees.

As a crop year, 1928 presented many obstacles. The weather was favorable for the early breaking of land and one field on the station of very poor hill land, consisting of twelve acres, fertilized with 300 pounds of an 8-4-4 (PNK) fertilizer per acre and side dressed with 100 pounds of nitrate of soda per acre and planted March 31st to Cocke's Prolific corn and otootan soybeans, produced an average of 26.5 bushels of corn to the acre besides the crop of soybeans. This corn was harvested the first week in September, the corn stalks and green bean vines turned under and the entire field planted to hairy vetch which at present would furnish fairly good grazing. On the other hand, dairy cattle or stock could have grazed the green bean vines as pastures were very dry at the time.

Early cotton did not fair so well as packing rains and late frosts caused a number of people to plant the same field three or four times to secure an acceptable stand. On the night of June 13th, this immediate section received a ten inch rain that washed up much cotton on the lowlands after it had been chopped out and dirted. Cotton seed became scarce and many good farmers were compelled to reseed their land to "gin-run" seed of mixed varieties. Many cotton fields got very grassy due to frequent rains which caused the land to be wet enough to prevent cultivation. A six acre field on the station, after being chopped, had a twenty-two foot bridge to float diagonally across it without damaging a stalk of cotton. Water was about three feet deep on this field but a little over eight five hundred pound bales were produced at harvest.

The boll weevil was worse this season than it has been since 1923. Poison was applied twice to all of our plats and the fifteen acres we had in cotton produced sixteen and three-fifths five hundred pound bales. The average yield per acre for Mississippi this year is estimated at 174 pounds of lint cotton per acre which is also the ten year average. This is a higher yield than any other cotton producing state of any consequence except North Carolina.

Truck crops came in for their share of the late frosts and heavy rains, but produced fair yields which brought very poor prices.

This station faired these adverse conditions well, producing more than a bale of cotton per acre on the average, plenty of hay and about seven hundred bushels of grain. Every foot of cultivated land is now growing a winter legume of some kind and this caused a darkey visitor the other day to make this remark, "Cap, you grows your fertilizer in the winter and I buys mine in the spring."

Much credit is due our capable farm manager, Mr. J. C. Peyton, for the success attained and to Mr. J. L. Cooley, Jr., Horticulturalist, who rendered material assistance with the horticultural experiments. Mr. Cooley will report all the horticultural work in this bulletin.

COTTON

Cotton represents the principal cash crop of our State, hence much attention has been given it from a standpoint of varieties, fertilizers, spacing and diseases.

As a cotton year, 1928 furnished many obstacles, such as excessive rains which caused grass to invade the wet fields which could not be cultivated, late frosts which injured stands causing replanting and last but not least, the boll weevil which had it not been for dry weather in the latter part of the season would have reduced the final yield materially. Due to so much replanting, good seed were not obtainable in many instances and careful farmers were compelled to plant "gin-run" seed. This, too, had a tendency to reduce final yields.

On July 21st, one field on the station had a 45 per cent infestation of boll weevils and daily showers for a period of two weeks prevented effective poisoning and the infestation increased to 100 per cent by July 31st. Another field of six acres had an infestation of 68 per cent on July 31st, but two applications af calcium arsenate reduced this to five per cent and the final yield was something over eight 500 pound bales. Many other fields were infested from 35 to 65 per cent. At the second poisoning the plant lice were beginning to get bad so to combat them, one pound of tobacco dust or "Black Leaf 40" was added to eight pounds of calcium arsenate and the lice gave no more trouble. Other conditions may have been responsible for this however.

One rain on the night of June 13th, totaled ten inches in nine hours and all fields were covered until noon the next day from one to four feet in slowly moving water which had the effect of back-water. Regardless of these disastrous troubles, our crop from fifteen acres amounted to sixteen and three-fifths bales.

A large acreage is responsible for the 1928 yield in Mississippi being as high as it is and it has also caused to a certain extent a lower yield per acre. It is evident more than ever that we should plant fewer acres to cotton and make more cotton to the acre. To aid increased production per acre, the following tables will reveal actual yields produced on our fields this past year.

Below may be seen the results with twenty-two leading varieties of cotton which were planted on both valley and hill land, as shown in Table 1 for the valley and Table 2 for the hill test.

Table 1—Cotton Variety Test—Valley Land —1928

Variety:	Lint data				Total value per acre	Rank in val.
	lbs. lint per acre	Percentage	Length	Cents per lb.		
Cleve., 54	691.7	34.5	15-16 f	17.95	158.52	2
Cleve., 884	387.4	33.7	1 1-32	19.05	87.51	20
Cleve., Wilson	634.1	32.0	7.8 f	17.70	136.48	4
Cleve., Piedmont	557.2	32.4	7-8 f	17.70	119.54	13
Half and Half	489.9	38.9	13-16 f	17.20	98.11	19
Cook 1010	540.8	39.2	13-16 f	17.20	108.11	17
Acala 37	511.1	33.1	1 1-32	19.05	115.95	15
D. & P. L. No. 8	542.6	37.6	1	18.45	116.30	14
Rowden 40	586.1	34.3	1	18.45	128.34	6
Miller	565.0	33.8	1 1-32	19.05	127.54	8
D. & P. L. No. 4	531.5	35.6	1	18.45	115.16	16
Deltatype Webber	440.2	31.6	1 3-16	20.60	107.83	18
Delfos 910	541.2	31.7	1 1-8	19.80	128.04	7
Missdel No. 1	356.9	33.5	1 5-32	20.00	84.13	21
Delfos 911	759.7	32.3	1 5-32	20.00	180.60	1
Delfos 6102	634.0	32.2	1 3-32	19.65	148.57	3
D. & P. L. No. 6	541.3	35.2	1 3-32	19.65	124.29	9
Express 121	586.4	33.8	1 3-32	19.65	135.89	5
Lone Star 168	536.6	33.6	1 3-32	19.65	124.23	10
Lone Star 284	534.5	33.7	1 1-16	19.40	122.81	11
Lone Star 65	524.0	33.1	1 1-16	19.40	120.71	12

Table 2—Cotton Variety Test—Hill Land—1928

Variety:	lbs. lint per acre	Lint data: Percentage	Length	Cents per lb.	Total value per acre	Rank in val.
Cleve., 54	252.3	36.2	15-16	17.95	53.32	6
Cleve., 884	234.5	35.1	1	18.45	51.06	10
Cleve., Wilson	264.3	34.5	13-16 f	17.20	54.48	4
Cleve., Piedmont	240.3	35.0	13-16 f	17.20	49.36	13
Half and Half	254.5	40.6	3-4 f	17.20	50.45	12
Cook 1010	219.2	40.3	13-16	17.20	43.54	17
Acala 37	188.4	34.9	1	18.45	41.07	18
D. & P. L. No. 8	152.4	38.6	15-16	17.95	31.71	20
Rowden 40	167.3	36.2	15-16 f	18.20	35.74	19
Miller	188.4	34.9	1	18.45	41.07	18
D. & P. L. No. 4	277.1	37.0	15-16	17.95	47.72	14
Deltatype Webber	220.9	32.3	1 1-8	19.80	52.16	9
Delfos 910	201.1	32.6	1 3-32	19.65	46.99	15
Missdel No. 1	200.5	35.3	1 1-16	19.40	45.50	16
Delfos 911	291.1	33.5	1 3-32	19.65	67.60	1
Delfos 6102	284.5	33.6	1 1-16	19.40	65.31	2
D. & P. L. No. 6	228.4	36.2	1 1-32	19.05	50.75	11
Express 121	236.3	34.6	1 1-32	19.05	53.05	7
Lone Star 168	239.1	34.8	1 1-32	19.05	53.60	5
Lone Star 284	250.3	34.3	1 1-32	19.05	56.31	3
Lone Star 65	228.7	34.2	1 1-16	19.40	52.28	8

Recommendations:—For hill land, it has been found that Cleveland-54, Cleveland-Wilson, any of the Lone Star strains, Miller, D. and P. L. 4 and Acala are all good.

For Valley land, Delfos-6102 and any of its progenies, any of the Lone Star strains, D. and P. L. 6, Cleveland-54, Express-121, Miller and Rowden-40. If a good premium is being paid for an extra long staple, it would very probably be wise to grow Delta-type Webber on very strong land. To maintain length of staple in the long staple varieties, always plant them on strong land. Many long staple varieties are planted on the poorer classes of soils and when the sample is classed the cotton buyer sometimes gets the credit for shortening the length instead of the soil which is usually responsible.

The valley land test has been conducted for eight years, while this is the second year for the test on hill land.

At one time this year, August 4th, the hill test had a weevil infestation of 100 per cent. Both tests had two applications of poisoning in the form of calcium arsenate.

Table 3—Cotton Variety Test on Loess Soil—1928

Variety:	Lint data: lbs. lint per acre	Percentage	Length	Cents per lb.	Total value per acre	Rank in val.
Trice	401.2	34.1	1	18.45	87.79	10
Cleve., 54	427.6	36.2	1	18.45	92.45	4
Cleve., Wann.	423.8	37.8	7-8	17.50	86.71	12
Half & Half, Mahon	463.4	40.6	3-4 f	17.20	91.91	6
Cook 1010	481.8	40.3	13-16	17.20	95.70	1
Willis	220.4	34.7	7-8 f	17.70	46.48	18
Acala 37	362.7	34.9	1	18.45	78.04	14
Miller	431.7	34.9	1	18.45	94.13	3
D. & P. L. No. 8	453.6	38.6	15-16	17.95	94.41	2
D. & P. L. No. 4	431.4	37.0	15-16	17.95	90.65	7
Lone Star 65	324.9	34.2	1 1-16	19.40	74.28	16
Lone Star 168	382.2	34.8	1 1-32	19.05	85.68	12
Delfos 1374	284.7	33.2	1 1-8 f	20.00	67.25	17
Delfos 911	395.9	33.5	1 3-32	19.65	91.93	5
Delfos 1341	392.9	36.4	1 1-16 f	19.40	88.58	8
Express, Lightning	377.3	32.9	1 1-8	19.80	88.55	9
Deltatype Webber	356.3	32.3	1 3-16	20.60	86.83	11
Simpkin's	341.4	35.0	1	18.45	74.39	15

Cooperative Variety Test on Loess Soil:—Owing to the Loess soils near the Mississippi river, our station in cooperation with Mr. J. B. Brabston, Bovina, Mississippi, conducted a simple variety and fertilizer test on these soils.

This test was planted in three series May 1, 1928. No fertilizer was applied until the cotton was chopped, then Series 1 was side dressed with 200 pounds of nitrate of soda which gave a yield of 1093 pounds of seed cotton per acre; Series 2 was side dressed with 200 pounds of nitrophoska (30-15-15) and produced 1004 pounds, and Series 3 was side dressed with 150 pounds of sulphate of ammonia and yielded 1058 pounds of seed cotton per acre. The results of the variety test are to be found in the table listed above and it appears that the big boll varieties will probably be best suited to this hill soil. One year's results should not be considered conclusive, however.

Fertilizers:—A majority of our visitors are more interested in fertilizers for cotton than anything else. Due to this fact, more attention has been given this than any other subject. Farmers not acquainted with cotton fertilizers seem astounded when shown that around ten dollars worth of fertilizer put under an acre of cotton will double the yield in many instances, even on fairly good land. Many are of the opinion that fertilizers are profitable only on poor land and after finding out otherwise one of our visitors remarked that it had cost him many dollars in the past because he held this opinion. Judicious use of fertilizer will increase the yield on any land suitable for the growth of cotton.

In all fertilizer work reported in this bulletin, the increase was obtained according to the standard adopted by the American Society of Agronomy as reported in Volume 16, Number 1 of the Journal. The column marked "Check yield" was obtained according to the above method by assuming that there is a gradual increase or decrease in fertility from one check plat to the other.

In testing kinds of fertilizer it is a good idea to test quantity also, so as high as 2400 pounds of a mixed fertilizer per acre has been used on the station with a four year average net gain, after paying for the fertilizer, of $37.58. All fertilized plats have produced nice profits for the past four years.

According to custom, cooperative fertilizer tests were conducted in 1928. A simple test was located north of Bovina, Mississippi, on the farm of Mr. J. B. Brabston, the results of which have already been given. Mr. Brabston gave his undivided attention to the tests located on his place.

Our main cooperative fertilizer test with cotton was located on a gray soil, peculiar to some areas in this section, on the farm of Senator H. H. Casteel, located a few miles north of Canton, Mississippi. Through some misunderstanding, these plats were picked and mixed before any weights could be recorded by station men.

Below is to be found the general fertilizer test conducted on the station as listed in Table 4.

Table 4—Analysis Test With Cotton—1928

Pounds of Material applied per acre				Pounds of Seed cotton per acre		Dollars per acre			
Acid phos.	Nitrate of soda	Mur. of potash	analysis	Plot yield	Check yield	increase	Increase at 7c	Cost of fert.	Net gain
No fertilizer				615					
300	160	100	8-4-8	1093	607.0	483.3	33.83	9.33	24.50
300	160	75	8-4-6	1149	598.4	550.7	38.55	8.73	29.82
300	160	50	8-4-4	990	589.9	400.6	28.04	8.13	19.91
No fertilizer				581					
300	160	25	8-4-2	882	559.3	323.2	22.62	7.53	15.09
300	160	—	8-4-0	784	537.3	247.3	17.31	6.93	10.38
300	320	50	8-8-4	1060	515.2	545.0	38.15	12.81	25.34
No fertilizer				493					
300	240	50	8-6-4	1074	496.0	578.5	40.50	10.47	30.03
225	160	50	6-4-4	979	498.7	480.6	33.64	7.57	26.07
150	160	50	4-4-4	968	501.5	466.8	32.68	7.00	25.68
No fertilizer				504					
600	320	100	8-4-4	1356	510.0	846.4	59.25	16.26	42.99
900	480	150	8-4-4	1440	515.9	924.1	64.69	24.39	40.30
1200	640	200	8-4-4	1794	521.8	1272.7	89.09	32.52	56.57
No fertilizer				527					

Remarks:—This test was planted in three series to Lone Star-65 cotton on April 21, 1928, after having been fertilized on April 19, 1928. A good stand was secured but was badly damaged by a heavy frost on April 28th. On the night of June 13th, a ten inch rain completely washed up the third series and necessitated shortening the other two series to five row plats 100 feet long. Records were taken from the three inside rows on each plat to eliminate variations that might be caused from the stealing of fertilizer.

Recommendations:—It would appear that the use of six hundred pounds of an 8-6-4 for general conditions will give good results. Where lespedeza has preceded the cotton or where cotton rusts, it may be advisable to use eight per cent potash in the formula. If the land is heavily infested with coco or Johnson grass, then apply only half the nitrogen before planting and use the other half as a side dressing after chopping. Heavy red clay hill sides may not need potash in some instances, but to insure full returns from the nitrogen and phosphorus, it is best to apply around four per cent. Always remember that fertilizer judiciously used pays as well on fertile soil as it does on poor soil.

Where legumes have been previously grown and turned under, then four per cent nitrogen in a formula should be sufficient. In following heavily fertilized truck crops of the year before with cotton, it may be safe to cut the phosphorus and potash to half and reduce the nitrogen to four per cent.

Factory Versus Home-Mixed Fertilizers:—A test of this nature was conducted at this station for the first time this past year. Stock-run commercial 8-4-4 fertilizer was secured from the Jackson Fertilizer Company and the Meridian Fertilizer Factory and nitrophoska (30-15-15), a highly concentrated fertilizer was used against home mixed 8-4-4 goods using superphosphate of 16 per cent and Rhum's phosphate of 34 per cent for the phosphorus, nitrate of soda for nitrogen and muriate of potash for the potash. All fertilizer was applied at the rate of 800 pounds of an 8-4-4 per acre.

This test was fertilized April 30th and planted in three series May 2, 1928 to D. and P. L. No. 6 cotton. Each plat consisted of five rows 125 feet long and records were taken from the three inside rows. A ten inch rain of June 13th put this field three feet deep in water. A good stand was secured and maintained as the yields indicate.

Table 5—Factory Versus Home-Mixed Fertilizers—1928

Fertilizers used: 800 lbs, of an 8-4-4 or 200 lbs. of a 30-15-15	Pounds of seed cotton per acre Plot yield	Check yield	Increase	Rank
No fertilizer	1429	1429	......	..
Jackson 8-4-4	1725	1420	304	3
Home-mixed 8-4-4	1650	1412	237	4
Nitrophoska 30-15-15	1566	1404	162	6
No fertilizer	1396	1396	......	..
Meridian 8-4-4	1707	1352	355	1
Home-mixed 8-4-4 (Rhum's)	1472	1307	165	5
Nitrophoska 30-15-15	1607	1263	343	2
No fertilizer	1219	1219	......	..

Nitrogen Sources:—There are many forms of nitrogen being offered the farmers these days and in turn they look to the experiment stations for advice as to which will give them the best results. Due to this fact, quite a bit of attention has been given as to finding the best nitrogen fertilizer to use in mixing fertilizer. This is the fourth year that this test has been conducted and in the table below will be seen the 1928 results with a four year average shown in the last column of all sources except Leunasalpeter which is averaged for only three years.

This test was fertilized April 20th and planted in three series to Lone Star-65 cotton on April 21, 1928. A heavy frost on April 28th retarded the growth and injured the stand to an average extent. On the night of June 13th, the above mentioned rain submerged this land to a twenty inch depth until noon the next day and completely washed up the third series to the depth of the plow. Records were taken from the three inside rows of each plat on two series only. There can be no doubt but that some sources lost more nitrogen than others in leaching during this rain. All plats, including checks received a blanket application of 600 pounds of an 8-0-4 fertilizer per acre.

This past year, as well as the four year average, shows calcium nitrate to be leading the other sources. The long growing season for the past two years has no doubt, been more favorable to the slowly acting forms of nitrogen. In using some forms of nitrogen in fertilizer mixtures, extreme care should be taken not to mix up more than can be put out within eight hours as chemical reactions take place that cause changes in the mechanical condition of the fertilizer as well as the loss of nitrogen to the air.

Below may be seen the tabulated results of this test.

Table 6—Nitrogen Sources Test With Cotton—1928

Pounds of material applied per acre	Pounds of seed cotton per acre: Plot yield	Check yield	Increase	Four year average seed cotton increase lbs.	Rank
No fertilizer	959.3	959.3	——	——	..
150 Ni. Soda	1180.6	930.5	250.1	274.2	3
112.5 sul. ammonia	1154.5	901.7	252.8	239.9	5
86.5 Leunasalpeter	1043.7	872.9	170.8	246.5*	4
No fertilizer	844.1	844.1	——	——	..
105 Cal. cyanamid	1012.9	835.6	177.3	187.4	6
150 Cal. nitrate	1224.6	827.0	397.6	285.9	1
48.9 Urea	1176.0	818.5	357.6	280.1	2
No fertilizer	810.0	810.0	——	——	..

Note—Each carrier equivalent to 150 pounds nitrate of soda per acre * Leunasalpeter carries a three year average only.

All plats, including checks, were fertilized with 300 pounds superphosphate and 50 pounds muriate of potash per acre.

Potash Sources:—Like the nitrogens, there are several forms or sources for potash. Among these sources, we have tested for three years kainit, muriate and sulphate of potash. Muriate has led each year in our tests. Kainit contains 12 per cent available potash and muriate and sulphate contain around 50 per cent.

When cotton rusts badly it signifies a deficiency of potash in the soil and an application of 100 pounds of muriate or sulphate of potash or 400 pounds of kainit per acre will come nearer correcting this condition than anything we know of. In our test this year, the plats containing potash in the above forms held foliage six weeks longer than the plats fertilized with only nitrogen and phosphorus. It is evident, in this case, that phosphorus and nitrogen do their share in maintaining a vigorous, healthy plant, but it remains in the power of potash to cause the plants to retain its leaves. It is our opinion that a liberal application of a well balanced fertilizer and pure seed will do more to ward off disease than anything else.

This test was planted in four series on land that is suffering for the want of potash. All plats including checks received the same quantity of phosphorus and nitrogen and the table reveals the sources and amounts of potash applied to the others. Plats consist of five rows, each 125 feet long, but records were obtained from the three inside rows in each case. Fertilized May 3, 1928, on the basis of 600 pounds of an 8-6-4 fertilizer per acre and was planted to Lone Star-168 cotton on May 8, 1928. On August 1st, this field had a boll weevil infestation of 63 per cent, which was reduced to 15 per cent by an application of calcium arsenate and on August 16th, it had climbed to 34 per cent and another poisoning reduced it to below 10 per cent, where it remained the rest of the season.

Results of this test may be seen in the table listed below.

Table 7—Potash Sources Test With Cotton—1928.

Fertilizer used: (800 lbs. 8-6-0 applied generally:	Pounds of seed cotton per acre Plot yield	Check yield	Increase	Rank
No potash	1058.0	1058.0	——	..
50 lbs. muriate	1344.0	1016.0	328.0	1
50 lbs. sulphate	1279.0	973.0	306.0	2
200 lbs. kainit	1194.0	931.0	263.0	3
No potash	888.0	888.0	——	..

Cotton Spacing Work:—Increased yields in cotton for the past few years have been influenced by close spacing and proper fertilizing more than any other cause. The cotton grower today realizes that to get maximum yields he must have a good stand and to inform him, work of this nature has been conducted for the past four years on this station. In order to avoid all possible error, each plat was thinned by hand and each space measured. After the last picking was made, the stalks were again counted on each plat in order to account for those that died from natural causes or lost by other means. All plats were fertilized exactly alike, planted the same time and treated alike in every respect.

Below may be seen the results of this test in table form.

Table 8—Cotton Spacing Test—1928.

Plot	Number of stalks Foot	seed cotton per acre	Four year average 1925-26-27 and 28 Stalks per foot	Yield per acre	Rank in Yield
754	1.01	1761.8	.91	1732.9	5
1284	1.71	1924.7	1.62	1837.0	3
1896	2.53	1905.3	2.18	1861.2	2
2497	3.33	1785.7	2.81	1811.6	4
3138	4.18	1891.0	3.10	1893.3	1

Remarks:—The above test was made on improved valley land that made one and one-third bales of cotton per acre as an average for the six acres in the field. On April 28, 1928, 800 pounds of an 8-6-4 fertilizer was applied per acre and D. and P. L. No. 6 cotton was planted on May 2nd. This test was under water for a few hours on three occasions; the ten inch rain on the night of June 13th, covered it to a depth of three feet. The boll weevil also caused trouble, the infestation being 68 per cent on July 31st, which a poisoning reduced to 6 per cent by August 6th and on August 16th, the infestation was 11 per cent, which was brought to under ten per cent by another application of poison for the remainder of the season.

This test was planted in six series and an endeavor made to bunch the cotton a foot apart, leaving one, two, three, four and five stalks in each bunch on the respective plats. As has been mentioned, this was accomplished by hand and rule.

Recommendations:—A four year average indicates two to three stalks in bunches per foot on three and one-half foot rows on valley land.

For hill land, use three foot rows and leave three to five stalks in bunches every foot. The poorer classes of soils will stand much closer spacing than the fertile soils. Quick maturing, medium sized, small leaved varieties will also stand closer spacing than the slow growing, large leaf varieties.

To insure a good stand, plant one and one-half to two bushels of good seed on well prepared, slightly elevated rows from April 10th to the 25th and then put in a crop of corn and soybeans for feed. In the meantime the cotton germinates and if it should get grassy, run around it with a side harrow. Do this twice if necessary, but permit the cotton to get some growth before chopping and the weak plants will probably die out during this time and then it will be a hard proposition for any hand to cut out many of the pretty stalks. While waiting for the cotton to get large enough to chop, then March or early planted corn and beans will be about ready for a hoeing and a side dressing of some form of nitrogen, then it will make without further assistance if necessary and all attention can be given the cotton. This plan is being practiced by a staunch supporter of the station on his 1,200 acre farm near Raymond and he always makes good crops of cotton and has corn to sell every year.

Bear in mind that the young cotton plants should become well established before chopping. More cotton can be made on fewer acres by the proper use of fertilizer, good varieties, practical cultural methods and close spacing as recommended above.

Seed Treatment for Seed-Borne Diseases of Cotton:— Tests were made in cooperation with the Department of Plant Pathology of the Experiment Station and the State Plant Board, the plan and treatments being furnished by Dr. D. C. Neal, Plant Pathologist, A. and M. College, Mississippi. Promising results have been obtained in the corn growing sections to the north of us by the use of these organic mercury disinfectants for the control of corn root, stalk and ear rots. The Bayer Chemical Company and the Du Pont Company are pushing the sales of these organic mercuries in this territory and to be able to answer inquiries, this test was made for the first time this year on the Raymond station.

Table 9—Seed Treatment Work—Cotton—1928.

Seed Treatments:	Pounds of seed cotton per acre: Plot yield	Check yield	Increase	Rank
No treatment	971.5	971.5	....	..
Upsulum	1039.3	977.1	68.2	5
Iodine with Bentonite	1113.5	982.7	130.8	1
Iodine with Kieselguhr	1079.1	988.3	90.8	2
No treatment	993.8	993.8	....	..
Dust Corona Merco	1049.2	973.3	75.9	3
Dupont K-I-C	1026.2	953.0	73.2	4
Dupont K-I-B	997.1	932.7	64.4	6
No treatment	912.4	912.4	....	..
Special Bayer No. 6X	877.5	940.4	-62.9	8
Special Bayer No. 100	997.4	968.4	29.0	7
No treatment	996.3	996.3	....	..

Remarks:—Results in the above table are in line with similar work on a much smaller scale at the Holly Springs station last year. The above test was conducted in two series on medium valley land that had a white clay base. Plats consisted of three rows, each 208 feet long in one series and 125 feet long in the next. Six hundred pounds of an 8-6-4 fertilizer were applied April 23rd, and Lone Star-65 cotton treated eight different ways was planted April 24th. Seed of the same lot with no treatment whatever were planted on every fourth plat to serve as checks. The highest weevil infestation was 65 per cent on August 1st and two applications of poison kept it under control for the remainder of the season.

This work appears to have great promise and the above table is submitted for the use of those interested.

CORN

Mississippi has very few farmers that make enough corn to properly feed their livestock throughout the year. If food for the home and feed for the livestock were raised and then the balance of the time devoted to growing cotton, then there is no doubt but that a better price could be secured for cotton. The time has been when bankers and supply merchants could have been blamed for this as practically all accounts were secured with so many bales of cotton. These days a banker is eager to lend money on pure bred livestock, especially for dairying purposes, provided the party is reliable. A few good cows quickly grow into a profit producing herd and a herd of cattle call for corn and legumes for feed. Growing legumes in every row of corn should be practiced on every farm as there is no better soil builder at a cheaper price. About six or seven pounds of laredo or otootan soybeans will plant an acre when planted in the row with the corn.

On November 1st, 1928, it was estimated that only one and one-half per cent of the 1927 corn crop remained on Mississippi farms. The average yield per acre last year was 17.8 bushels and the estimate for this year's crop is 14.5 bushels per acre. The ten year average acre yield is 16.8 bushels. This situation makes it plain to us that it will be necessary for Mississippi to purchase many dollars worth of corn from other states. The plan mentioned above in regard to planting corn and soybeans while waiting for the cotton to get large enough to chop out will help toward remedying this situation.

The work here includes variety tests, fertilizer tests, nitrogen sources, corn and bean tests and mercurial treatments for seed-borne diseases of corn. These tests should prove interesting as well as beneficial.

Below may be seen the results of the variety test which was planted in six series to eighteen leading varieties on May 25th, and was harvested October 10, 1928. Four hundred pounds per acre of an 8-4-4 fertilizer was applied before planting and when the corn was knee high it was hoed and side dressed with 100 pounds of nitrate of soda per acre. This test was planted in three foot checks on three and one-half foot rows.

Table 10—Corn Variety Test—1928.

Variety:	Yield in bushels shelled corn per acre	Percentage of grain	Rank 1928	Av. bushels 1922-28	Av. Rank 1922-28
Mosby-Station	53.7	78.25	11	33.7	5
Mosby-Delta	70.3	80.84	1	36.5	4
Mosby-D. & P. L.	54.4	78.27	10		
Mosby-Suttle	35.3	81.91	17		
Cocke's Pro.-Station	59.1	80.56	8	36.9	2
Cocke's Pro.-Delta	42.7	79.17	15	32.2	8
Hastings	58.1	80.39	9	33.4	6
Delta Prolific	59.4	80.00	7		
College-47	62.0	77.42	5		
Laguna	64.0	76.69	4	38.7	1
Mexican June	39.8	76.50	16	32.7	7
Paymaster-Neal	68.9	78.75	3	36.7	3
Paymaster-Fisher	70.1	78.56	2		
Yellow Dent-Ferguson	49.2	77.14	12		
Yellow Dent-Station	47.7	78.23	13		
Golden Dent-R. H.	31.6	76.50	18		
Golden Dent-Station	61.5	76.06	6		
Golden Dent-Standifer	47.2	77.78	14		

Remarks:—In the above table, the 1928 results will be found in the first three columns of figures. The fourth column shows the seven year average yeild of 8 varieties, while the last column shows the rank for seven years. This test was planted after a crop of vetch that followed cotton last year and at present another vetch crop, which is now growing beautifully, would stand grazing.

It is interesting to note that the leading variety produced 38.7 bushels of corn more per acre than the trailer, which in turn produced 14.8 bushels more than the ten year average yield in Mississippi. Delta Mosby leads this test with 70.3 bushels shelled corn per acre and Fisher's Paymaster was a close second with 70.1 bushels. In a seven year average of eight varieties, Laguna leads with 38.7 bushels per acre with Station Cocke's Prolific second with 36.9 bushels. The difference between the leader and the trailer in this case is 6.5 bushels per acre.

The Mosbys are subject to weevil damage in this section if planted early. Cocke's Prolific, Laguna, Paymaster and Hastings are all good varieties to use. For late plantings, use Mexican June or Laguna.

Table 11—Nitrogen Sources Test With Corn—1928.

	Bushels ear corn per acre			Per cent increase	
Pounds material applied per acre:	Plot yield	Check yield	Increase	1928	Three year average
Check	12.0	12.0	......	....	......
200 Nitrate of Soda	27.1	13.4	13.7	102.2	70.8
146.3 Sul. ammonia	23.6	14.9	8.7	58.4	35.4
115.4 Leunasalpeter	32.3	16.3	16.0	98.1	53.0
Check	17.7	17.7	......	....	......
138.0 Cal. cyanamid	27.1	17.1	10.0	58.5	45.6
200.0 Cal. nitrate	34.8	16.6	18.2	109.5	75.8
65.2 Urea	26.7	16.0	10.7	66.9	62.6
Check	15.4	15.4	......	....	......

Note—All plots including checks received 300 pounds superphosphate and 200 pounds of kainit per acre.

Remarks:—The last column of figures in the above table represents a three year average of a nitrogen sources test with corn showing the percentage of increase over the check or plat fertilized with 300 pounds of superphosphate and 200 pounds of kainit per acre. All these percentages indicate that nitrogen is very necessary.

This test was planted in three series to Cocke's Prolific corn on May 10th, after having applied the fertilizer on May 9, 1928. Frequent rains in the early season permitted this field to get grassy, but a stalk count revealed comparatively uniform stands. This test was harvested and weighed on September 24th. All plats consisted of five rows, each 125 feet long. Records were made from the three inside rows in each case.

Calcium nitrate leads in 1928 with 109.5 per cent increase over the checks, while nitrate of soda is a close second with 102.2 per cent increase. The three year average increase runs the same way with calcium nitrate 75.8 per cent and nitrate of soda 70.8 per cent increase.

Table 12—Analysis Test With Corn—1928.

Pounds of material applied per acre			Bushels ear corn per acre		
Super Phosphate:	Nitrate: soda:	Muriate potash:	Plot yield	Check yield	Increase
......	200	....	23.2	23.2	......
100	200	....	21.2	24.1	-2.9
100	200	50	22.9	25.1	-2.2
......	200	50	27.5	26.0	1.5
......	200	....	26.9	26.9	......
......	......	....	13.3	26.7	-13.4
200	200	....	23.7	26.4	-2.7
200	200	50	24.8	26.2	-1.4
......	200	....	26.0	26.0	......

Remarks:—In this test we use 200 pounds of nitrate of soda per acre as a check, for all corn needs nitrogen in some form. The other plats vary with the addition of phosphorus and potash. The table speaks for itself, but too much confidence cannot be placed in one year's results.

This test was fertilized and planted in four series, May 10, 1928. Good stands were secured, but heavy rains very probably leached some of the fertilizer out. It is interesting to note that the plat receiving no fertilizer made 13.4 bushels per acre less than the check plat which received two hundred pounds of nitrate of soda. A stalk count on this test indicates a very uniform stand. This field was harvested September 24, 1928.

For general use in fertilizing corn, a mixture of 100 pounds of superphosphate, 150 pounds of nitrate of soda, calcium nitrate or their equivalent in pounds of nitrogen and 50 pounds of muriate of potash per acre will give good results. Where good farming and frequent cultivation is to be done, then a side dressing of from 50 to 100 pounds of nitrate of soda or its equivalent in some quick acting form of nitrogen might be profitably used. Any form of potash may be used. One must be more careful in fertilizing corn than in fertilizing cotton because corn does not require the quantity demanded by cotton and, too, it is hard to show a profit on corn if large quantities are used.

Table 13—Corn and Bean Test—1928.

Method of planting:	Bushels per acre Plot yield	Check yield	Decrease due to beans in corn bu. per acre
3-Rows corn (alone)	34.70	34.70	
3-Rows Corn and Soybeans	30.50	37.12	-6.62
2-Rows Corn -1 Row Corn & Beans	40.40	39.55	.85
3-Rows Corn and Peas at Layby	40.20	41.97	-1.77
3-Rows Corn (alone)	44.40	44.40	

Remarks:—This simple test was conducted to determine the decrease in yield in corn when soybeans are planted with it. An application of 300 pounds of an 8-4-4 fertilizer was made May 24, and the test planted to Cocke's Prolific corn and Otootan soybeans on May 26, 1928. A good stand was secured except in the case of the peas at "lay-by", the drouth prevented proper germination. More work in the future is to be done along this line since some important results seem probable.

Treated Corn Work:—Seed treatment for seed-borne diseases with mercurial disinfectants was used on Cocke's Prolific corn in cooperation with Mr. H. H. Wedgworth, Associate Plant Pathologist, with the Experiment Station and State Plant Board, A. and M. College, Mississippi.

Much success has been obtained in the "Corn Belt" with these mercurial disinfectants toward controlling corn root, stalk and ear rots, but our results were to the effect that no material benefit was derived from these treatments of corn seed. It may have been the good, disease-free selected seed that caused this negative test. No conclusions should be drawn from one year's results, however. Further experiments will probably be conducted in the future along this line.

This test was conducted in six series and was harvested October 9, 1928. Two crops of sargrain had preceded this test.

Soybeans—There is no crop that is better suited for our purposes than soybeans. This crop is three-fold in benefit as it constitutes a safe feed crop, makes hay with a high grain content and improves the soil. Stock can be carried over the winter on good soybean hay and some farmers have been known to make a crop while feeding this hay alone. Every corn field and every other field that begins to fall off in production should be planted to soybeans or peas and given a chance to come back to normal.

Twelve acres planted March 31, 1928, to Cocke's Prolific corn and otootan soybeans on the station on poor hill land which was fertilized with 300 pounds of an 8-4-4 fertilizer per acre attracted quite a bit of attention from visitors during the early fall. The beans were planted in the row with the corn with a duplex hopper and on September 1st, the corn was ready for the crib and the beans had just begun to bloom. The corn could have been harvested and the beans could have been grazed or cut for hay or saved for seed. Pastures are usually very dry at this time, so as a dairy pasture this would have been excellent. Dairymen were especially impressed while any farmer easily saw where early feed might be had for an emergency.

Below may be seen the tabulated results of the soybean test for comparative yields of hay and grain.

Table 14—Soybean Variety Test for Hay and Grain Yields—1928.

Varieties:	Hay		Grain	
	Date of cutting	Tons per acre yield	Date of cutting	Bushels per acre yield
George Washington	9-24-28	2.10	10-13-28	14.75
Ebony	9-11-28	1.98	9-24-28	17.28
Laredo	9-24-28	3.53	10-13-28	18.11
Midwest	9-11-28	1.66	9-24-28	16.03
Loxitan-483-Black	10-10-28	3.51	11-10-28	13.75
Tanloxi-483-Olive	10-10-28	3.60	11-10-28	15.33
Delta-488	10-2-28	2.29	10-13-28	12.79
Delta-491	10-3-28	2.29	10-20-28	6.96
Hollybrook	9-24-28	4.21	10-20-28	9.82
Tar Heel Black	9-24-28	3.69	10-30-28	17.61
Biloxi	10-10-28	3.01	11-10-28	12.44
Mammoth Yellow	9-24-28	2.71	10-20-28	26.89
Mammoth Brown	9-24-28	3.15	10-13-28	12.86
Haberlandt	9-24-28	2.64	10-20-28	13.09
Tokio	10-10-28	2.65	10-30-28	18.39
Otootan	10-10-28	3.19	11-10-28	14.68
Goshen	10-10-28	3.19	10-30-28	11.68
Six Weeks Peas			10-10-28	8.71

Remarks—The above test was planted June 30, 1928, after having turned a crop of crimson under the month before. Soybeans may be safely planted from March 25, to July 15, but the earlier the planting, usually the higher the yield, as the plant has more time to develop. Maturity dates of various varieties remain more or less the same regardless of when planted, that is, the otootan usually begins blooming around September 1, regardless of when planted. For other varieties we might say that the margin of difference in the dates of maturity are not nearly so great as the margin of difference in the dates of planting.

Soybeans should be cut for hay when the top pods are well formed. This is the good dough stage which makes the hay palatable and of high digestible nutrient content. The leaves will not shed much at this time.

In saving grain, cut when one-half to three quarters of the leaves have shed or on the other hand, when three-fourths to four-fifths of the pods have lost their green color. Saving beans for seed on the poorer types of soil especially is a good practice as the beans will improve the soil. If soybean harvesters are to be used the plants should be permitted to fully mature. On thin land soybeans should be planted on three foot rows and fertilized with 200 pounds of superphosphate per acre. Where soybeans have never grown before, the seed should be inoculated to get the best results from a soil improvement standpoint, as well as yields.

The above table speaks for itself. Careful study of harvest dates and yields will be beneficial to those planning to grow this crop. Again we emphasize the importance of planting soybeans in every row of corn in Mississippi.

Alfalfa—A new alfalfa fertilizer test was planted on a well drained brown loam soil with a clay base on November 10, 1928. Three tons of crushed limestone per acre were applied generally. Previous plantings of alfalfa have given excellent first cuttings, but subsequent cuttings were of a high per cent of crab grass. Lime is absolutely necessary in this section for the production of alfalfa, so for this reason alfalfa will never be grown on a commercial scale in the non-lime lands. Two to five acres near the barn will certainly be beneficial to stock and poultry, especially during winter months. Our little field of alfalfa on the station this winter causes our neighbors "fence breakers" to come on through to graze and sometimes even we are tempted to partake of this green succulent plant with them.

HORTICULTURE

By J. L. Cooley, Jr., Horticulturist.

This station is located on the northern edge of the world famous "Crystal Springs-Hazlehurst" trucking section. For this reason the horticultural investigations have been devoted principally to truck crops. Although, the station has a variety orchard of peaches, pears, apples and cherries. Some few varieties of grapes and pecans are grown. These latter projects are for demonstration purposes, to show our visitors that these fruits can be produced with the proper attention given to pruning, spraying, fertilization and cultivation. More extensive work along this line is anticipated for the coming year, including a peach orchard fertilizer test, a strawberry variety test and tests with other truck crops.

Some plant disease work has been conducted in cooperation with the State Plant Board with tomatoes and potatoes.

Due to the importance of the tomato as one of our leading truck crops, it has received major attention. In all the following tests, the fertilizer formulae used were of the order phosphorus, nitrogen and potash. Our trucking projects, with the exception of cabbage, as reported in bulletin 252 of this station have been continued this year and may be grouped as follows:

(1). Tomatoes—
- (a). Variety yield and wilt test.
- (b). Fertilizer analysis test.
- (c). Potash formulae test.
- (d). Nitrogen source test.
- (e). Nitrogen source, side-dressing and Nitrate of Soda rate test.

(f). Long-distance shiping test.

(2). English Peas—

(a). General fertilizer test.

(b). Nitrogen source test.

(c). Variety work.

(3). Snap Beans—

(a). General fertilizer test.

(b). Nitrogen source test.

(c). Variety work.

(4). Irish Potatoes—

(a). Remarks.

Table 15—Tomato Variety Production and Wilt Test—1927 and 1928.

Variety:	Yield in lbs. per acre		Percentage picked early		Percent shippers	Percent wilt resistance	Av. size of shippers pounds
	Tot.	Shipr's	Tot.	Shipr's			
Globe	12813	7964	51.8	52.6	59.9	83	.290
Gulf States	14498	9399	59.0	64.3	64.8	52	.280
Detroit	13372	8833	47.2	54.8	66.1	47	.239
Marglobe	13387	9060	54.4	55.1	66.8	82	.257
Marvel	13607	9290	48.1	46.4	66.5	83	.231
Norton	13860	8855	51.5	49.6	63.3	81	.257
Richards	14617	8942	55.5	58.0	60.8	63	.264
Crystal Spg. Mkt.-1	12720	7600	57.7	60.2	59.8	69	.294
Marvelosa	11390	6611	52.4	53.3	57.7	77	.203
Marvana	14177	9288	59.3	57.8	64.2	42*	.217
La. Red	11743	7548	51.0	53.3	62.6	76*	.207
La. Pink	12824	8186	57.6	56.4	63.8	82	.231
*Kanora	7132	5150	43.9	37.6	72.2	65	.217
*Foster	8577	4720	59.9	49.9	55.0	84	.218
*Crystal Spg. Mkt.-NS	5102	3314	54.0	51.0	64.9	61	.202
*Crystal Spg. Mkt.-2	10974	7415	54.8	52.6	67.5	55	.282
*Crystal Spg. Mkt.-3	9407	6662	48.2	41.5	70.0	57	.243

Note—Varieties marked (*) were tested in 1928 only.
Wilt per cent market (*) were in only one replication.
Wilt results are for the year 1928 only. (See next to last column.)

Remarks:—The test consisted of the twelve varieties as were tested last year, with the addition of the last five varieties in the above table. These were promising and worthy of being in the test. The seed were planted in the hotbed January 25, transplanted to the coldframes March 8 and 9 and set in the field April 7. Plants were set 2 feet apart in 3½ foot rows, staked and trained to a single stem. The test was conducted in three series, using 1,500 pounds per acre of an 8-4-3 fertilizer with a combination nitrogen source of equal pounds of nitrogen from nitrate of soda, sulphate of ammonia and cottonseed meal.

Three separate series of this variety test were inoculated with a culture of fusarium wilt organisms, for a wilt resistance test. This test was given the same treatment as in the variety yield test.

Results—The Gulf States, Marvel, Marvana, Marglobe, Richards, Norton and Detroit varieties, respectively, produced the largest yields of shipping tomatoes.

Kanora, Crystal Springs Market No. 2 and 3, Marvel, Marglobe, Detroit and Gulf States varieties, respectively, produced the highest percentage of shippers.

Crystal Springs Market No. 1, Globe, Crystal Springs Market No. 2 and Gulf States varieties, respectivelv, produced the average largest fruit.

Foster, Globe, Marvel, Marglobe, La. Pink, Norton and Marvelosa, respectively, were the most wilt resistant.

Many growers mix Globe and Gulf States plants and claim to get a better pack with most of the "shake" eliminated for shipping. Globe, Gulf States, Richards, Marglobe and Crystal Springs Market varieties are grown extensively in this trucking section.

Table 16—Analysis Test With Tomatoes (average) 1926-27 and 28.

Analysis	Yield in lbs. per acre Total	Shippers	Percent shippers	Percent picked early Total	Shippers	Dollars per acre Value at 6c	Cost of fert.	Net gain.
			(1500 pounds per acre)					
10-3-3	12290	6497	52.8	40.9	40.6	389.82	19.74	370.08
8-3-3	13005	7873	60.5	44.5	40.7	472.37	18.05	454.32
8-4-3	14376	8833	61.3	46.9	40.4	529.98	21.01	508.97
8-5-3	13551	9357	69.4	42.1	42.0	561.42	23.96	537.46
			(2000 pounds per acre)					
10-3-3	14186	9148	64.4	48.7	40.5	548.88	26.32	522.46
8-3-3	13497	8294	61.4	44.2	43.0	497.64	24.07	473.57
8-4-3	11105	6706	60.3	43.2	38.7	402.36	28.01	374.35
8-5-3	13740	9205	66.0	41.4	42.3	522.30	31.95	520.35

Remarks—This test was conducted to determine the best fertilizer analysis for producing the commercial crop. The test was in three series and the above table represents a three year average of the results. The past season was very unfavorable. The rainfall was so great at planting time that plants were set three times before a sufficiently good stand of living plants could be obtained, making the crop four weeks late. The plants that lived were of the Globe variety. Plants were set 2 feet apart in 3½ foot rows, staked and trained to one stem. The plants were topped with four clusters of fruit. Fruit was harvested in the "green wrap" stage.

The fertilizer formulae used were as stated in the above table. The combination nitrogen source was used, derived from equal pounds of nitrogen from nitrate of soda, ammonium sulphate and cottonseed meal. Potash was derived from sulphate of potash and the phosphorus from 16 per cent superphosphate.

Results—A 1,500 pound per acre application of an 8-5-3 was the leading analysis. A 2,000 pound application of a 10-3-3 and an 8-5-3 analysis gave the second best returns.

Table 17—Average Results of Potash Tests With Tomatoes—1924, 25, 26, 27, and 28.

Analysis	Yield in lbs. per acre		Percent shippers	Percent picked early		Dollars per acre		
	Total	Shippers		Total	Shippers	Value at 6c	Cost of fert.	Net gain
				(1000 pounds per acre)				
8-4-0	12055	6359	52.0	43.3	52.5	381.54	10.44	371.10
8-4-3	12743	6680	49.4	50.0	49.2	400.80	12.00	388.80
8-4-6	13769	6315	45.4	47.2	53.2	378.90	13.56	365.34
				(1500 pounds per acre)				
8-4-0	13121	6745	49.0	42.8	52.3	404.70	15.66	389.04
8-4-3	12068	6275	50.2	48.4	47.4	376.50	18.00	385.50
8-4-6	12244	6902	55.0	44.5	47.8	414.12	20.34	393.78
				(2000 pounds per acre)				
8-4-0	12686	6533	48.7	41.1	50.8	391.98	20.88	371.10
8-4-3	13254	7135	48.8	46.4	52.6	428.10	24.00	404.10
8-4-6	11162	5535	39.4	34.6	35.1	332.10	27.12	304.98

Remarks—This test was conducted to determine the most economical amount of potash to use in producing the commercial crop. The same difficulty in securing a living stand of plants was encountered as in the preceding test. Plants of the globe variety were set 2 feet apart in 3½ foot rows, staked and trained to a single stem. The plants were topped at four clusters of fruit. The test was in three series. Fruit was harvested in the "green-wrapped" stage.

Muriate of potash was the source of potash, phosphorus was derived from 16 per cent superphosphate and the combination source of nitrogen (as given in the preceding test) was used.

Results—The above table of results represents a five year average and should be very dependable. In the 1,000 and 2,000 pound applications, the 8-4-3 formula gave the highest net returns per acre. It is our opinion that the potash percentage should be varied according to the different soil types, the sandy soils requiring the more potash. We feel safe in recommending at least 3 or 4 per cent potash on average soils, believing this will enable the plants to make a better use of the available nitrogen and phosphorus fertilizers. From observations, a more stockily built plant and a better colored fruit results from the use of potash in tomato fertilizers.

Table 18—Average Results of Nitrogen Source Tests With Tomatoes—1924-25-26-27 and 28.

Nitrogen sources:	Yield in lbs. per acre Total	Yield in lbs. per acre Shippers	Per-cent ship-pers	Percent pkd. early Tot.	Percent pkd. early Shp'rs	Total value, dollars	RANK
(1500 pounds of an 8-4-3 per acre)							
Nitrate of soda	10266	5673	52.9	45.6	52.8	340.38	1
Ammonium sulphate	9177	4707	50.2	52.5	53.6	282.42	5
Combination	9891	5640	53.8	48.4	49.6	338.40	2
Urea	9671	5421	53.8	47.7	51.6	325.26	4
Cottonseed meal	10030	5434	52.6	46.4	46.2	326.04	3
(2000 pounds of an 8-4-3 per acre)							
Nitrate of soda	10373	5642	52.5	48.6	52.8	338.52	3
Ammonium sulphate	10179	5468	52.7	53.0	55.9	328.08	5
Combination	11091	5627	50.2	48.6	53.5	337.62	4
Urea	10966	6065	54.2	50.4	54.1	363.90	1
Cottonseed meal	10707	5859	53.1	47.4	51.0	351.54	2

Remarks—The above test was conducted to determine the best source of nitrogen to use in a fertilizer formula for producing tomatoes commercially. The same difficulty was encountered in securing a living stand of plants as given in the two preceding tests. Plants used were of the Globe variety, set 2 feet apart in 3½ foot rows, staked and trained to a single stem. Plants were topped with four clusters of fruit. The fruit was harvested in the "green wrap" stage of ripeness.

Where a combination nitrogen source is listed, it means that the nitrogen was derived with equal pounds of nitrogen from nitrate of soda, sulphate of ammonia and cottonseed meal. The other nitrogen sources were as indicated, phosphorus derived from 16 per cent superphosphate and the potash from sulphate of potash.

Results—The above table represents average results over a five year period. In the 1,500 pound application, nitrate of soda is the leading source, returning a total production value at $340.38, followed by the combination source with a like value of $338.40.

In the 2,000 pound application used, cottonseed meal and nitrate of soda, respectively, were the leading sources. All sources appear to be better than ammonium sulphate.

Table 19—Average Results of Nitrogen Sources, Side-dressing and Nitrate of Soda Rate Tests—1927 and 28.

Amount per acre of 8-4-3	Sources of Nitrogen	Yield in pounds per acre. Total	Shippers	Per-cent Shippers.	Percent picked early. Total	Shippers.	Total value dollars.	RANK
	(Nitrogen Source Test)							
1500	Nitrate of soda	11360	7556	66.5	52.2	47.6	453.36	3
1500	Amm. sulphate	9177	5558	60.9	57.9	46.4	333.48	7
1500	Combination	11245	7601	67.6	58.7	49.4	456.06	2
1500	Urea	10804	6976	64.6	52.1	52.1	418.56	5
1500	Cottonseed meal	11433	7105	62.1	50.7	38.7	426.30	4
1500	Nitrate of soda Cottonseed meal	12802	8671	67.7	55.5	53.3	520.26	1
1500	Amm. sulphate Cottonseed meal	10821	6658	61.5	54.0	53.0	399.48	6
2000	Nitrate of soda	11515	7640	66.4	52.9	50.3	458.40	2
2000	Amm. sulphate	11820	7426	62.8	59.2	54.9	445.56	4
2000	Combination	11332	6699	59.1	51.0	50.9	401.94	7
2000	Urea	12265	7566	61.7	57.3	56.1	453.96	3
2000	Cottonseed meal	11672	7402	63.4	56.7	50.1	444.12	5
2000	Nitrate of soda Cottonseed meal	12179	7684	63.1	57.6	56.4	461.04	1
2000	Amm. sulphate Cottonseed meal	11685	7069	60.5	49.2	57.0	424.14	6
	(Nitrogen source and Side-dressing Test)							
1000	No. of So., 200 No. So.	12080	8048	66.6	40.6	49.7	482.88	2
1000	C. S. Meal Ni. So., 200 lbs Ni. So.	10649	7157	67.2	48.9	54.9	429.42	3
1000	Cot'nseed ml., 150 Amm Amm, sulphate, sul. ..	10693	7075	66.2	58.8	58.8	424.50	4
1000	C. S. ml., 200 Ni. So.	11709	8249	70.4	48.7	58.2	494.94	1
	(Nitrate of Soda Rate Test)							
1000	Nitrate of Soda	11476	7415	64.6	42.1	56.1	444.90	3
2500	Nitrate of Soda	12635	8843	70.0	51.0	55.8	530.58	1
3000	Nitrate of Soda	10826	7445	68.7	59.2	57.7	446.70	2

Remarks—The above tests were conducted to determine the best nitrogen sources, nitrogen side-dressing carriers and rates of nitrate of soda per acre in a complete fertilizer, for producing a commercial crop. This test was conducted as a part of the preceding nitrogen source test and all details of the two tests are alike. The nitrogen side-dressings were applied when the first fruit were about one-half grown.

Results—In the above table a two year average of results of this test is given. The past season was very unfavorable, the crop was very late and received too much rain; which, it seems to the writer, would favor the slower-acting organic forms of nitrogen.

In the 1,500 pound application, the combination source of nitrate of soda and cottonseed meal, the combination source and nitrate of soda alone were the leading sources with per acre production values of $520.26, $456.06 and $453.36, respectively.

In the 2,000 pound application, the combination of nitrate of soda with cottonseed meal, nitrate of soda and urea sources gave the largest per acre returns with productions valued at $461.04, $458.40, and $453.96, respectively.

In the nitrate of soda rate test, the 2,500 and 3,000 pounds per acre rates both were superior to the 1,000 pound rate with respect to total money value of the crop. This tends to prove that heavy applications of nitrate of soda are not injurious to the crop, but give the best results.

In the nitrogen source and side-dressing test, nitrate of soda as a side-dressing with cottonseed meal or nitrate of soda as the formula source, respectively, were the two leading source and side-dressing combinations with per acre productions valued at $494.94 and $482.88. Nitrate of soda as the side-dressing, in every case, gave much better results than sulphate of ammonia.

Long-distance Shipping Test—To meet the present-day arguments that nitrate of soda injures the shipping and keeping quality and causes "puffs" with tomatoes, this test has been conducted. Two shipments of one basket each (about 17 fruit) from plots using an 8-4-3 formula, where nitrate of soda was the only source of nitrogen at the rates of 1,000, 2,000, 2,500, and 3,000 pounds per acre were made by local express to the Bureau of Agricultural Economics, U. S. D. A., New York City, for a careful and rigid inspection. The baskets were marked repsesentative numbers so that the inspectors did not know any of the details of the test and that an unbiased report could be obtained.

Results—Average results from these reports give the following data:

Long-distance Shipping Test—1928

No. of fruit:	Fertilizer rates per acre:	Percent of marketable fruit On arrival:	5 days later:	10 days later:
34	1000 lbs.	94.3	100.0	84.4
34	2000 lbs.	94.2	83.8	86.2
34	2500 lbs.	97.3	88.3	100.0
34	3000 lbs.	97.3	81.3	87.1

All packages arrived in good condition and with a tight pack. It is evident that these fruit were subjected to a much more severe treatment than would have been the case had they been in car-load lot shipments.

These reports show no shriveled marketable fruit. Slight injuries are reported from molds, fusarium, soil rot, Rhizopus rot and growth cracks. Of the 136 fruit, there were but four with crate scars and no "puffy" fruit. This test indicates that the shipping and keeping quality of the tomatoes were very good and that these results are even better with the heavier applications. These results compare favorably with those for 1927.

Table 20—Average Results of English Pea Fertilizer Work—1924-25-26-27-28.

Analysis:	Yield per acre pounds	Dollars per acre Value at 5c	Cost of fertilizer	Net gain
		(1000 pounds per acre)		
10-3-3	3768	188.40	11.59	176.81
8-3-3	3331	166.55	10.49	156.06
8-4-3	3432	171.60	12.00	159.60
		(1500 pounds per acre)		
10-3-3	3609	180.45	17.39	163.06
8-3-3	3593	179.65	15.74	163.91
8-4-3	3535	176.75	18.00	158.75

Table 21—Average Results of Nitrogen Sources Test With English Peas—1924-25-26-27-28.

Rate per acre	Yield in pounds per acre using		
of an 8-4-3 lbs.	Nitrate of soda	Sulphate of ammonia	Combination
1000	4310	4285	3392
1500	4128	4030	3623

Remarks—This test was conducted on a sandy loam soil with a deep clay sub-soil. It was fertilized and planted February 11, in two series. In table 20, the nitrogen was derived from a combination of equal pounds of nitrogen from nitrate of soda, sulphate of ammonia and cottonseed meal. In table 21, the nitrogen was derived from sourses as indicated, and in both tests the phosphorus was derived from 16 per cent superphosphate and the potash from muriate of potash. The Thomas Laxton variety was planted in both tests.

Results—The results given in both tables represent an average for a five year period. In the general fertilizer test, 1,000 pounds per acre of a 10-3-3 fertilizer produced the best results, with a 1,500 pound application of a 10-3-3 and an 8-4-3 giving second best results.

In the nitrogen source test, nitrate of soda gives the best results in both the 1,000 and 1,500 pound applications. Sulphate of ammonia gives second best results with the combination source ranking last. This crop must be produced early and the more quickly available sources are to be recommended.

English Pea Variety Test—This test consists of five of the leading varieties in this trucking section and was conducted in three series. The Thomas Laxton and Gradis (Rice) varieties were a few days earlier than the other three. To lead the test, Gradis (Allen) yielded 5,548 pounds per acre. Thomas Laxton was second best with a yield of 4,388 pounds. Gradis (Rice) yielded 3,266, Record (Kerney) 2,814 and Record (Allen) 2,684 pounds.

The test was attacked by a bacterial blight. Gradis (Allen) was the most resistant. The Thomas Laxton variety has fairly large pods and peas and is of good quality.

Table 22—Average Results of Snap Bean Fertilizer Test—1924-25-26-27-28.

Analysis	Yield per acre pounds	Dollars per acre Value at 5c	Cost of fertilizer	Net gain
		(1000 pounds per acre)		
10-3-3	4015	200.75	11.59	189.16
8-3-3	3663	183.15	10.49	172.66
8-4-3	3689	184.45	12.00	172.45
		(1500 pounds per acre)		
10-3-3	4123	206.15	17.39	188.76
8-3-3	3579	178.95	15.74	163.21
8-4-3	3986	199.30	18.00	181.30

Table 23—Average Results of Nitrogen Sources Test With Snap Beans—1924-25-26-27-28.

Rate per acre of an 8-4-3, lbs.	Yield in pounds per acre using Nitrate of Soda	Suplhate of Ammonia	Combination
1000	3649	3833	3671
1500	4012	3858	3867

Remarks—This test was conducted in two series and planted March 20. The first picking was made May 29. The above tables represent average results over a five year period. In the fertilizer formula test the nitrogen was derived from a combination of equal pounds of nitrogen from nitrate of soda, sulphate of ammonia and cottonseed meal. In the nitrogen source test the nitrogen was derived from sources as indicated. In both cases the phosphorus was derived from 16 per cent superphosphate and the potash from muriate of potash. The valentine variety was used throughout the two tests. Six rows were attacked by a bacterial blight so seriously that they were discarded from the test.

Results—The above results represent a five year average and appear to favor a 1,500 pound application of a 10-3-3, with 1,000 pounds per acre of an 10-3-3 giving second best results.

In the nitrogen source test, the nitrate of soda source in the 1,500 pound application gave the highest returns per acre. In the 1,000 pound application sulphate of ammonia was the leading source.

No correlation could be observed between the bacterial blight and the different fertilizer treatments.

Snap Bean Variety Test—This test consisted of the three leading varieties grown in this trucking section and were Valentine, Wax (yellow) and Giant Stringless Green Pod. The planting and first picking dates are the same as for the fertilizer work with beans. The test was planted in three series, using 1,000 pounds per acre of a 10-3-3 fertilizer with a combination nitrogen source consisting of equal pounds of nitrogen from nitrate of soda, sulphate of ammonia and cottonseed meal. Muriate of potash and 16 per cent superphosphate were used in the formula.

The first picking was made on May 29 and no difference could be observed in earliness. The Valentine variety was the leading with a yield per acre of 3,896. The Wax yielded 3,849 and the Giant Stringless Green Pod 2,648 pounds per acre. This test was attacked by the same bacterial blight as in the above two tests and the giant Stringless Green Pod variety was almost 100 per cent resistant.

Irish Potato Work—More attention should be given to the source of seed when planting an Irish potato crop. To impress this feature, this station has cooperated with the State Plant Board, in which Mr. H. H. Wedgworth has secured certified seed from northern grower's associations to test against seed secured locally. Largely due to the results obtained from these experiments, the use of certified seed by Missississippi growers has been increased from a few bushels in 1925 to approximately 20,000 bushels in 1928. An average of the four years results from the cooperating Mississippi Experiment Stations may be obtained in circular form (Circular No. 80) from the Mississippi Experiment Station, A. and M. College, Mississippi. An extract from this circular is given below:

"In each test conducted, the certified have proved superior to the uncertified seed. This has been the case especially with the Triumph variety because it is more susceptible to the mosaic disease than the Cobbler variety. The average yield per acre of marketable potatoes of 52 samples of certified Triumph seed was 120.2 bushels compared to an average yield per acre of 84.2 bushels for 21 samples of uncertified seed of the same variety or an increase of 42.8 per cent. The average per acre yield of marketable potatoes of 28 samples of certified Cobbler seed was 163.8 bushels compared to an average yield per acre of 128.2 bushels for 7 samples of uncertified seed of the same variety or an increase of 27.7 per cent."

"The results from these tests conducted during the past four years prove that certified seed are much superior to uncertified seed. They also indicate that there is a difference in the quality of certified seed produced by individual growers within a state. Therefore, too much stress can not be placed upon the value of keeping the tags which give the name or certificate number of the grower and which accompany each sack of certified seed."

GENERAL WORK

By H. F. Wallace

Rotations—It is our policy to grow a legume on all lands at least once a year. The poorer fields grow legumes twice a year. The entire station where the fields were cultivated are now growing winter legumes alone and in some instances mixed with rye or oats. Several rotations are under way and outstanding among these is the two year rotation with cotton, vetch, corn and soybeans.

To begin this rotation, sow broadcast seventeen to twenty pounds of inoculated vetch seed at the last cultivation of the cotton. This statement is not made for those who "lay-by" cotton by July 4th, but for the real cotton farmer that cultivates up to the time cotton is nearly ready to open. This vetch germinates in the fall and matures seed around the middle of May when the entire crop should be turned under to insure a volunteer crop the following fall. After turning under, plant the land to corn and soybeans. As stated, the vetch volunteers and in the spring may be turned under or cut for hay as desired and then the land planted to cotton. Permit vetch to mature seed every other year and be insured of a volunteer stand every year. In this connection, bur clover will also reseed itself and may be used in a similar rotation.

Vetch has been grown on very poor gray land on the station and has about trebbled the yield of soybeans for hay on these lands. It should be borne in mind, however, that vetch like any other crop does better on good land, so to be successful with vetch, plant it on good land and give it a chance. One of our good, substantial farmers started the above two year rotation on sixteen acres this past year and now has a good volunteer stand on this land and in addition has planted 100 acres more.

Where vetch is to be grazed a little during the winter and later cut for hay, it is advisable to plant oats with it. If for grazing or turning under, use rye with vetch. A bushel of rye and fifteen pounds of vetch is a good seeding for an acre and one and one-half bushels of oats with fifteen pounds of vetch is a good seeding.

Legumes—Legumes may be divided into two classes, winter and summer legumes. Much benefit has been derived from using bur clover, vetch, Austrian winter peas and crimson clover as winter legumes. Crimson clover is an annual and must be planted every year. As stated, vetch and bur clover will reseed themselves, but help the land more if turned under around the middle of April. Quite an acreage has been planted to Austrian winter peas this fall on the station as they withstood severe cold weather well last year.

Last fall an elaborate winter legume test was put in but due to being planted late, the severe cold weather of the first week of January destroyed it. This test was followed with cotton however and the check plots received 600 pounds of a complete fertilizer in the form of an 8-6-4. While the plots that grew legumes received the same fertilizer with the exception of the nitrogen. One plot in each series was left bare and fertilized in the same manner as the legume plots. Results were recorded on this test but will not be published on account of the legumes being killed out due to a very late planting. This fall the legumes, hairy vetch, monantha vetch, bur clover, crimson clover and Austrian winter peas are growing nicely and when turned under, before planting cotton, should add quite a bit to the nitrogen content of the soil.

Among the summer legumes are soybeans, velvet beans, peas and lespedeza. Lespedeza reseeds while the others must be planted each year. These legumes fit into rotations nicely and are recognized as excellent soil builders.

Pastures—Excellent pastures are easily obtained in this section by getting a start of bermuda, carpet grass, lespedeza and white clover. Paspalum grows well in the lower wet places. Early spring clovers such as the hop clover also help out on early grazing. Meadow fescue and the rye grasses also do well. Any part of this section is well adapted to dairying provided there is a good milk market within a radius of fifty miles. Many of our pastures carry cattle easily eight months in the year. Many cattle are never housed during the winter and when they are, it is for a very short period during cold, rainy spells. Carpet grass, lespedeza and bermuda are native in this section.

Some pasture work is being planned for this station in the near future.

Orchards—A nice variety orchard produces excellent fruit each year. Peaches from this orchard were as nice as any that can be produced anywhere. Our trees are fertilized each year with an 8-4-4 fertilizer and also by the vetch that grows in the orchard each winter. This vetch is turned under in early spring. Results show that the choicest fruits may be produced by a little attention given to pruning, spraying and cultivation.

Boll Weevil Work—Hibernation and boll weevil ememgence work has been done in cooperation with Mr. O. M. Chance, Jackson, Mississippi, of the State Plant Board. At present there are cages in the woods and in the open fields that contain five hundred weevils each. These weevils were caught in the late fall and put in these cages. In the spring daily records will be kept to see how many emerge from winter quarters. Those that do not emerge will be listed as not surviving the winter, while those that emerge will give the cotton grower warning as to how bad the infestation will be during the ensuing year. Several cotton states are doing this work.

Improvements—Several improvements have been made on the station during the past year. The barn and machine shed have been painted and the two tenant houses stained green and trimmed in white. The new office has been ceiled and plastered and water and sewerage disposal has been installed in same. Folding chairs for the lecture room and three office chairs have been purchased. New rolling doors have been installed at the front of the barn. Bridges and fences have also been repaired. Shrubs have been planted around the new office building and people traveling the new concrete highway from Raymond to Jackson easily recognize the place by a beautiful new sign that has been erected east of the station residence.

Conclusion—A successful year's work has come to a close. Many visitors have come to the station and many more have written in for information.

We wish to express appreciation to Dr. B. M. Walker, President of the A. and M. College, and to Director J. R. Ricks, of the Experiment Station for the kind and business-like manner in which they have directed the work of the Raymond Branch Experiment Station.