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ALABAMA

Agricultural Experiment Station

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Corn Culture.

By

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CORN CULTURE

By J. F. Duggar.

SUMMARY.

During the past ten years 52 varieties of corn have been tested at Auburn, Alabama. Among these the most productive varieties were Mosby, Cocke, Henry Grady and Sanders.

Varieties of the prolific type, "two-eared varieties," afforded larger average yields than did the type in which the number of ears was smaller but the size larger.

Early varieties were relatively unproductive.

Repeated tests of seed corn grown in different latitudes indicated that with certain varieties seed from Virginia and Tennessee proved superior to that from Delaware, Illinois, Alabama and Georgia. It is impossible to determine whether this result was due chiefly to climate or to more careful selection of the seed corn obtained from Virginia and Tennessee. It is generally advisable that seed corn for Alabama be obtained either from this latitude or from some other region south of the Ohio and Potomac rivers.

Many early varieties from northern grown seed afforded a large proportion of unsound corn.

In six tests seed corn from the bottom ear afforded a slightly larger yield than from the top ear and in two tests seed from the top ear gave the larger yield.

Subsoiling did not increase the yield of corn sufficiently to be profitable.

The yield was not materially influenced by the depth of the first cultivation.

Planting corn in water furrows did not increase the yield.

The yield of grain was slightly decreased by pulling fodder, by topping and by cutting and shocking the plant. The average yield of dry fodder or blades was 515 pounds, of

cured tops 473 pounds and of cured stover 1,799 pounds per acre.

The increase in the yield of corn due to the use of velvet bean stubble as a fertilizer was 4.3 bushels per acre. Where the entire growth of velvet beans was plowed under the increase in the first corn crop was 12.3 bushels and the increase in the second corn crop was 4.4 bushels. The increase in the two corn crops was 16.7 bushels greater where the entire growth of velvet beans was plowed under than where only the roots and stubble were plowed under.

The yield of corn was 8.9 bushels per acre greater when cow pea vines were plowed under than when only the stubble was used as fertilizer. The increase from plowing under beggar weed, which grew after the corn was laid by, averaged 5.4 bushels per acre.

When velvet bean vines or cow pea vines were plowed under the addition of acid phosphate profitably increased the yield of corn.

Applying a part of the fertilizer before planting and a part at the second cultivation did not increase the yield as compared with using all of it before planting.

Nitrate of soda afforded a larger increase than did cotton seed meal, cotton seed or barnyard manure.

It is recommended that a fertilizer for corn contain a relatively large proportion of nitrogen.

TESTS OF VARIETIES OF CORN IN 1901, 1904 AND 1905.

For ten years in succession tests of varieties of corn have been made on the Experiment Station farm at Auburn under the present management.

Bulletins Number 76, 88 and 111 of this Station, now out of print, give the results of variety tests at Auburn from 1896 to 1900 inclusive. In 1902 an unprecedented drought, from April to August, ruined our variety test, and in 1903 rogues vitiated the results. The results obtained in 1901, 1904 and 1905 are presented in this bulletin.

All of our tests were made on upland soil characteristic of this region, and naturally poor. Only commercial fertilizers were employed, except in 1905, when in addition to commercial fertilizers, barnyard manure, chiefly from cattle, was used at the estimated rate of ten tons per acre.

Planting was done at the usual time or a few days later and the distance between rows was usually 4 feet 8 inches, and between plants about three feet. The distance between plants was the same for all varieties.

Every precaution was taken to secure and maintain a stand, but when this was impaired by bud worms, no correction of yields was attempted.

Yield of varieties of corn in 1901.

Variety	Per ct. of stand	Yield per acre	Rank in yield
	Per ct.	Bus.	
Mosby	93	**35 2**	1
Shaw	94	**31.9**	2
Cocke	100	**31 8**	3
Arnold's Cross Bred	100	30 1	4
Tennessee White	91	29 9	5
Tennessee Yellow	100	28 8	6
Red Cob, Tennessee	93	27 7	7
Experiment Station Yellow	98	27.1	8
Blount	95	21 6	9
Jones Pearl	99	19 6	10
Hickory King	100	18.9	11

Yield of varieties of corn in 1904.

Variety	Per ct. of stand	Yield per acre	Rank in yield
	Per ct.	Bus.	
Sanders	88	**35.5**	1
Mosby	100	**35.5**	2
Cocke	91	**33 5**	3
Henry Grady	93	32.3	4
Cocke (Ga.)	96	29.6	5
McMackin's Gourd Seed	95	29.6	6
Experiment Station Yellow	100	26.8	7
Boone County White (Tenn.)	87	25 8	8
Boone County White (Ind.)	92	24 2	9
Boone County Special	88	23.5	10
Reid's Yellow Dent	92	22.1	11
Riley's Favorite	91	19.6	12
No. 77 U. S. Dept. Agr	91	19.4	13
Silver Mine (Iowa)	81	19.1	14
Leaming Yellow	94	18.2	15
Snow Flake	81	12.9	16

Yield of varieties of corn in 1905.

Variety	Per ct. of stand	Yield per acre	Rank in yield
	Per ct.	Bus.	
Henry Grady	97	**40.6**	1
Sanders	99	**39.4**	2
Mosby	99	**38.9**	3
Marlboro	97	34 9	4
Local White Cob	91	34.3	5
McMackin's Gourd Seed	95	33.1	6
No. 77 U. S. Dept. Agr	99	32 6	7
Cocke (Tenn.)	92	30.9	8
Experiment Station Yellow	96	30.7	9
Albemarle	81	30 3	10
Shaw	81	29.7	11
Boone County Special	94	29.4	12
Red Cob (Tenn.)	84	28.9	13
Cocke (Ala. Exp't Sta.)	92	28.6	14
Hickory King	96	28	15
Boone County White (Tenn.)	88	26.3	16
Reid's Yellow Dent	85	25.7	17
Boone County White (Ind.)	87	24.6	18
Boone County White (Ill.)	76	22	19
Silver Mine (Iowa)	93	22	20
Leaming Yellow	94	18.9	21
Riley's Favorite	80	17.1	22

Relative yield of varieties of corn at Auburn, taking the yield of Experiment Station Yellow as 100.

	1896	1897	1898	1899	1900	1901	1904	1905	Average
Tested 8 years									
Mosby	91	138	109	92	115	130	132	130	117
Exp't Sta. Yellow	100	100	100	100	100	100	100	100	100
Tested 7 years									
Hickory King	122	72	73	73	80	70		91	83
Tested 6 years									
Cocke		129	87		108	117	118	97	109
Shaw		99	117	81	95	118		97	101
Blount	132	103	72	83	98	80			95
Tested 5 years									
St. Charles	148	90	104	81	96				105
Tested 4 years									
Red Cob (Tenn.)				82	99	102		96	95
Jones Pearl	99	97		93		72			90
Champion White Pearl	126	79		74	70				87
Tested 3 years									
Sanders					104		132	128	121
Farmer's Pride		101	94		96				97
Early Mastodon	134	60			91				95
Iowa Silver Mine		48					71	72	64
Leaming Yellow					57		55	61	58
Tested 2 years									
Henry Grady							121	132	127
Arnold					113	112			112
McMakin's Gourd Seed							110	108	109
Renfro	86	128							107
Higgins	72	134							103
Boone County Special							88	96	92
No. 77 U. S. Dept. Agr							73	106	90
Boone County White							93	79	86
Golden Beauty			89		83				86
Evans				86	81				84
Reid's Yellow Dent							82	84	83
Riley's Favorite							73	56	65
Tested 1 year									
Golden Giant	125								125
Cade Prolific		124							124
Yellow Dent	117								117
Marlboro								114	114
Baden			113						113
Local White Cob								112	112
Bradbury					112				112
Tennessee White						110			110
Peabody	108								108
Tennessee Yellow						106			106
Albemarle								99	99
Cary Klondike					97				97
Strawberry		97							97
Giant Broad Grain					94				94
Chester County Mammoth	93								93
Golden Dent				92					92
Poor Man					89				89
Welborn's Conscience		87							87
Cuban Giant			79						79
Sheep Tooth White					75				75
Creole					74				74
Snow Flake							4		48

Mosby is one of the most productive of the prolific varieties. Comparing its record with that of other prolific varieties we find that in each of six years Mosby yielded more than Cocke; in comparison with Blount, Mosby led in five out of six tests.

Comparing Mosby with some of the most productive non-prolific varieties, we find that it stood ahead of Sanders in 2 out of 3 tests, and equaled Sanders in the third test; once Mosby stood above Henry Grady and once slightly below. Compared with Shaw, Mosby was the more productive in 5 out of 6 tests.

Compared with all varieties tested, Mosby occupied *first* place in 2 tests, *second* place in 2 tests, *third* place in 2 *tests, fourth* place in 1 test and *twelfth* place in 1896, when weather conditions injured all late varieties.

Cocke, though averaging less than Mosby, proved to be one of the most productive varieties when all of our tests, made during the last ten years are considered.

In six tests its relative position was *second* in 2 tests, *fourth* in 2 tests, and *seventh* and *tenth* in the other two years.

Henry Grady has been tested only two years, but has taken high rank, namely *first* in 1905 and *third* in 1904.

Sanders has been tested only two years, but in both has taken high rank. It was *first* in 1904 (equaling Mosby), and *third* in 1905.

Other promising varieties as regards yield, but which have not been often tested here, are: Bradberry, Marlboro, Arnold, Local White Cob, Tennessee White and McMackin's Gourd Seed.

For illustrations of ears of certain varieties, see Appendix.

RELATION OF NUMBER OF EARS PER PLANT TO YIELD OF GRAIN PER ACRE.

The following table gives the number of ears and nubbins of each variety per plant. It will be noted that even most

of the prolific varieties average less than two ears and nubbins per plant and that several varieties average less than one grain-bearing shoot per plant.

The number of grain-bearing shoots varies greatly for the same variety in different seasons, but, nevertheless, this number is largely a variety characteristic.

Number of ears and nubbins per plant.

Variety	1900		1901		1904		1905		
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Average
Albemarle	....	....	....	....	....	....	2.02	1	2.02
Arnold	.91	22	.94	10	....	....	....	....	.93
Blount	1.86	1	1.00	9	....	....	....	....	1.43
Boone County White	....	....	....	....	1.11	5	....	....	1.11
Bradbury	1.40	4	....	....	....	....	....	....	1.40
Cary Klondike	1.00	16	....	....	....	....	....	....	1.00
Champion White Pearl	.99	17	....	....	....	....	....	....	.99
Cocke	1.55	2	1.85	1	1.49	2	1.60	6	1.65
Creole	1.39	5	....	....	....	....	....	....	1.39
Early Mastodon	1.04	10	....	....	....	....	....	....	1.04
Evans	.92	21	....	....	....	....	....	....	.92
Experiment Sta. Yellow	1.17	7	1.36	3	....	....	1.44	7	1.32
Farmers' Pride	.99	17	....	....	....	....	....	....	.99
Giant Broad Grain	1.03	12	....	....	....	....	....	....	1.03
Golden Beauty	1.03	12	....	....	....	....	....	....	1.03
Henry Grady	....	....	....	....	1.15	4	1.37	9	1.25
Hickory King	1.31	6	.91	11	....	....	1.38	8	1.20
Jones' Pearl	....	....	1.18	5	....	....	....	....	1.18
Leaming	.99	17	....	....	.77	11	....	....	.88
Local White Cob	....	....	....	....	....	....	1.10	14	1.10
Marlboro	....	....	....	....	....	....	1.86	2	1.86
McMackin's Gourd Seed	....	....	....	....	1.11	5	1.21	12	1.16
Mosby	1.02	14	1.60	2	1.36	3	1.74	3	1.43
No. 77 U. S. Dept. Agri.	....	....	....	....	.85	9	1.24	11	1.05
Poor Man	1.15	8	....	....	....	....	....	....	1.15
Red Cob, Tenn.	1.01	15	1.04	8	....	....	1.15	13	1.07
Reid's Yellow Dent	....	....	....	....	1.05	7	1.68	5	1.37
Riley's Favorite	....	....	....	....	.98	8	1.08	15	1.03
Sanders	1.45	3	....	....	1.61	1	1.74	3	1.60
Shaw	.96	20	1.12	7	....	....	1.27	10	1.12
Sheep Tooth, White	1.04	10	....	....	....	....	....	....	1.04
Silver Mine, Iowa	....	....	....	....	.85	9	.99	16	.92
St. Charles	1.12	9	....	....	....	....	....	....	1.12
Tennessee White	....	....	1.22	4	....	....	....	....	1.22
Tennessee Yellow	....	....	1.16	6	....	....	....	....	1.16

Dividing the varieties tested according to number of ears and nubbins per plant, we have the following classification:

Prolific varieties.

Sanders	Albemarle
Blount	Marlboro
Mosby	Cocke

Medium prolific varieties.

Hickory King	Creole
Jones' Pearl	Reid's Yellow Dent
McMackin's Gourd Seed	Experiment Sta. Yellow
Tennessee Yellow	Henry Grady
Poor Man	Tennessee White
Bradbury	

Non-prolific varieties.

Golden Beauty	Shaw
Riley's Favorite	St. Charles
Cary Klondike	Boone County White
Farmers' Pride	Local White Cob
Champion White Pearl	Tennessee Red Cob
Arnold	No. 77, U. S. Dept. Agr.
Silver Mine, Iowa	Early Mastodon
Evans	Sheep Tooth White
Leaming Yellow	Giant Broad Grain

The above classification has been made as a means of securing an answer to the question, "What type of corn has been most productive in recent tests at the Alabama Experiment Station?" An examination of the yields gives the following table of averages:

Average yields of types of corn in bushels per acre.

	Prolific.	Medium.	Non-prolific.
	Bus.	*Bus.*	*Bus.*
1900—Average yield	37.4	27.8	31.6
1901—Average yield	29.5	24.7	29.9
1904—Average yield	34.2	26.6	20.2
1905—Average yield	34.0	31.6	26.5
4 years, average of averages..	33.8	27.7	27.0

In three out of four years the prolific varieties gave decidedly the highest average yield. It must be stated, however, that the averages for the medium and non-prolific varieties are low largely because these lists embrace so many early non-productive northern varieties.

In the following table all early or otherwise unproductive varieties have been eliminated and a comparison made between the average yields of the best prolific, the best medium and the best non-prolific varieties.

Average yields of best varieties of three types.

Year	Prolific Vars.		Medium Vars.		Non-Prolific Vars	
	Bus.		Bus.		Bus.	
1900	39.	Mosby Cocke	37.	Bradbury Expt. St. Yel.	35.9	Shaw Red Cob Arnold
1901	33.5	Mosby Cocke	28.6	Expt. St. Yel. Tenn. White Tenn. Yel.	29.9	Shaw Red Cob Arnold
1904	34.2	Mosby Cocke Sanders	29.6	Expt. St. Yel. Henry Grady McMackin		
1905	36.9	Mosby Cocke Sanders Albemarle Marlboro	34.5	Expt. St. Yel. Henry Grady McMackin	31.6	Local Wh. Cob Red Cob
Av.	35.9		32.4		32.4	

The above figures show that the best prolific varieties each year averaged higher than the best varieties bearing a smaller number of ears.

SIZE OF EAR IN DIFFERENT VARIETIES.

Number of ears and nubbins required to shell 56 pounds of grain.

Variety	1900		1901		1904		1905		Average
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	
Albemarle	....	....	....	....	....	....	168	....	168
Arnold	78	1	115	1	....	....	....	....	97
Blount	151	22	161	7	....	....	....	....	156
Boone County White	....	....	....	....	141	5	....	....	141
Bradbury	122	11	....	....	....	....	....	....	122
Cary Klondike	99	4	....	....	....	....	....	....	99
Champion White Pearl	139	18	....	....	....	....	....	....	139
Cocke	133	14	209	10	167	10	154	12	166
Creole	172	23	....	....	....	....	....	....	172
Early Mastodon	109	6	....	....	....	....	....	....	109
Evans	114	8	....	....	....	....	....	....	111
Experiment Sta. Yellow	120	10	161	7	....	....	130	7	137
Farmers' Pride	99	4	....	....	....	....	....	....	99
Giant Broad Grain	113	9	....	....	....	....	....	....	113
Golden Beauty	123	12	....	....	....	....	....	....	123
Henry Grady	....	....	....	....	126	1	101	2	114
Hickory King	149	21	184	9	....	....	148	11	160
Jones' Pearl	....	....	220	11	....	....	....	....	220
Leaming	147	20	....	....	135	3	....	....	141
Local White Cob	....	....	....	....	....	....	90	1	90
Marlboro	....	....	....	....	....	....	161	14	161
McMackin's Gourd Seed	....	....	....	....	134	2	106	4	120
Mosby	143	19	156	6	151	7	137	10	147
No. 77 U. S. Dept. Agri.	....	....	....	....	159	8	117	6	138
Poor Man	126	13	....	....	....	....	....	....	126
Red Cob, Tenn.	93	3	137	4	....	....	102	3	111
Reid's Yellow Dent	....	....	....	....	165	9	172	15	169
Riley's Favorite	....	....	....	....	171	11	157	13	164
Sanders	136	17	....	....	145	6	135	9	140
Shaw	97	2	121	2	....	....	108	5	109
Sheep Tooth, White	135	15	....	....	....	....	....	....	135
Silver Mine, Iowa	....	....	....	....	136	4	131	8	134
St. Charles	109	6	....	....	....	....	....	....	109
Tennessee White	....	....	136	3	....	....	....	....	136
Tennessee Yellow	....	....	149	5	....	....	....	....	149

By means of this table we are able to make three groups of varieties according to the average size of ears and nubbins, that is according to the number of ears and nubbins required to shell one bushel of 56 pounds of grain.

A much better showing would, of course, be made for each variety if we should give a table showing the number of well grown ears required to shell a bushel. The figures in the above table are not intended to show the average weight of typical, well grown ears, but to indicate how many ears and nubbins a farmer must handle to obtain one bushel of grain. This, of course, varies widely with the season, as well as with the variety.

Large-eared varieties.

Arnold	Local White Cob
Cary Klondike	McMackin's Gourd Seed
Early Mastodon	Red Cob
Evans	Renfro
Farmers' Pride	Shaw
Giant Broad Grain	St. Charles
Henry Grady	Strawberry
Higgins	

Medium-eared varieties.

Bradberry	Poor Man's
Experiment Station Yellow	Sheep Tooth White
Golden Beauty	Silver Mine
Jones Pearl Prolific	Tennessee White
No. 77 U. S. Dept. Agr.	Welborn's Conscience

Small-eared varieties.

Champion White Pearl	Hickory King
Sanders	Marlboro
Leaming	Riley's Favorite
Boone County White	Cocke's Prolific
Mosby	Albemarle
Tennessee Yellow	Reid's Yellow Dent
Blount	Creole

EARLY AND LATE VARIETIES.

Grouping the varieties according to earliness when grown in the South, we have the following groups:

Early varieties.

Blount	Leaming
Boone County White	No. 77 U. S. Dept. Agr.
Champion White Pearl	Reid's Yellow Dent
Early Mastodon	Riley's Favorite
Golden Beauty	Silver Mine
Golden Dent	Snowflake
Hickory King	Saint Charles

Late varieties.

Albemarle	Marlboro
Arnold	McMackin's Gourd Seed
Bradbury	Mexican June
Cade's Prolific	Mosby
Cocke's Prolific	Poor Man's
Creole	Red Cob
Experiment Sta. Yellow	Renfro
Evans	Sanders
Farmers Pride	Shaw
Henry Grady	Strawberry
Higgins	Tennessee White
Jones Pearl Prolific	Tennessee Yellow
Local White Cob	Welborn's Conscience

Of course still further sub-division of each class is possible. For example, we might place St. Charles in a medium early group, and probably include Blount in the same. Subdividing the second group, we should have as medium to late, Albemarle, Marlboro, Evans; and as very late, Creole, Poor Man's and Mexican June.

The yields of the late and medium late varieties are very much greater than the yields of the early varieties.

The large-eared group consists of late varieties, except Early Mastodon and St. Charles.

The medium-eared group includes both early and late varieties, the late prodominating.

The small-eared group is made up chiefly of the early northern varieties and the prolific or many-eared kinds; it thus includes both the most unproductive and the most productive varieties.

SEED CORN FROM DIFFERENT LATITUDES.

This series of experiments has been under way for nine years under the present management. The plots for this experiment have always been located on upland soil, naturally poor, on the Station farm at Auburn.

The northern or western seed corn used in all of these eight years has come from the same grower, J. C. Suffern, Voorhees Post Office, in the central part of Illinois, in latitude 39 degrees and 50 minutes, or about one degree north of St. Louis. This northen seed corn has been compared with, (1) seed corn of the same varieties grown in Georgia and Alabama and, (2) with seed corn from Virginia, Delaware and Knoxville, Tennessee.

Tests of this character are beset with difficulties and results are not easy to interpret, for the reason that other factors besides climate enter into the problem. The soil in which each strain has recently grown, the carefulness of different growers in maintaining the purity and excellence of their strains of corn, and other factors complicate the results. Nevertheless, the average of a number of experiments extending over nine years and made with four different varieties should afford reliable indications.

For detailed tabulated results the reader is referred to the Appendix to this bulletin.

In sixteen separate tests, in which seed from Alabama or Georgia was compared with the same variety from Illinois, the yields were in eight cases in favor of seed corn from

Alabama and Georgia and in eight cases in favor of seed corn from Illinois. The average difference in yield was only thirty five one-hundredths of a bushel per acre, in favor of northern seed. Thus the seed from the two sources proved to be of practically equal value so far as regards the average of results with Hickory King, Blount and St. Charles. These varieties may be ranked as early or medium early varieties as compared with southern varieties. Our variety tests show that they are relatively unproductive here, like all other early varieties of corn. It seems that while northern seed corn has afforded as large yields as southern in the case of early varieties, it is advisable for the southern farmer to give the preference to southern seed corn, for the reason that he cannot, in the North, obtain seed of the varieties that are most productive in the South, the season there being too short for our best southern varieties.

Comparing seed corn from Illinois and Delaware we find that each led in one test, the difference in their average yields being very slight.

In each of three tests seed grown in Virginia proved decidedly more productive than seed of the same varieties, (Hickory King and Blount), grown in Illinois. The average difference in favor of Virginia seed was 8.5 bushels per acre.

In three out of four tests, using the varieties Hickory King, Blount and Cocke the yields decidedly favored the Virginia seed, as compared with seed from Alabama and Georgia, the average difference for the four tests being 4.9 bushels per acre in favor of the seed corn from Virginia.

Using the same three varieties just mentioned and comparing seed grown at Knoxville, Tennessee, with seed from Alabama and Georgia, we find that in each of four tests the advantage was with the Tennessee seed, the average difference being 2.3 bushels per acre.

Thus on the whole there was some advantage in using seed from Virginia and from the more elevated region of Tennes-

see, as compared with seed of Cocke, Hickory King and Blount grown in Georgia and Alabama.

Are these differences due to climate, or are they due to more careful selection and greater purity of the seed from certain regions? A positive answer cannot be given. The writer's own opinion is that the difference is chiefly due to selection. If this be the correct view, it follows that the only thing needed to make Alabama seed corn the equal or superior to that from any other part of the country is to improve it by careful selection. Methods of thus improving corn will be dealt with in a later publication from this Station.

In view of results here recorded and of observations made elsewhere, the writer's conclusions relative to the source from which we, of the Gulf States, may advantageously draw our seed corn may be stated as follows:

Varieties of corn from north of the Ohio river usually give smaller yields in Alabama than corn grown further south.

Seed corn from the northern corn belt is sometimes useful in the Gulf States as a means of securing a field of early maturing corn, especially when the local corn crop of the preceding year has been poor. On such early ripening patches we need not expect as large yields as are obtained from corn maturing at the usual time.

Corn from the northern corn belt has often given, in Alabama, a very poor quality of grain, which has often been too poor for marketing or for making meal.

For planting in Alabama, seed corn of late and prolific varieties may safely be obtained from any locality south of the Ohio and Potomac rivers, and perhaps slightly above this line.

Seed corn from about the same latitude as that in which it is to be grown appears to be as good as that from further north, provided it is as well selected and maintained as pure as the imported strain. Local seed corn, when pure

and well improved, has the advantage of permitting the grower to select it in the ear, the condition in which it is desirable that all seed corn, whether local or from a distance, should be received by the farmer.

Corn brought south from higher latitudes becomes later and later each year for several years after its introduction, the plant grows taller, and generally the proportion of trashy, weevil-eaten or otherwise unmarketable grain becomes less than during the first year of growth in the South.

TOP VERSUS BOTTOM EARS.

To ascertain whether there is any difference for seed purposes between the lower and the upper ear on plants bearing two ears, tests were made in 1903 and in 1905.

The results in 1903 with St. Charles White corn were as follows, in bushels per acre:

From upper ear.....25.0 bushels per acre.
From lower ear.....22.8 bushels per acre.

In 1905 five pairs of plots were used, planting seed corn from five different plants of the variety Experiment Station Yellow. Plots 1 and 2 were planted with upper and lower ears respectively from the same plant, plot 3 with corn from the same plant as plot 4, and so on for each pair of plots.

Yields in 1905 *from planting upper and lower ears from the same plant.*

Plot No.	Seed corn from.	Yield per acre from Top ears Bus.	Bottom ears. Bus
1.	Top ear	26.3	——
2.	Bottom ear	——	27.7
3.	Top ear	30.0	——
4.	Bottom ear	——	29.4
5.	Top ear	32.9	——
6.	Bottom ear	——	33.1
7.	Top ear	28.5	——
8.	Bottom ear	——	29.4
9.	Top ear	27.1	——
10.	Bottom ear	——	28.6
Average 5 plots top ears		28.9	——
Average 5 plots bottom ears		——	29.6
Increase from bottom ears over top ears			.7

Viewing the six tests made in the two years we note that the yield was greater with seed from bottom ears in four cases and with seed from the upper ears in two cases. In 1905 the average number of ears and nubbins combined and their average size or weight were almost identical from planting upper and lower ears. This evidence is not sufficient to justify the conclusion that the bottom ear is better than a well developed upper ear, or the reverse.

SUBSOILING.

A tract of level rather poor upland has, for ten years, been devoted to continuous experiments in subsoiling, using different crops each year. The surface soil is made up of flinty stones and of rather stiff reddish loam. The subsoil is a very compact yellowish sandy clay, which in winter is usually too wet for the subsoil plow to do effective work. A regular subsoil plow drawn by two mules is run in the furrow made by a one-horse turn plow, giving a total depth of from 10 to 12 inches of loosened soil. Subsoiling is not done every year, but every second or third year. The following table shows that when the land for corn was subsoiled only about six weeks before corn was planted, the yield was slightly less on the subsoiled plots than on those not subsoiled. When subsoiling was done two years before planting, this operation resulted in a slight increase in yield.

Immediate and third year effects of subsoiling.

Crop grown in	When subsoiled	Yield per acre		Loss from subsoiling	Gain from subsoiling
		Not subsoiled	Subsoiled		
		Bus.	*Bus.*	*Bus.*	*Bus.*
1901	Never subsoiled	13.1	.....	.....	.....
1901	Subsoiled Feb. 1901	.....	11.2	1.9	.....
1903	Never subsoiled	13.8	.....	.....	.....
1903	Subsoiled Feb. 1901	.....	14.5	.....	.7
Average loss from subsoiling		.....	.....	.6	.....

Subsoiling should not be condemned simply on this showing. The figures, together with slightly better results on the same land with some other crops, should emphasize the fact that subsoiling done within two months of the time of planting may have an injurious effect. It is believed that land of this character would be helped by using the subsoil plow during long dry periods in the fall when the subsoil is dry enough to crumble.

DEPTH OF EARLY CULTIVATION.

In 1900 on rather stiff reddish soil, with flinty stones, there was no injury from making the first cultivation deep with two scooter furrows per row, all subsequent cultivations being shallow.

In 1901 on gray sandy upland the yield was 23.6 bushels on the three plots cultivated shallow and 23.4 bushels on those given an early deep cultivation with two scooter furrows per row, the subsequent cultivation being shallow. Thus in both experiments there was no marked advantage in favor of making the first cultivation deep. However, it should be noted that in both tests the first cultivation or "running around" was given when the plants were only a few inches high. If cultivation had been delayed as late as sometimes occurs, the injury from early deep cultivation would doubtless have been appreciable. When land is in good condition there seems to be no need for deep early cultivation. Possibly when clay land has been plowed early and has become badly compacted there may be some justification of "running around" the young plants with a scooter. But in general the danger of injury to roots, of excessive drying of the soil if dry weather follows, and the slowness of this process, are against this primitive method of cultivation.

PLANTING CORN IN WATER FURROW VERSUS ON A LEVEL.

On light sandy lands farmers frequently plant corn below the general level, or in the water furrow. This method was

compared with planting on the level flushed field, both in 1900 and in 1901.

In preparing to plant corn in the water furrow the land was thrown into beds with a one-horse turn plow, leaving unbroken until planting time a narrow balk where the corn was to be planted. When ready to plant, this balk was thrown out with a shovel plow and seed and fertilizer placed in this freshly-stirred soil. Likewise seed and complete commercial fertilizer were applied on the same day in the furrow on the plot that was planted on the level. In both cases the fertilizer was mixed with the soil before the seed were put into the ground.

The yields in bushels per acre were as follows:

	1900	1901
Planted on the level	22.2	16.5
Planted in water furrow	19.0	16.5

In 1900, in which April and June were wet months, there was a loss even on this porous soil, from planting in the water furrow. In 1901 when there was abundant rain from time of planting until June 15, but a drought from the middle of June to the middle of July, the yields by the two methods were identical.

METHODS OF HARVESTING CORN.

The ordinary method of harvesting corn in the Gulf States consists in stripping the blades while they are still green, a practice that is expensive in labor and in the decreased yield of grain that frequently results. In recent years in many southern localities a number of farmers have cut and shocked the plants when the shucks have colored, afterwards passing the plants through a shredder to remove and shuck the ears, and better to prepare the stalk for food and bedding. Rarely the tops are cut, bound into bundles, and cured.

An experiment covering this point was made in 1904, to secure data additional to that obtained in our earlier ex-

periments in 1896, 1897 and 1900. The yields in 1904 were as follows:

Yield per acre of corn and forage from different methods of harvesting in 1904.

Method of harvesting	Corn per acre.	Forage per acre.
Only ears harvested	25.7 bus.	00 lbs.
Tops cut and ears harvested	26.1 bus.	360 lbs.
Entire stalk cut and ears afterwards harvested	25.4 bus.	1980 lbs.
Blades stripped and ears harvested	25.5 bus.	415 lbs.

In 1904 there were practically no differences in yield attributable to the method of harvesting.

The table below summarizes the yield of corn in four experiments made at Auburn, the results of the earlier years having been published in Bulletins Nos. 88 and 111 of this station.

Yield per acre of corn from different methods of harvesting.

Methods of harvesting	Corn per acre					
	1896	1897	1900	1904	Average 4 years	Average loss
	Bus.	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Bus.*
Only ears harvested	34.4	31.0	46.9	25.7	34.5	.....
Tops cut and ears harvested	30.2	29.2	44.3	26.1	32.5	2.0
Entire plant cut and shocked	29.2	29.5	44.3	25.4	32.1	2.4
Blades stripped and ears harv't'd	.....	.....	45.9	25.5	.....	.....

This table shows that the average loss of grain per acre where the tops only were saved for forage was 2 bushels, or where the plant was cut and shocked, 2.4 bushels per acre. Both losses were greater than in most of the experiments at other stations. As to the effects of pulling fodder, we have data for only two years. The average of all experiments at all stations show that generally stripping the blades reduces the yield by several bushels per acre, but that under some conditions (probably when the stripping is late) no material reduction in yield occurs.

The following table shows the amount of forage derived from "fodder pulling," from topping, and from shocking.

Yields of cured corn tops, stover and blades.

	Average yield of grain	Yield of forage per acre					
		1896	1897	1900	1904	Avg.	
	Bus.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	
Only ears harvested	34.5	.....	.....	.....	.....	.....	.....
Tops cut and ears harvested	32.5	312	509	711	360	473	Tops
Entire stalk cut and ears afterwards harvested	32.1	2103	1355	1759	1980	1799	Stover
Blades stripped and ears harvested ..	.....	.....	.....	615	415	515	Blades

It should be noted that the average amount of cured blades per acre was 515, of cured tops 473 and of cured stover (leaves and stalks) 1799 pounds. It is evident that we can expect less than a ton of stover per acre on southern uplands when the yield is thirty-five bushels or less per acre.

When only the ears are harvested, partial utilization may be made of the weather-worn blades, and of leaf sheaths and tips of stalks, by pulling the ears early and turning cattle into the field. Where labor is scarce, other winter forage abundant, and a shredder not at hand, this may prove to be the most practicable method.

Considering the cost and usual injurious effects of fodder pulling, this method of obtaining forage must be condemned.

This Station is accumulating data relative to the feeding value of shredded corn stover, which may throw further light on the advisability of shocking and shredding corn, the method that is usually regarded as the best.

Assuming—in the absence of a sufficient number of exact experiments in feeding tops and stalks,—that tops are worth 40 cents, stover 30 cents per 100, and corn blades 60 cents, we find that one acre gives a value of $1.80 in corn

tops; or of $3.09 in corn blades or "fodder," and of $5.40 in stover.

Cutting and shocking can be done before cotton picking begins, a merit that will be generally recognized. Moreover, the cutting of the stalks leaves the land in better condition for plowing, and enables the farmer to begin the plowing for small grain at an earlier date than is practicable when the ears are allowed to cure slowly on the living plants. The removal of the stalks is somewhat more exhaustive to the land than is burying them with the plow, but this on most soils is probably counterbalanced by the greater convenience of preparing and cultivating land that is free from stalks.

LEGUMINOUS PLANTS AS FERTILIZERS FOR CORN.

Velvet bean stubble vs. vines as fertilizer for corn in 1901.

In 1900 velvet beans were planted after oats in 4 feet rows on certain plots of light sandy upland adjacent to the land on which for a long period our fertilizer experiments with cotton and corn were conducted. On certain other plots corn was grown in 1900.The velvet bean vines were cut for hay on a part of the area, yielding 3332 pounds of hay per acre.

In 1901 corn was grown on all plots, using on all acid phosphate at the rate of 100 pounds per acre. The object was to note the comparative value as fertilizer of (1) the entire velvet bean plants plowed under late in winter, (2) the stubble of velvet beans, plowed in at the same time, and (3) as a check, corn stalks of the preceding corn crop.

	Yield per acre *Bus.*	Increase per acre *Bus.*
Corn following corn	13.6	....
Corn following velvet bean stubble	17.9	4.3
Corn following velvet beans, entire growth plowed in	25.9	12.3

The increase attributable to the plowing in of the entire growth of velvet beans, grown as a catch crop after oats,

was 12.3 bushels per acre, this increase being worth, at 70 cents per bushel, $8.61 per acre. Doubtless there was also a considerable residue of humus and nitrogen left in the soil to increase the crop of 1902.

The cost of growing the velvet beans consisted chiefly of expenditures for 200 pounds of acid phosphate per acre, for the seed, and for a small amount of cultivation. By using the entire crop of velvet beans as fertilizer the yield of the first crop of corn was nearly doubled.

The plot on which only the stubble of velvet beans was used for hay afforded an increase of 4.3 bushels per acre, and lacked 8 bushels of giving as large a crop as the plot on which the entire growth was plowed under. Hence in deciding which was the more profitable use of the velvet bean vines we have on one side 8 bushels of corn and the saving of labor from not harvesting the hay and on the other hand the value of more than one and a half tons of hay.

As recorded in Bulletin 111 of this Station, (the issue of which is now exhausted), in 1900 on a similar and adjacent soil, the increase in yield of corn after plowing in the entire vines of velvet beans of 1899, as compared with plowing in only the velvet bean stubble, was 11.9 bushels per acre. That year the yield of velvet bean hay was 2800 pounds.

On the same plots in 1901 on all of which corn was the preceding crop, the residual fertilizing effect of the 1899 crop of velvet beans was 4.4 bushels greater where the entire growth of vines had been plowed under than where only the stubble had been plowed under. Here we have in two years a total superiority of vines over stubble of 16.3 bushels of corn per acre, which may be weighed against 2800 pounds of velvet bean hay, less the cost of harvesting the hay.

Cowpea stubble versus cowpea vines as fertilizer for corn.

On a poor reddish loam upland soil cowpeas were sown in drills June 13, 1900, following oats, and fertilized with 150 pounds of acid phosphate per acre.

A part of the cowpea area was cut, yielding 1648 pounds of hay per acre. On another part of the area the peas were neither cut nor picked, but the entire growth turned under.

In 1901 corn was grown on both areas, and was fertilized with 100 pounds of high grade acid phosphate per acre. The yields of corn in bushels per acre were as follows:

After drilled cowpea stubble.....11.4 bushels
After drilled cowpeas, all plowed in.....20.3 bushels
Excess from entire growth of cowpeas as compared with cowpea stubble..... 8.9 bushels

Beggar weed as a fertilizer for corn.

On June 24, 1899, beggar weed seed were sown on certain plots on a poor hilltop, where the soil is a light gray sandy loam. The growth that year was only medium and the stand poor, but some of the plants matured and shed seed.

The entire growth of beggar weed was plowed under during the winter, as was also the stubble of drilled velvet beans on adjacent plots, and all plots planted in corn in 1900 and again in 1901. After cultivation of the corn ceased in 1900 beggar weeds sprang up , reseeded the land, and this volunteer crop was plowed under as a fertilizer for the corn crop of 1901.

As compared with the plot where velvet bean stubble was left in 1899, the increase on the plots where beggar weeds were plowed in immediately preceding each corn crop was 3.1 bushels in 1890 and 7.6 bushels in 1901, an average annual increase of 5.4 bushels per acre. Doubtless this increase, especially in 1900, would have been considerably greater could the comparison have been made with some plot on which no legume had recently been grown.

Acid phosphate as a fertilizer for corn grown after velvet beans.

In 1901 acid phosphate containing 14 per cent. available phosphoric acid was applied to corn on poor gray sandy up-

land. No other fertilizer was used, but on both plots the entire growth of velvet bean vines had been plowed under late in the winter. The yield without any phosphate was 21.5 bushels per acre; with 100 pounds of phosphate 25.9 bushels. This difference of 4.4 bushels of corn per acre represents the effect of 100 pounds of high grade acid phosphate when applied in the presence of abundance of vegetable matter.

Likewise in 1905 a test was made to determine whether, after plowing under a luxuriant growth of velvet bean vines, it would pay to apply commercial fertilizers in addition.

On level sandy land in good condition a very heavy growth of velvet bean vines was plowed under with a disc plow February 27, 1905. On the adjacent plots on either side there was plowed under at the same time and in the same way the stubble of drilled sorghum which had been cut for hay. Two of the velvet bean plots received no other fertilizer than the vines and two of them, besides the vines of velvet beans, were also fertilized with 40 pounds of muriate of potash and 240 pounds of acid phosphate per acre.

Average results for two plots in each test are given below:

Yield of corn per acre fertilized with velvet bean vines alone.....21.3 *bushels.*

Fertilized with velvet bean vines, potash and phosphate .....27.3 *bushels.*

Increase from potash and phosphate.....6.0 *bushels.*

In this experiment it was profitable to employ as fertilizer for corn, muriate of potash and phosphate, in addition to a mass of velvet bean vines. The gain from this mineral fertilizer, when used in the presence of an abundance of vegetable matter, was 6 bushels per acre.

A crop of velvet bean vines turned under gave practically the same yield of corn as did a very heavy application of the best grade of barnyard manure, applied on adjoining plots, at the estimated rate of about ten tons per acre.

FRACTIONAL APPLICATIONS OF FERTILIZER.

It is a favorite plan of some farmers to apply only a part of the fertilizer to cotton or corn before planting, and to apply the remainder after growth has well begun.

After the publication of Bulletin No. 111, in which it was shown that corn had not responded very freely to large applications of commercial fertilizers, the writer received several letters suggesting that the results with fertilizers would have been much better if a part of the fertilizer had been withheld until the plants were one or two feet high.

To test this matter again eight plots were employed in 1905, located on fairly good upland, where the soil is a reddish loam, containing many flint stones.

The fertilizer applied before planting was drilled in the planting furrows and mixed with the soil March 7, and planting was done March 29. The portion of fertilizer withheld was applied on certain plots May 15, in the siding furrows of the second cultivation.

Fractional application of fertilizer for corn in 1905.

Plot number.	FERTLIZER			Yield per acre	Increase over unfertilizer plots
	Amount per acre	Kind	Time applied		
	Lbs			*Bus.*	*Bus.*
1	200 200 40	Cotton seed meal .... Acid phosphate ..... Muriate of potash	All at planting	25.1	.....
2	200 200 40	Cotton seed meal .... Acid phosphate ..... Muriate of potash	½ of fert. at planting .... ½ of fert. at 2nd cult.	24.0	.....
3	00	No fertilizer	....	19.4	.....
4	200 200 40	Cotton seed meal .... Acid phosphate ..... Muriate of potash	All at planting	20.9	.....
5	200 200 40	Cotton seed meal .... Acid phosphate ..... Muriate of potash	½ of fert. at planting .... ½ of fert. at 2nd cult.	22.6	.....
6	00	No fertilizer	....	20.6	.....
7	200 200 40	Cotton seed meal .... Acid phosphate ..... Muriate of potash	½ of fert. at planting .... ½ of fert. at 2nd cult.	24.0	.....
8	200 200 40	Cotton seed meal .... Acid phosphate ..... Muriate of potash	All at planting	25.4	.....
Av. 3,6	00	No fertilizer	....	19.7	.....
Av. 1,4,8	200 200 40	Cotton seed meal .... Acid phosphate ..... Muriate of potash	... . All at planting	23.8	..... 4.1
Av. 2,5,7	200 200 40	Cotton seed meal .... Acid phosphate ..... Muriate of potash	½ of fert. at planting .... ½ of fert. at 2nd cult.	23.5	3.8

Wherever fertilizer was employed a complete fertilizer, at the rate of 240 pounds per acre, was used. The average results show a difference of three-tenths of one bushel per acre in favor of applying the entire amount before planting.

In favor of this method is also the greater convenience and saving of labor.

The corn receiving the entire amount of fertilizer before planting made a much better start than did the other plots, but the difference nearly disappeared late in the season.

The increase due to 240 pounds of a complete fertilizer was only 4.1 bushels when all was applied before planting, and only 3.8 bushels when applied in two doses.

COTTON SEED VERSUS COTTON SEED MEAL AS FERTERLIZER.

In 1901, 200 pounds of cotton seed meal was compared with 434 pounds of cotton seed, these amounts containing equal quantities of nitrogen. The cotton seed was scalded to prevent germination and all fertilizers were applied in the drill April 8. Acid phosphate at the rate of 160 pounds per acre was used on all plots.

Increase from 200 pounds cotton seed meal.....2.8 bushels
Increase from 434 pounds cotton seed.....2.3 bushels

This shows a slight superiority the first year for cotton seed meal.

An experiment made in 1897 on similar soil, comparing 200 pounds of cotton seed meal with 434 pounds of cotton seed, all applied when corn was planted, April 7, also resulted in a slight advantage for cotton seed meal.

In 1904 and again in 1905 on the same plots a comparison was made between the following nitrogenous fertilizers:

Cotton seed meal, 200 pounds per acre; cotton seed, 434 pounds; manure (unleached) from feeding steers on cotton seed meal and sorghum hay, 4800 pounds; 100 pounds of nitrate of soda; and a mixture of nitrate of soda and cotton seed meal. To prevent germination the cotton seed were scalded in 1904 and ground in 1905.

Cotton seed meal versus cotton seed, nitrate of soda and stable manure.

Fertilizers per acre.		Yield per acre.			Increase per acre from nitrogenous fertilizers.		
Am't. per acre.	KIND	1904	1905	Av.	1904	1905	Av.
Lbs.		*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Bu.*
200	Cotton seed meal						
240	Acid phosphate	22.9	18.9	20.9	1.8	2.2	2.0
48	Muriate of potash						
434	Cotton seed						
240	Acid phosphate	21.0	17.8	19.1	.8	.7	.8
48	Muriate of potash						
240	Acid phosphate						
48	Muriate of potash	20.2	17.1	18.7	.....	.....	....
100	Nitrate of soda, 2nd cult.						
240	Acid phosphate	27.3	21.1	24.2	7.1	4.0	5.6
48	Muriate of potash						
100	Cotton seed meal						
50	Nitrate of soda						
48	Muriate of potash	25.2	21.2	23.2	5.0	4.1	4.6
240	Acid phosphate						
33	Nitrate of soda (at plantg						
67	Nitrate of soda, 2nd cult						
240	Acid phosphate	29.3	24.4	26.8	9.1	7.3	8.2
48	Muriate of potash						
4800	Manure from steers fed cotton seed meal and hulls or sorghum fodder	24.2	22.3	23.5	4.0	5.2	4.6

This soil did not respond very generously to any of the fertilizers in either year, although it had been rather exhaustively cropped with silage corn, wheat and sorghum, and had borne no leguminous plant for at least two years before the beginning of this experiment.

It is obvious that cotton seed meal was more effective than cotton seed; that a mixture of cotton seed meal and

nitrate of soda was still more useful; and that nitrate of soda was more beneficial than any other fertilizer. One pound of nitrate of soda afforded a greater average increase than 48 pounds of manure made under shelter by feeding steers on cotton seed meal and coarse sorghum fodder. Unexpectedly there seems to have been but little cumulative or second-year effect from either cotton seed or manure. This experiment is being continued on the same plots, using wheat as the crop, and we may reasonably expect that as this experiment is continued we shall obtain some cumulative effect from the manure.

There was an advantage both years in applying one-third of the nitrate of soda with the other fertilizers before planting, instead of reserving all this for use at the second cultivation. Nitrate of soda is believed to be the only fertilizer which can be applied to corn with as much advantage after growth begins as before planting.

A number of fertilizer experiments have been made with corn. But these will not be published until some of these tests have been further repeated. In general they point to the conclusion that corn, growing on average upland soil in Alabama, usually requires a fertilizer rich in nitrogen, and that the application of very large amounts of commercial fertilizers for corn is not very profitable.

The following fertilizer formulas for corn are suggested:

(A) 100 lbs. acid phosphate,
50 lbs. nitrate of soda, (both just before planting).
50 lbs. nitrate of soda, at second cultivation.

(B) 100 lbs. acid phosphate
200 lbs. cotton seed meal, (both before planting).

Credit is due to the following for participation in the experiments detailed in this bulletin: T. U. Culver, formerly superintendent of the farm; C. M. Floyd, superintendent of the farm during 1904 and 1905; and L. N. Duncan, assistant in agriculture, who has prepared most of the tables in this bulletin.

APPENDIX

Seed corn from different latitudes.

Year	Variety	Seed from	Yield per acre: Seed from Ill.	Yield per acre: Seed from Gulf Region	Yield per acre: Seed from Del & Va.	Increase per acre from: Gulf Region over Ill. seed	Increase per acre from: Va. & Del. over Ill. seed	Increase per acre from: Gulf over Va., Del & Tenn seed.
						Bus.	*Bus.*	*Bus.*
1896	Hickory King	Alabama		16.5		—2.8		
do	do	Illinois	19.3					
do	do	Delaware			15.6		—3.7	
1896	Blount Prolif	Ga. (South)		13.1		—1,1		
	do	Illinois	14.2					
1897	Hickory King	Alabama		12.1		—2.2		
do	do	Illinois	14.3					
897	Blount Prolif	Ga. (South)		18.9		— .2		
do	do	Illinois	19 1					
1898	Hickory King	Ga. (North)		11.4		1.0		
do	do	Illinois.	10.4					
1898	Blount Prolif.	Ga. (North)		11.0		.5		
do	do	Illinois	10.5					
1899	Blount Prolifi.	Georgia		17.1		1,9		
do	do	Illinois	15 2					
1899	St. Charles	Alabama		15.3		—.8		
do	do	Illinois	16.1					
1900	St. Charles	Ala.(1 year)		34.2		1.1		
do	do	Illinois	33.1					
1900	Blount Prolif.	Ga. (South)		32.2		1.9		
do	do	Illinois	34.1					
do	do	Virginia			36 8		2.7	—4.6
1900	Cocke Prolif.	Ga. (South; J.)		32 6				
do	do	Ga. (South; A.)		38.4	Av.36.5			
do	do	Ga. (North)		38.6				
do	do	Virginia			41.7			—5.2
1900	King Hickory	Virginia			29.8			
do	do	Delaware			30 4			

Seed corn from different latitudes. (Continued).

Year	VARIETY	Seed from	Yield per acre			Increase per acre		
			Seed from Illinois	Seed from Gulf Region	Seed from Va., Del. and Tenn.	Gulf Region over Illinois seed	Gulf Region over Va., Del. and Tenn.	Va., Del, and Tenn. over Ill. seed
1901	Blount	Georgia	....	22.6	....	....	....	....
do.	Blount	Illinois	27.3	....	....	-4.7	....	....
1901	St. Charles White	Alabama	....	18.9	....	....	....	....
do.	St. Charles White	Illinois	24.6	....	....	-5.7	....	....
1903	Hickory King	Georgia	....	20.7	....	.6	....	....
do.	Hickory King	Tenn.	....	....	24.3	....	-3.6	4.2
do.	Hickory King	Illinois	20.1	....	....	....	....	....
1903	St. Charles White	Illinois	23.5	....	....	....	....	....
do.	St. Charles White	Alabama	....	23.9	....	.4	....	....
1904	St. Charles White	Illinois	20.5	....	....	....	....	....
do.	St. Charles White	Alabama	....	27.7	....	7.2	....	....
1904	Cocke	North Ga	....	31.2	....	....	.8	....
do.	Cocke	Virginia	....	....	30.4	....	....	....
do.	Cocke	Tenn.	....	....	33.4	....	2.2	....
1904	Hickory King	Virginia	....	....	31.7	....	-10.7	11.8
do.	Hickory King	Illinois	19.9	....	....	....	....	....
do.	Hickory King	Delaware	....	....	22.7	....	-1.7	2.8
do.	Hickory King	North Ga.	....	21.0	....	1.1	....	....
do.	Hickory King	Tenn.	....	....	22.0	....	-1.0	2.1
1904	Blount	Virginia	....	....	25.2	....	....	....
do.	Blount	Illinois	14.3	....	....	....	....	10.9
1905	Cocke	Alabama	....	28.6	....	....	....	....
do.	Cocke	Tenn.	....	....	30.9	....	-2.3	....

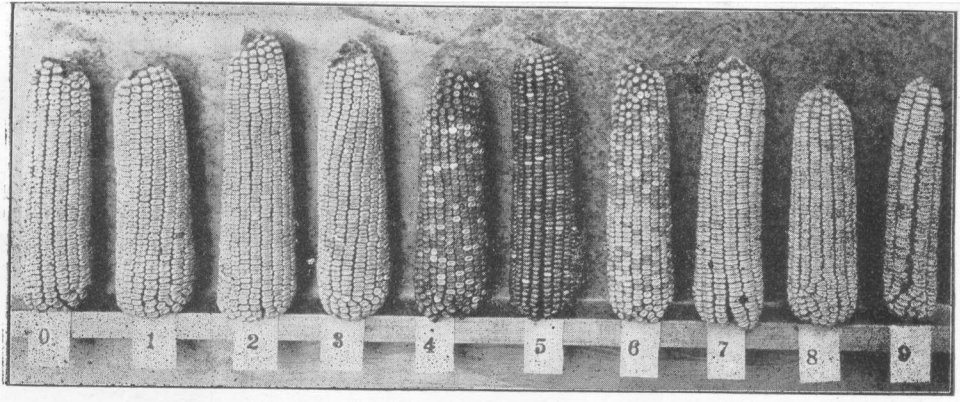

Fig. I. 0, 1 *and* 2, *Boone County White;* 3, *Boone County Special;* 4, *Leaming;* 5, *Experiment Station Yellow;* 6, *Reid Yellow Dent;* 7, *No. 77 U. S. Dept Agr.;* 8, *Iowa Silver Mine;* 9, *Hickory King.*

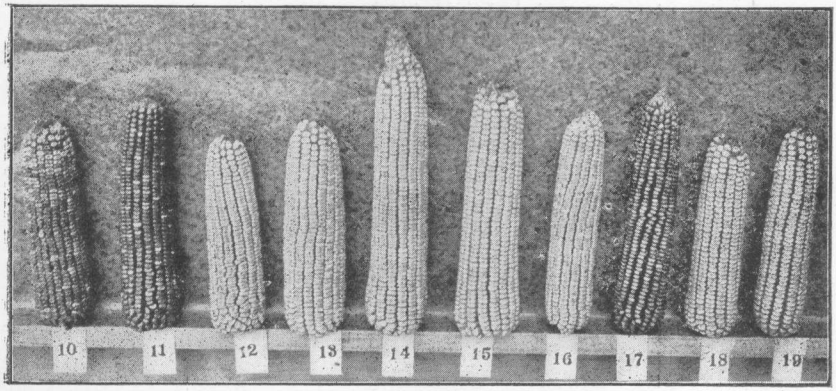

Fig. II. 10, *Riley Favorite;* 11, *Experiment Station Yellow;* 12, *Sanders;* 13, *McMakin's Gourd Seed;* 14, *Local White Cob;* 15, *Henry Grady;* 16, *Mosby;* 17, *Experimcnt Station Yellow;* 18, *Marlboro;* 19, *Cocke.*

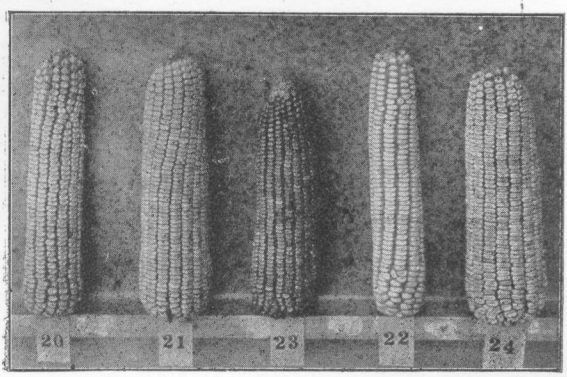

Fig. III. 20, *Cocke;* 21, *Shaw;* 22, *Albemarle;* 23, *Experiment Station Yel-*

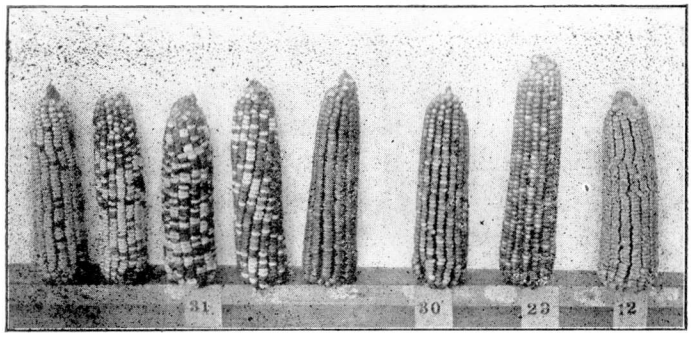

Fig. IV. 31, *Lead colored Mexican June and crosses;* 29 *and* 30, *Experiment Station Yellow, with cross on lead colored Mexican June;* 12, *Sanders, with few lead colored grains.*

Fig. V. White (or ordinary) Mexican June Corn.

Fig. VI. Rainfall chart in inches for growing season, Auburn, Ala., 1901-1905.