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EXPERIMENTS WITH CORN.

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EXPERIMENTS WITH CORN, 1896.

By J. F. Duggar.

SUMMARY.

I. The spring and early summer of 1896 were extremely dry.

II. Among fourteen varieties of corn tested, the largest yield was made by St. Charles, followed by Early Mastodon and Blount Prolific.

Averaging many tests of varieties made in Southern States, the varieties giving the largest yields were found to be as follows: (1) Cocke Prolific, (2) Mosby Prolific, (3) Calhoun Red Cob, (4) St. Charles, (5) Mammoth White Surprise, and (6) Blount Prolific.

III. In the unusual season of 1896, seed corn from Illinois afforded a larger yield than did that from Alabama and Georgia.

IV. Kernels from the middle of the ear of dent varieties afforded a smaller yield than grains from the butt and tip ends of the ear.

This result was confirmed by averaging the relative yields obtained in fourteen tests at five experiment stations.

V. In this dry season the yields were practically the same whether the distance between single plants in rows five feet apart was three or four feet; a distance of two feet in the row greatly reduced the yield.

VI. On sandy branch bottom land the yield of corn was 3.1-10 bushels greater where 426 pounds per acre of crushed cotton seed was used than where 180 pounds of cotton seed meal was employed, the amount of nitrogen furnished per acre being the same in each fertilizer.

VII. On sandy branch bottom land which had borne two crops of weeds, the loss when the weeds were burned, instead of being plowed under, was 2.8 bushels of corn per acre.

VIII. The yield of grain was less when the entire stalks were cut and cured before pulling the ears and also less when topping was practiced than when the plants were not disturbed before gathering the ears. Financially, topping was unprofitable, and the profit in harvesting the entire stalks was doubtful where no shredder was available to prepare the stalks for feeding, and when corn was valued at 45 cents per bushel, and stalks at 25 cents per 100 pounds.

A compilation of results of stripping the blades or pulling fodder showed an average loss of 2.9 bushels of corn per acre from pulling fodder. Only when fodder is high and corn low in price can fodder-pulling be regarded as profitable. Hay making would generally give better returns than fodder-pulling for the labor employed.

I. The Rainfall During the Growing Season of 1896.

Of all the factors in crop production that are beyond the farmer's control, the most important is the amount and distribution of the rainfall. With ample and well distributed rainfall in April, May, June, and July, a relatively good crop is almost certain. A deficiency in the total rainfall for these months, or the occurrence of long dry spells at this time, almost invariably causes a poor yield, no matter what the method of fertilizing and cultivating the crop.

The greater part of the growing season of 1896 was abnormally dry. The rainfall for March and May was only about half the normal, and in April and June it was only about one-third the usual quantity.

Very heavy rains, accompanied by damaging winds, fell about the middle of July, but this was too late to be of much benefit to the corn crop.

The following table shows the periods in which there was little or no rain :

		Rainfall in inches.
28 days immediately preceding	April 29, ...	0.00
9 " " "	May 14, ...	0.00
7 " " "	May 22, ...	0.00
18 " " "	June 21, only....	0.22
14 " " "	July 6, only....	0.13
24 " " "	Aug. 16, only....	0.26
27 " " "	Sept. 21, only....	0.05

Some of these periods of drought appear short, but many of them were in reality longer than they seem, for the showers separating them were light and altogether insufficient.

The effect of the dry season is shown by the low yields obtained in nearly all experiments conducted on upland.

II. Variety Test of Corn, 1896.

For this test sixteen plots were used. The land was quite uniform in fertility as was indicated by the close agreement between the duplicate plots. Fertilization, culture, etc., were identical for all plots. The distance, 4⅔ by 3 feet, or 14 square feet per plant, is probably less than is advisable for most of the upland of this vicinity.

The following table gives the number of pounds of thoroughly dry unshucked corn required to afford 56 lbs. of shelled corn, the percentage of grain in the unshucked corn, and the yield per acre of each variety, arranged in order of productiveness:

Variety test of corn.

Plot No.	VARIETY.	Unshucked corn per bushel.	Grain in unshucked corn.	Yield of shelled corn per acre.
		Pounds.	*Per cent.*	*Bnshels.*
8	St. Charles	71.1	78.8	25.1
13	Early Mastodon..........	73.7	76.	22.7
16	Blount Prolific	74.1	75.6	22.3
11	Golden Giant............	77.3	72.4	21.2
14	Champion White Pearl..	72.9	76.8	21.3
5	Hickory King...........	71.8	78.	20.7
4	Yellow Dent.............	71.8	78	19.8
1	Peabody.................	82.8	67.6	18.2
10	Experiment Sta. Yellow.	81.4	68.8	16.9
7	Jones Pearl Prolific......	84.3	66.4	16.8
12	Chester County Mammoth	77.3	72.4	15.9
2	Mosby Prolific............	83.3	67.2	15.5
3, 9, 15	Renfro, average..........	81.3	68.8	14.7
6	Higgins.	86.4	64.8	12.2

In this test St. Charles, a white variety, stood first, followed by Early Mastodon and Blount Prolific.

As the Alabama Experiment Station has no seed for sale or distribution, a list is given below of the parties from whom our seed corn was obtained :

VARIETY.	Color of grain.	SEED FROM—
Peabody....................	W	W. B. Tucker, Opelika, Ala.
Mosby Prolific..............	W	Miss. A. & M. Col., Starkville, Miss.
Hickory King...............	W	C. C. L. Dill, Dillburg, Ala.
Higgins.....................	W	W. J. Higgins, Larkinsville, Ala.
Jones Pearl Prolific........	W	H. P. Jones, Herndon, Ga.
Blount Prolific.............	W	" " " "
St. Charles.................	W	J. C. Suffern, Voorhies, Ill.
Champion White Pearl.....	W	" " " "
Yellow Dent..............	Y	" " " "
Golden Giant	Y	E. G. Packard, Dover, Del.
Early Mastodon...........	Y	" " " "
Chester County Mammoth.	Y	" " " "
Renfro.....................	W	Ala. Exp't Station, Auburn, Ala.
Experiment Sta. Yellow....	Y	" " " "

The result of a single test of varieties is apt to be misleading, especially in such an unusual season as 1896. Much more reliable conclusions are obtainable by taking average results for a large number of tests.

In order to learn what varieties succeed best in the South, a compilation was made of all published tests conducted at the Agricultural Experiment Stations in the Gulf States, Arkansas, Georgia and South Carolina. Since no one variety entered into all of these tests, it was impossible to use any one variety as a standard of comparison. To make comparisons possible the average of the yields of all varieties in each test was calculated and this average yield was taken as 100 ; any variety yielding more than the average in a certain test was given its proportional grade above 100, and any variety falling below the average was given a rating correspondingly below 100.

By averaging all relative yields calculated as above for each variety, a figure is obtained for each variety which is more satisfactory than is the result of a single test.

In making this compilation calculations were made for nearly 700 tests with 260 varieties. The greater the number of experiments into which a given variety enters the more reliable is the average yield for that variety. The list given below contains the average for only such varieties as have each been tested five or more times, and the varieties are arranged in the order of productiveness :

Relative yields of varieties of corn repeatedly tested in the Gulf States, Arkansas, Georgia, and South Carolina.

	No. of tests.	Relative yield.
Cocke Prolific	5	136
Mosby Prolific	19	126
Calhoun Red Cob	6	122
St. Charles	11	121
Mammoth White Surprise	6	115
Blount Prolific	26	111
Banks Improved	7	111
Early Mastodon	6	110
Experiment Station Yellow	5	110
Virginia Gourd Seed	5	110
Welborn Conscience	18	109
McQuade	9	109
Piasa King	10	107
Brazilian Flour	8	107
Patterson	7	107
Maryland White Gourd Seed	5	107
Giant White Normandy	13	106
Pride of America	5	105
New Madrid	5	103
Giant Broad Grain	9	103
Shoe Peg Improved	7	103
Clarke Early Mastodon	7	102
Champion Early White Pearl	8	101
Clayton Bread	6	100
Mexican Flint	5	99
White Mexican	6	99
Alabama	7	98
Hickory King	19	96
Hendron White Bread	5	95
Leaming White	8	93
Common White	5	93
Golden Beauty	20	92
Chester County Mammoth	7	92
Improved Leaming	8	88
Champion White Pearl	11	86
Golden Dent	9	86
Western Yellow	5	85
Riley Favorite	5	83
New Hickory King	5	81

The results of two tests in which St. Charles was the most productive variety are unavailable for the above compilation because published only in the form of a summary. If these figures could have been used, St. Charles would have ranked higher, possibly first, instead of fourth, in the above table.

Three of the varieties standing near the head of the list, Cocke Prolific, Mosby Prolific, and Blount Prolific, bear several small ears on each stalk.

III. Seed Corn from Different Latitudes.

Early in 1896 Hickory King corn was obtained from Illinois, Delaware and Alabama, and Blount Prolific corn from Illinois and Georgia. Six plots, each one-tenth acre in area, were used for this experiment ; plots 1 and 4 were both planted in Hickory King corn grown in Alabama, the purpose of this duplication being to learn whether the different plots were nearly of uniform fertility.

Preparation, fertilization, and culture were the same for all plots. The young plants were thinned so as to leave the same number on each plot, the distance between plants averaging 2.4 by 4.5 ft., which is at the rate of about 4,000 plants per acre.

The following table gives the locality from which seed was procured, the yield of shelled corn per acre on each plot, and the increase or decrease of Northern seed over Southern seed :

Seed corn from different latitudes.

Plot No.		Shelled corn per acre.	
		Yield.	Increase (—) or decrease (—) from Northern seed.
	Hickory King.	*Bus.*	
1	From Pickens Co., Alabama..	16	....
2	From Voorhies, Illinois	19.3	—2.8
3	From Dover, Delaware	15.6	— .9
4	From Pickens Co , Alabama..	17.1	....
1& 4	Average of Alabama seed...	16.5	....
	Blount Prolific.		
5	From Voorhies, Illinois	14.2	—1.1
6	From Herndon, Georgia......	13.1	....

The above table shows that with both varieties seed corn from Illinois produced a larger crop than that from the South. However, since the differences are only slight in most cases, it is not safe to conclude that Northern seed will generally afford a larger yield than that of the same variety grown in the South. But it is an interesting fact that in the abnormally dry season of 1896, Hickory King corn grown in Illinois, was more productive than the strain of that variety already acclimatized in this State.

The results secured in the test of varieties (p. 364) are also suggestive as showing relatively heavy yields produced by Northern varieties.

The average yield in 1896 for eight Southern varieties was 17.2 bushels per acre ; for six Northern varieties 21 bushels. Of the Northern varieties in that experiment the three from Illinois averaged 22 bushels, while the three varieties from Delaware averaged 19.9 bushels per acre. Results of a variety test in Oklahoma (Bulletin No. 10) in a very dry season also showed a larger yield of grain from Northern than from Southern varieties. However, results from averaging a number of varieties of Northern origin and comparing the average yield with that of dissimilar varieties of Southern origin are valuable in this connection only when the number of varieties from each section is large.

The results recorded in the preceding table do not confirm the common belief that Northern seed corn is inferior to pure Southern varieties.

Differences in yield between the same varieties from different latitudes are not wholly due to climate, but also to the kind of soil and culture which produced each strain. Thus seed of the same variety grown on adjacent farms may vary in productiveness—an encouraging fact for one who may desire to improve his corn by good culture and careful selection.

IV. Butt, Middle, and Tip Kernels for Seed.

It is a common practice in selecting seed corn to discard the kernels growing at the tip and butt ends of the ear. To obtain more light on the advisability of this practice, the experiment recorded below was undeıtaken.

There were selected good, well filled ears of Experiment Station Yellow corn, a variety with ears of medium size, and usually a single ear to the stalk. From each ear the grains which grew within one inch of the tip end were shelled to obtain tip kernels for planting. Likewise kernels growing within an inch of the butt end were obtained. Near the center of the ear, a space of one inch was shelled to obtain middle kernels for planting.

The field used for this experiment was divided into nine plots, each one-ninth acre in area.

Three plots were planted with butt grains, three with middle grains, and three with tip grains, the arrangement of plots being such as to distribute equally to all classes of seed any advantage due to differences in the fertility of different plots.

Preparation of land, fertilization, and culture were the same for all plots. The yields from all three kinds of seed were poor, the unusually severe drought causing an undue proportion of nubbins and poorly filled ears.

Yield of shelled corn produced by seed corn from middle, butt, and tip of ear.

Kind of Seed.	Yield corn per acre.	Grain in unshucked corn.
	Bus.	*Per cent.*
Middle kernels (average of 3 plots).........	11.7	68.3
Butt kernels (do).........	12.6	69.2
Tip kernels (do)........	12 7	70.1

The differences in yield are probably too small to point to the superiority of the kernels from any particular part of the ear. There is certainly no evidence here that the removal of tips and butt grains from seed corn is advantageous.

As a check on the above experiment a more comprehensive test was undertaken on plots so small as to permit of the weighing on chemical balances of all the seed planted. In this experiment butt, tip, and middle grains were obtained from spaces of one inch located respectively at the butt, tip, and middle portions of the ear. All unsound kernels, found chiefly among the tip grains, were rejected; otherwise the kernels which were weighed were not selected but represented average grains from the several parts of the ear.

From each large, well filled ear, used in this experiment, 50 grains from each part of the ear were weighed, and these 50 kernels were planted in 24 hills, spaced 4 by 4 ft. Later the stand was reduced to one stalk per hill and the missing hills were replanted with Brazilian Flour corn, the replanted hills equalizing the stand, but forming no part of the experiment.

The following table gives the weight of the middle, butt, and tip kernels planted, and the weight, in apothecaries' grains, of the shelled corn grown from each kind of seed :

Weight of middle, butt, and tip kernels planted and yield of shelled corn produced by middle, butt, and tip seed.

Plot No.	Ear No.	VARIETY.	Seed kernels from	Weight of 50 kernels planted.	Yield of shell'd corn per plant.
				Grains.	*Grains.*
1	A	Expt. Sta. Yellow...	Middle...	210.2	1836
2	"	do	Butt. ...	212.6	2100
3	"	do	Tip	153.9	1789
4	B	Expt. Sta. Yellow. .	Middle...	306.6	2360
5	"	do	Butt	323.9	2346
6	"	do	Tip	214.1	2294
7	C	Renfro...............	Middle...	427.3	2221
8	"	do	Butt.	491.3	3350
9	"	do	Tip	391.2	2916
10	D	Hickory King.......	Middle...	352.9	1950
11	"	do	Butt	437.3	1960
12	"	do	Tip	276.7	1750

In three instances the butt grains led in productiveness and in the fourth case they wanted only a very slight weight of taking first place. In three cases tip grains were least productive. Taking an average for the four ears planted, the weight of the shelled corn produced was as follows :

WEIGHT OF SHELLED CORN PER PLANT.	*Grains*.
From planting butt kernels, ...	2439
" " middle kernels, ...	2092
" " tip "	2187

Attention is called to the fact that butt kernels led in average weight and in productiveness ; that tip kernels fell much below the others in weight, and that tip kernels were least productive in three out of four cases, although the relatively large yield with tip kernels of the Renfro variety made the average figure for tips higher than for grains from the center of the ear. The frequent correspondence between weight of seed and productiveness in this test is suggestive and is worthy of further study in future experiments.

The following table brings together in a form for easy reference the results of our tests and of previous tests at other experiment stations on the relative productiveness of grains from different parts of the ear.

In each test the lowest yield, whether made by middle, butt, or tip kernels is graded at 100, and the two higher yields at correspondingly higher figures :

Summary of results of planting kernels frm middle, butt, and tip of ear.

Station.	Variety.	Relative yield produced by seed from— Butt.	Middle.	Tip.
	Dent Varieties.			
Alabama....1896	Experiment Sta. Yellow... (Six small plots.)	109	103	100
" "	Experiment Sta. Yellow... (Nine large plots.)	109	100	109
" "	Renfro....................	151	100	131
" "	Hickory King.............	112	111	100
Arkansas...——	....	112	101	100
Kansas.... 1891	St. Charles................	108	102	100
Ohio.......1886	———Dent................	120	100	111
" 1888	———Dent................	105	106	100
" 1889	———Dent................	100	100	101
" 1890	———Dent................	117	100	112
	Flint Varieties.			
N. Y. State, 1882	——— Flint...............	101	100	104
" " 1883	——— Flint...............	100	101	106
" " 1884	——— Flint...............	100	103	103
" " 1885	——— Flint...............	100	105	103
Average of all	tests with dent varieties...	114	102	105
" "	" " flint " ...	100	102	104
" "	" " " & dent variet's	110	102	106

The average of all tests shows that butt kernels have been most productive, and that tip kernels have stood ahead of grains from the middle of the ear. The few figures for flint varieties do not agree with the average, but favor tip kernels.

The most striking fact about the above table is that in no case do the middle kernels show a marked superiority over those from other parts of the ear. This indicates that the farmer can advantageously dispense with the labor of removing the butt and tip grains from the ears used for seed.

V. Distance for Upland Corn.

This experiment occupied 6 plots near the top of a hill. Plot 1 was on the highest ground, from which there was a slight slope to plot 6.

The altitude of all the plots and the sandy character of the soil made the position a dry one and hence unfavorable to thick planting. The very dry season also militated against thick planting.

Fertilizers and culture were the same for all plots. Seed of Renfro corn, a variety with large ears, was planted at measured distances March 23. A single plant was left in each hill and the stand was regular. On plots 1, 2 and 3, the distance between the rows was the same, 5 feet, but the distance between plants in the drill varied from 4 to 2 feet, affording wide variations in the number of plants per acre. On the other hand the thickness of planting was the same on each of plots 4, 5 and 6 ; the only difference between these latter plots was that on plot 6 the rows were close together and the distance between plants in the drill was considerable, while on plot 4 the rows were 6 feet apart and the plants correspondingly closer in the drill. The arrangement on plot 5 was intermediate between that of plots 4 and 6.

The following table gives the number of stalks and the yield of corn per acre when the plants stood at different instances apart :

Yield of corn when Plants stood at different distances apart.

Plot No.	Distance.		Number of plants per acre.	Yield per acre.
	Between Rows.	Between plants.		
				Bus.
1	5 feet.	4 feet	2178	12.4
2	5 feet.	3 feet	2904	12.9
3	5 feet.	2 feet	4356	9 8
4	6 feet.	2 feet 6 in.	2904	13.1
5	4 feet 10 in.	3 feet 1½ in.	2904	15.6
6	4 feet.	3 feet 9 in.	2904	16.9

Where the rows were 5 feet apart there was practically no difference in yield for distances of 3 and 4 feet between plants. A space of two feet between plants was much too close for this poor soil and dry season. On the three plots where the thickness of planting was constant, but the arrangement of plants different, the figures at first view suggest a continuous increase in yield as the constant area devoted to each plant approaches a perfect square in shape. However the land was not perfectly uniform, as seemed the case when the plots were located. There is a slight increase in fertility towards the lower plots, which is apparent on comparing the yields of plots 2 and 5,—plots which are practically duplicates.

Allowing for this natural advantage which their position gives to the narrow rows, the yield becomes practically the same for rows nearly 5 feet apart as for narrower rows less thickly planted. For land of this character, high, sandy, dry, and poor, 5 feet between rows is the minimum distance that can be recommended, and on very poor land wide rows are best. Rather wide rows are necessary to economy of cultivation and to allow the planting of a row of cow peas in the middle between the corn rows.

In order to make this test as accurate as possible, our usual custom of planting a row of cowpeas in each middle was not followed in this experiment. As compensation for this omission, crimson clover seed was sown broadcast soon after the corn was gathered, and covered by using a Planet, Jr., cultivator, supplied with five very small shovel points. This seeding was made in September with the expectation of plowing under the growth of crimson clover late in March, 1897.

VI. Cotton Seed Meal Versus Crushed Cotton Seed for Corn.

An experiment to compare the fertilizing effect of nitrate of soda and cotton seed meal and to test the effect of applying only half the cotton seed meal at planting time and the other half later was located on a poor hill-side, having a rather stiff soil. This spot suffered more from the protracted drought and gave a smaller yield, only 6.9 to 8.7 bushel per acre, than any other field on the Station farm. The failure of the crop on all plots on this hillside rendered the experiment worthless.

A test of the relative values of cotton seed meal and crushed cotton seed was made on a piece of sandy branch bottom which had borne a crop of oats in 1894 and had since grown up in weeds. The heavy growth of weeds was plowed under with a one-horse turn plow February 27, 1896, and Renfro corn planted March 18. Immediately before planting, rows were marked off with a shovel plow; in this furrow fertilizers were drilled. Then a scooter was run once in this furrow to mix the fertilizer with the soil, after which corn was planted and covered with a double-foot plow stock furnished with two small scooters. Each plot received acid phosphate at the rate of 360 pounds per acre and kainit at the rate of 120 pounds per acre, the mixture of these two fertilizers constituting what is frequently, for convenience, called "mixed minerals." In addition, one plot received 180 pounds of cotton seed meal per acre; the other 426 pounds of crushed cotton seed. Both cotton seed meal and cotton seed are valued as fertilizers chiefly because of the nitrogen which they contain. The same amount of nitrogen is contained in 180 pounds of cotton seed meal as in 426 pounds of cotton seed.

The yields in bushels per acre were as follows, 83.8 pounds of corn in the shuck being required for 56 pounds of shelled corn:

With 426 pounds crushed cotton seed, (and mixed minerals)	26.7 bushel
With 180 pounds cotton seed meal (and mixed minerals)	23.6 bushel
Difference in favor of cotton seed , ,	3.1 bushel

The increased yield from cotton seed is 3.1 bushels per acre, or 13 per cent in excess of the yield from the same amount of nitrogen in the form of cotton seed meal. Cotton seed is believed to pay better on land deficient in vegetable matter than on soil well supplied with this material. And yet even on this piece of weed land, fairly well supplied with organic matter, cotton seed was the most efficient source of nitrogen.

It does not necessarily follow that cotton seed is the most profitable fertilizer. That depends on the relative prices of cotton seed and meal, or on the quantity of cotton seed meal which the oil mills are willing to give in exchange for a ton of cotton seed.

The cotton seed meal used in this test cost $20.00 per ton delivered in Auburn, or $1.82 per acre.

The 426 pounds of crushed cotton seed on one acre also cost $1.82, if we assume a price of $8.56 per ton or 42.8 cents per hundred pounds. With both articles at prices named above, one ton of cotton seed would purchase only 845 pounds of cotton seed meal, and the results reported above indicate that such an exchange would have been unprofitable to the grower. The oil mills usually give considerably more than 845 pounds of cotton seed meal for one ton of seed.

The exchange value of cotton seed and cotton seed meal will be more fully discussed in a future bulletin from this Department.

Burning Weeds vs. Plowing Them Under.

This test was made on two plots in a sandy bottom (the same as that noted in the preceding section) where the land had been given over to weeds after harvesting the oat crop in 1894; so that there was considerable accumulation of litter from two crops of weeds. The dead weeds on both plots stood about five feet high at the time when the trash on plot 1 was burned, February 27, '96. Plot 2 was plowed without first setting fire to the vegetable matter. Fertilizers, culture, etc., were the same for both plots.

The yield of corn in bushels per acre was as follows:

Burning trash vs. not burning it.

Plot No.	TREATMENT.	Yield per acre.
		Bus.
1	Trash burned	24.5
2	Trash not burned but plowed under	27.3
	Difference in favor of not burning	2.8

The increase of nearly three bushels per acre on the plot where fire was not used is a strong argument against wholesale burning preparatory to breaking land. While it is often inconvenient both in preparation and in subsequent cultivation to contend with dead weeds, cornstalks, etc., yet one can scarcely doubt the good effect of such material in the permanent improvement of the soil. The crying need of the majority of Southern soils is for vegetable matter, which is valuable (1) for its fertilizing ingredients, and (2) especially for its effect in so changing the texture of the soil as to make the latter less sensitive to drought. The custom of always burning cornstalks and weeds must inevitably result in decreased productiveness, and this is true of prairie land as well as of sandy and clay soils.

VIII. METHODS OF HARVESTING CORN.

For this experiment one measured acre of branch bottom land was used. Mosby Prolific corn, a variety with several small ears per stalk, was planted April 6 in rows $4\frac{1}{2}$ feet apart. Fertilizers, which were applied in liberal quantity, were separately weighed for each row.

The original plan was for the entire stalks on every fourth row to be cut and cured, for the tops to be cut from a second set of rows, for the blades or "fodder" on a third lot of rows to be pulled, and for the ears alone to be harvested from another set of rows. Circumstances prevented a test of the effect of stripping or fodder pulling, but the other comparisons were carried to a conclusion.

August 13, on a portion of the field the tops were cut just above the ear. At that date the lower leaves had "fired" too much to make good fodder.

August 22 on other rows the entire stalks were cut, put into large shocks and left until Sept. 12.

A third set of rows remained undisturbed until Sept. 12. On this last date the ears were pulled from all three classes of plants, viz: (1) those not previously disturbed, (2) those plants which had been topped, and (3) those stalks which had been cut near the ground and shocked.

Weather conditions were favorable to the curing of the stalks.

The following table gives the yields per acre both of grain and forage on the plots differently treated:

Yield per acre of corn and forage from different methods of harvesting.

METHODS OF HARVESTING.	Corn per acre.	Forage per acre.
	Bus.	*Lbs.*
Only ears harvested	34.9	00
Tops cut and ears harvested	30.2	312 (tops)
Entire stalks cut and ears afterwards harvested	29.2	2103 (stalks)

Apparently both topping and cutting the stalks before pulling the ears injuriously affected the yield of grain.

We have next to consider whether the forage gained by harvesting tops or stalks exceeded in value the grain which seems to have been lost by these processes.

With corn at 45 cents per bushel, tops at 50 cents per 100 lbs., and entire stalks with adhering blades at 25 cents per 100 lbs., and assuming that the different plots were uniform in fertility, we obtain the following financial results:

Value per acre of products from different methods of harvesting corn.

Method of Harvesting.	Value of grain.	Value of forage.	Value of total product.
Only ears harvested...........	$ 15 70	$ 0.00	$ 15.70
Ears and tops harvested........	13 59	1.56	15.15
Ears and entire stalks harvested.	13.14	5.26	18.40

At the prices assumed above, the highest value was secured by cutting and curing the entire stalks, this process showing a gain of $2.70 per acre over harvesting only the ears. Will this amount cover the cost of handling a weight of fresh stalks sufficient to produce about one ton of cured stalks? That is a local question the answer to which is largely dependent on the price and efficiency of labor. The value assumed for entire stalks, or stover, is necessary only on estimate, as the feeding value of stover from large southern corn has never been determined.

The low price of 25 cents per 100 lbs. of stalks has been assumed because of the immense waste in feeding the coarse forage, a waste which is inevitable unless one purchases a shredding machine and expends considerable labor in preparing shredded forage. Chemical analysis shows that even the butt of the stalk, the part which, unless shredded, is rejected by cattle, has some feeding value.

In an experiment at the Georgia Experiment Station, (Bulletin 30), where a shredder was used, a price of 40 cents per 100 lbs. was assumed for the cured stalks. In that test no reduction in yield of grain resulted from cutting the entire stalks, and at 40 cents per 100 lbs. of stalks, this method afforded a total product valued at $9.59 per acre more than the worth of the grain alone.

The effects of topping corn plants are variable. Results at the Arkansas Experiment Station, (Bulletin 24) showed a reduction in grain where the entire stalks were cut at a time when the bottom leaves of the plant were dying, and the kernels, nearly past the milk stage, were denting; the loss from cutting and curing the stalks before pulling the ears was nearly 3 bushels per acre.

Summarizing the results of experiments in topping we find that four* experiments show a loss of grain as a result of topping and that in three† others topping did not diminish the yield of grain.

It is apparent that topping, if postponed rather later than the usual time for pulling fodder, may be practiced without reducing the yield of grain.

If sufficient hay is not available and either topping or fodder pulling must be resorted to, topping is probably preferable. For though blades form a more palateable forage, topping has the advantage of requiring less labor, of affording a somewhat larger yield of forage per acre, and being less injurious to the crop of grain.

That stripping reduces the yield of grain more than does topping has been demonstrated in several experiments.

In an experiment in Texas the labor of pulling and storing a ton of "fodder" was three times as much as in harvesting a ton of tops.

Not only does fodder pulling require a large amount of labor, which could be more effectively employed in making hay, but its more serious disadvantage is that it almost invariable reduces the yield of grain. Summarizing the results

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*Arkansas Bulletin 24; Alabama (Col.) Bulletin 75; Kansas Report '88, p. 27; and Mississippi Report '90, p. 20.

†Alabama (Canebrake) Bulletin 10; Illinois Bulletin 20; and Texas Bulletin 19.

of numerous experiments made in Southern states, we find that on an average stripped stalks have yielded 2.9 bushels per acre less than those not stripped. This loss, together with the cost of pulling the blades on an acre, which has been variously estimated at from 78 cents to $1.69, should be charged against fodder pulling, and the value of the fodder obtained should be credited. In the experiments where the yield of fodder is recorded, the average amount per acre is 542 lbs.

Assuming the prices below, which each reader can change to suit his judgment, we have the following financial statement relative to pulling fodder:

To 2.9 bus. corn at 45c	$1.31	
To cost of pulling, tying and storing fodder from 1 acre (estimated)	1.35	
By 542 lbs. fodder at 60c per 100 lbs.		3.25
Balance in favor of fodder pulling	59	
	$3.25	$3.25

If values assumed are correct the margin of profit in pulling fodder here averages only 59 cents per acre, which is probably insufficient to cover the single item of risk from bad weather, which sometimes almost completely destroys this forage. Moreover, the yield of fodder obtained in these tests was much above the average, as shown by the fact that in one instance it reached 936 lbs. per acre and by the additional fact that the yield of corn even on the stripped plots averaged nearly 25 bu. per acre, a yield which shows a vigor of growth much above the average of southern corn fields. Probably 350 lbs. of fodder would be a more correct estimate as the amount likely to be obtained on fields yielding 15 bushels of corn per acre. This yield would make the financial statement show a direct loss from fodder pulling in addition to risk from unsuitable weather. Undoubtedly labor could be more profitably employed in saving hay, especially if cow peas, melilotus, lespedeza, or other renovating plant were grown for hay, thus benefiting the land through the roots and stubble left in the soil, while furnishing a cheap and highly nutritious forage for live stock.