CORRELATION STUDIES WITH INBRED AND CROSSBRED

STRAINS OF MAIZE

by

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INTRODUCTION

Many of the experiment stations throughout the country are now conducting selection experiments within inbred lines of corn. The ultimate use of each of the inbred lines developed probably will be in making some sort of crossbred combination. The final test of every inbred line, therefore, is the ability of its crosses to produce large yields of sound corn.

Much labor and expense are involved in the artificial self-pollination of any very large number of inbred lines. Good lines could be produced more cheaply and much more progress could be made if it were possible to distinguish and discard in the earlier years of selfing those lines which are likely to give unproductive crosses. The studies herein reported were undertaken primarily in an effort to determine, if possible, the characters associated with productivity, with the hope that these characters might then be used as indexes for selection.

The problem has been developed along three main lines. Coefficients of correlation have been computed among a number of different characters (1) within inbred lines, (2) within F_1 crosses and (3) between the inbred parents and their crossbred progeny. The parent-progeny correlations are of the most value as guides for selection. They also bring out some interesting relations in regard to the prepotency of inbred lines of corn. Detailed data are given on a number of characters of the parent lines and of their F_1 crosses in order to bring out some of the relations between parent and progeny, such as uniformity of reaction of different parents in their crosses, prepotency, etc., which are not always shown clearly by coefficients of correlation.

REVIEW OF LITERATURE

Correlations between various characters within inbred lines of corn and between the characters of parental inbred lines and those of their F_1 crosses have been reported by several investigators. Relatively few data have been published, however, which deal directly with the prepotency of inbred lines of corn used as parents of different crosses. The data of this sort that have been published have been confined largely to yield.

Kiesselbach (5)[1] found a general relation between the productivity of inbred parents and that of their hybrid offspring. Exceptions to this general rule occurred, however.

Richey (8) found that the tendency of certain strains to produce high yielding crosses was very noticeable. For example the mean yield of the seven crosses involving one certain strain exceeded the yield of any single one of the remaining 34 crosses not involving it.

Richey and Mayer (10) have presented data which indicate that some inbred lines are much better than others in producing high yielding crossbred combinations.

Kyle and Stoneberg (6) found that inbred lines having

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[1] Reference is made by number (italic) to "Literature cited", page 137.

smaller numbers of kernel rows had a greater length of ear per plant, were more resistant to corn smut, had fewer plants with heritable, deleterious characters, and were more vigorous and productive in general than the lines having larger numbers of kernel rows.

Hayes (2) presented a number of coefficients of correlation to show the inheritance of various characters through different generations of inbreeding. A number of coefficients of correlation between yield of the inbred lines and various other characters also were given.

More recently Nilsson-Leissner (7), in experiments conducted in Minnesota, found that some inbred lines were distinctly superior to others as parents of crosses. He reported the yields of most of the possible combinations among 13 dent inbreds and among nine flint inbreds. Both among the dents and among the flints some inbred lines were shown to be, on the average, more satisfactory parents for making F_1 crosses than others. He reported the coefficients of correlation between certain characters in the selfed lines and the same characters in F_1 crosses. The correlations were positive in every case. Correlations between the yield of the F_1 cross and the mean yield of the two parental lines were 0.1852 ± 0.0580 in a group of 13 dent inbreds, and 0.7434 ± 0.0427 in a group of nine flint inbreds. Multiple correlations were calculated between yields of the F_1 crosses and five characters in the parental lines. For the dents the multiple correlation coefficient was 0.6687 and for the flints it was 0.8240.

Jorgenson and Brewbaker (4), in experiments also conducted in Minnesota, presented data on 10 inbred lines from the dent variety Silver King and the F_1 crosses between them. Both high and low yielders were found among the crosses from each inbred line. On the basis of the average yield of all of the F_1 crosses in which they have been used as parents, some inbred lines appear distinctly superior to others as parents of crosses. These investigators also give a number of correlations between various characters in the F_1 crosses and the mean value of the same characters in the two parental lines. Their coefficients of correlation, like those of Nilsson-Leissner, are all positive. They calculated a multiple correlation with yield of the F_1 cross as the dependent variable and the characters of length of ear, diameter of ear, number of kernel rows per ear, height of plants and yield in grams per hill of the parents as the independent variables. This correlation was 0.6074. Yield of grain of the parents gave the highest simple correlation with yield of the F_1 cross. The correlation in this case was 0.5000 ± 0.0771.

MATERIAL

A list of all of the inbred lines used either in the crossing experiments, in the correlation studies, or in both is given in the Appendix, Table 1. This table shows the pedigree number of each inbred line, the variety from which it originated and summarizes the data on its F_1 crosses. Most of these inbred lines were produced at Ames, Iowa during the progress of these investigations. Five inbred lines (numbers 41, 42, 174, 175 and 176) were obtained from Dr. J. R. Holbert of the Office of Cereal Crops and Diseases, United States Department of Agriculture, Bloomington, Illinois. One inbred line (number 112) was obtained from Dr. E. W. Lindstrom of the Department of Genetics, Iowa State College. Most of the inbred lines listed in the Appendix, Table 1, were used both in the crossing experiments and in the correlation studies. There were a few exceptions, however, which are indicated in the table.

Some of the F_1 crosses in these experiments were made in 1925 and the remainder in 1926. The F_1 crosses made in 1925 were compared for yield in 1926 and those made in 1926 were compared for yield in 1927. The inbred lines developed at Ames had been selfed for three generations at the time the 1925 crosses were made and for four generations at the time the 1926 crosses were made. Inbred lines number 41 and 176 from Dr. Holbert had been inbred for five generations, number 42 for seven generations and numbers 174 and 175 for eight generations at the time they were used in making F_1 crosses. Inbred line number 112, supplied by Dr. Lindstrom, had been inbred for two generations.

The inbred lines included in the correlation studies were planted in 1926 in a special experiment for yield comparisons. Data for the correlation studies were taken on the plants in this experiment, or on the ears harvested from them. All of the inbred lines in the correlation studies had been selfed for four generations at the time the data were taken for these studies.

Table 1 gives a list of the varieties represented in the experiments together with the number of inbred lines originating from each variety. In all, 140 inbred lines from 18 varieties were represented in the crossing experiments and 142 inbred lines from 14 varieties in the correlation studies.

TABLE 1 - The varieties represented in the crossing experiments and correlation studies and the number of inbred lines from each variety.

Parent Variety	Number of inbred lines in the crossing experiments in the year stated. 1925	1926	Total	Number of inbred lines in the correlation studies.
Four County White	15	9	24	24
Silver King	3	1	4	4
C. I. No. 133	4	2	6	7
Iodent	18	13	31	34
C. I. No. 204	3	1	4	5
Lancaster Surecrop	4	6	10	11
Black's Strain of Reid Yellow Dent	3	4	7	8
Proudfit's Strain of Reid Yellow Dent	3	2	5	6
Krizer Bros. Yellow Dent	3	3	6	7
McCulloch's Strain of Reid Yellow Dent	3	4	7	7
Osterland's Strain of Reid Yellow Dent	4	3	7	7
Clark Yellow Dent	4	2	6	7
Walden Dent	3	5	8	7
Argentine Flint	4	4	8	8
Western Flint	1	0	1	0
White Flint	0	1	1	0
Funk Bros. 176 A	2	2	4	0
Griffin's Strain of Reid Yellow Dent	0	1	1	0
Total	77	63	140	142

EXPERIMENTAL METHODS

In the development of the inbred lines extreme care has been exercised to prevent accidental outcrossing of the self-pollinated ears. All of the self-pollinations since the experiments were started have been made by the bottle method described by the author (3). Very low amounts of outcrossing have been obtained. For instance in 1926, (after the lines had been inbred for 4 generations and outcrosses could be distinguished readily by the greater size and vigor of the plants) careful counts were made of the plants that appeared to be outcrosses. Less than 0.4 per cent of such plants were observed.

MAKING THE F_1 CROSSES

In comparing the inbred lines an effort was made to use each inbred line in at least 10 crosses. All of the crosses were made in a special block of rows called the crossing block. Several different methods were followed. In 1925, each row in the crossing block was from the seed of an individual ear. In 1926 seed from three to five selfed ears was mixed to represent each line.

The 80 inbred lines (numbers 1 to 80 in the Appendix, Table 1) in the 1925 crossing block were divided into three groups. The first group of lines, numbers 1-20, were from varieties of white corn, the second group, numbers 21-40, were from early varieties of yellow corn and the third group, numbers 41-80, were from the later varieties of yellow corn. Lines 8, 23 and 44 were weak and undesirable and were not used. This left 19 lines in each of the first two groups and 39 in the third group.

Within the first group, each of the lines numbered 1 to 10 inclusive (excluding line number 8) was crossed with each of the lines numbered 11 to 20 inclusive. This gave 90 different combinations. In a similar manner in the second group, lines 21 to 30 inclusive (excluding line 23) were crossed with lines 31 to 40 inclusive. This, also, gave 90 different combinations. In both of these experiments the crosses were made reciprocally and the seed from reciprocal crosses was mixed for the yield experiments. In the third group a slightly different procedure was followed. In this group ten of the 39 lines were selected as sires and an effort was made to cross each sire with each of the remaining 29 lines. This would have given 290 different combinations. However, nine of the combinations were not obtained so that a total of 281 combinations was made. No reciprocal crosses were made in this group.

The 1926 crossing block contained 76 inbred lines (inbred lines number 101 to 176 in the Appendix, Table 1).

Lines 101 to 113 inclusive were from varieties of white corn and the remaining lines were from varieties of yellow corn. The 11 best appearing lines of white corn were selected for crossing, the other two being discarded. An effort was made to obtain all possible combinations among the 11 lines selected for crossing. This would have given 55 different combinations, each combination being made reciprocally. Fifty-three of the 55 possible combinations were obtained. For various reasons ten of the lines from the yellow varieties also were discarded, leaving 53 lines. Ten of these 53 lines were selected as sires and were crossed with each of the other 43 lines. Reciprocal crosses were not made in this group. Later in the season after the crosses had been made, one of the lines used as a sire developed undesirable characteristics and all crosses with it were discarded. This left 387 possible combinations (9 sires crossed with each of 43 female parents) of which all but four were obtained.

In order to eliminate, as far as possible, individual plant variations in the lines being crossed, pollen was composited from 12 to 15 plants of the row used as the male parent and 3 to 6 ears were pollinated in each row used as a female parent. In the three groups of lines where reciprocal crosses were made and the seed mixed, therefore, from 12 to 20 plants in each of the parental lines were represented in the cross. In the two groups where reciprocal crosses were not made, 12 to 15 plants of the male parent and three to six of the female parent were represented in the cross.

In making the crosses the technic was very similar to that described by Coulter (1). A small half-ounce bottle was used to hold the pollen instead of a thistle tube. The top of the bottle was fitted with a two-hole rubber stopper. Two pieces of glass tubing were inserted through the rubber stopper and arranged as for an ordinary wash bottle. Then by blowing on one tube the pollen was forced out through the other. By the use of this method, it was easy to make 50 to 60 crosses with one collection of pollen.

YIELD EXPERIMENTS

In 1926 a yield experiment was conducted in which most of the inbred lines represented in the 1925 and 1926 crossing blocks were compared. All of the inbred lines included in the yield experiment had been inbred for 4 generations. Seed of the inbred lines in the 1926 crossing block was mixed for the yield experiment from the same ears from which seed was taken for planting the crossing block. As mentioned before, the rows of the 1925 crossing block were ear rows. The seed from these lines used in planting the yield experiment was a mixture of seed from several of the selfed ears obtained from the 1925 rows. It, therefore, had been inbred one year longer than that planted in the 1925 crossing block.

Three different plots, each consisting of a single row 15 hills long, were planted with each kind of corn. Due to a shortage of seed, only three kernels per hill were planted and the plots were not thinned. Every tenth plot was planted to a uniform check.

Two yield comparisons of F_1 crosses have been conducted in connection with the experiments herein reported. The first was in 1926 and the second in 1927. The three groups of F_1 crosses, white, early yellow and late yellow, which were made in the 1925 crossing block were planted in the 1926 yield experiment, and the two groups of F_1 crosses, white and yellow, which were made in the 1926 crossing block were planted in the 1927 yield experiment. In both of these experiments six plots were planted with each kind of corn. Each plot consisted of a single row 15 hills long. Four kernels per hill were planted and later the plots were thinned to three plants per hill in order to obtain more uniform stands. In the 1926 yield experiment every tenth plot was planted to a uniform check. No check plots were planted in the 1927 experiment.

All yields are reported as pounds per row of air dry shelled corn. Determinations of the per cent of moisture were made in the 1926 yield experiment with inbred lines by drying the entire yield from each plot. In the 1926 yield experiment with crosses the per cent of moisture was determined from a shrinkage sample of 15 ears taken from each plot. In the 1927 experiments the entire yield from two of the six replications of each kind of corn was dried. The average moisture content of the shrinkage samples from the various experiments after they had become air dry was 5.57 per cent for all of the experiments conducted in 1926, 5.69 for the comparison of white crosses in 1927 and 7.19 per cent for the comparison of yellow crosses in 1927. The yields in pounds per row may be converted to bushels per acre with 15.0 per cent moisture by multiplying by the following factors:

For all of the 1926 experiments........ 5.191
For the white crosses, 1927............ 5.184
For the yellow crosses, 1927........... 5.102

In both the 1926 and the 1927 yield experiments the six plots of each kind of corn were distributed at random over the field. However, the method of distribution differed slightly for the two years. In the 1926 experiments the first replication was planted in order according to the pedigree numbers of one inbred parent and the second replication was planted in order according to the other parent. The four packets of seed of each kind of corn for the remaining four replications then were put together into a churn and thoroughly mixed. They then were taken out and planted in the order in which they came from the churn. In 1927, as in 1926, six packets of seed were made up of each kind of corn, one packet for each replication. This year, however, the packets for each replication were mixed individually so that there was random distribution within each replication but the different replications were kept separate and distinct.

YIELD COMPUTATIONS

The field data were punched in cards prepared for use with the Hollerith sorting and tabulating machines. With the use of these cards it was no more effort to collect the data from the various plots of each kind of corn with random distribution than it would have been with a systematic distribution.

Yields were adjusted for variations in soil and for variations in stand. Adjustments for soil heterogeneity were made according to the regression of the individual rows on a five-row moving average as suggested by Richey

(9). Adjustments for stand were made according to the regression of yield on stand. The essentially different feature of the process used was that these two adjustments were combined into one regression equation which included them both. To accomplish this, the various correlations among stand, the five-row moving average, and the deviation of the yield of each plot from the mean yield of all plots of the same kind of corn first were calculated. From these correlations the multiple regression equation was determined. This equation was of the form

$$\bar{D} = \beta_{DS}\frac{\sigma_D}{\sigma_S} S + \beta_{DA}\frac{\sigma_D}{\sigma_A} A$$

in which $\bar{D}$ represents the estimated deviation in yield of any plot from the mean yield of all plots of the same kind of corn, S, deviation in stand of any plot from the mean stand of the experiment and A, moving average value. Actually in making the adjustments only the mean yields of the different kinds of corn were adjusted. In this case $\bar{D}$ represents the correction term to be applied to the mean, S, the mean deviation in stand of all plots of the same kind of corn and A, their mean moving average value.

A general standard deviation was calculated from the punched cards for each experiment. The formula used was the usual formula of $\sigma_E = \sqrt{\frac{\Sigma D^2}{N}}$ in which D is the deviation of each plot from the mean of all plots of the same kind of corn. The standard deviation of the difference between any two mean yields then was calculated according

to the formula suggested by Richey (9) as follows:
$\frac{2s\,\sigma_E^2\,(1-R^2)}{(s-1)\,(n-1)}$, in which s is the number of plots used in computing the moving average, n, the number of replications and R, the multiple correlation of stand and moving average with yield.

COLLECTING THE DATA ON THE CHARACTERS STUDIED

A list of all of the characters treated as variables in the correlation studies herein reported is given in Table 2. The symbols used throughout to designate the respective variables are shown at the left of the table. Each character is represented by the same symbol in the inbred lines and in the F_1 crosses. Table 2 also shows the unit of measurement and least count used in taking the data on each variable and the class intervals used in calculating the coefficients of correlation. In most cases the size of the class interval was arranged so as to give 10 classes.

TABLE 2. Characters of the plant
ears that are treated as variab
port, together with the unit of
least count used in taking the
able and the class intervals us
the coefficients of correlation

Symbol	Variable	Units ar
A	Date 1/4 tasseled	1 day
B	Date 1/4 silked	1 day
C	Plant height	0.5 foot
D	Chlorophyll color	1 grade
E	Number of nodes per plant	Actual nu
F	Number of nodes to upper ear	Actual nu
G	Per cent of nodes below ear	1 per cen
H	Per cent of plants smutted	1 per cen
I	Number of suckers per 100 plants	Actual nu
J	Per cent of plants standing erect at harvest	1 per cen
K	Per cent of plants with two or more ears	1 per cen
L	Number of ears per plant	Actual nu
M	Per cent of ears moldy	1 per cen
N	Ear length	0.1 cm.
O	Ear diameter	0.1 cm.
P	Ear shape index (diameter ÷ length)	0.001
Q	Shrinkage per cent of the harvested ears	1 per cen
R	Shelling Per cent	1 per cen
S	Mean number of kernel rows per ear	Actual nu
T	Coefficient of variability of number of kernel rows	0.1 per c
X	Yield	0.2 pound
X'	Mean yield of crosses	---

ers of the plants and harvested
reated as variables in this re-
with the unit of measurement and
d in taking the data on each vari-
ass intervals used in calculating
s of correlation.

	Units and least counts	Class Intervals: Inbreds	Class Intervals: F_1 crosses
	1 day	1 day	2/3 day
	1 day	1 day	2/3 day
	0.5 foot	0.5 foot	0.5 foot
	1 grade	0.3 grade	---
	Actual number	0.5 node	0.8 node
	Actual number	0.3 node	0.5 node
	1 per cent	2.2 per cent	2.2 per cent
	1 per cent	5.1 per cent	5.1 per cent
	Actual number	7.2 suckers	7.2 suckers
	1 per cent	11.0 per cent	11.0 per cent
	1 per cent	9.0 per cent	2.5 per cent
	Actual number	0.09 ear	0.09 ear
	1 per cent	8.2 per cent	6.0 per cent
	0.1 cm.	0.9 cm.	1.1 cm.
	0.1 cm.	0.216 cm.	0.15 cm.
	0.001	0.025	0.020
	1 per cent	2.3 per cent	2.3 per cent
	1 per cent	2.1 per cent	1.05 per cent
	Actual number	0.8 row	1.0 row
rows	0.1 per cent	1.6 per cent	---
	0.2 pound	0.7 pound	0.7 pound
	---	0.45	---

The data used in the correlation studies were taken on the various yield plots which have been described in detail previously. It will be remembered that there were three replications of each kind of corn in the yield comparison of inbred lines and six replications in the case of the F_1 crosses.

Records on each of the characters studied were taken on each replication of the yield experiments with the exception that records on date $\frac{1}{4}$ tasseled, date $\frac{1}{4}$ silked, plant height, number of nodes per plant and number of nodes to upper ear were taken on only two replications of the F_1 crosses. The final value for each character used in the correlation tables was the mean of the values determined for the different replications.

The date $\frac{1}{4}$ tasseled and date $\frac{1}{4}$ silked repmesent the date on which 10 plants in the row (approximately $\frac{1}{4}$ of the plants) were tasseled or silked. A plant was counted as tasseled as soon as anthers appeared.

Plant height was determined by measuring several representative plants in the row. The mean of these measurements then was computed.

Data on chlorophyll color were taken on the inbred lines only. Five arbitrary color grades were established.

These grades were numbered from 1 to 5 inclusive, number 1 being the darkest color and number 5 the lightest. Each replication of the inbred lines was given the number of the grade which best fitted it. The average of the numbers given the different replications was taken to represent the line.

Number of nodes per plant was determined as the mean number of nodes per plant for the first 10 plants in the row. Number of nodes to upper ear was determined in a similar manner.

The characters, per cent of nodes below the ear, per cent of plants smutted, number of suckers per 100 plants, per cent of plants standing erect at harvest, per cent of plants with two or more ears, number of ears per plant, and per cent of ears moldy are self-explanatory. With the exception of per cent of nodes below the ear, they were each determined from the total counts for all replications.

Data on the characters, ear length, ear diameter, ear shape index, shrinkage per cent of the harvested ears, shelling per cent and number of kernel rows per ear, were obtained from the samples taken from each plot and dried as previously explained for determination of weight of dry corn. These data were taken on all of the inbred lines in the yield experiments and only on those F_1 crosses grown for yield in 1926.

The coefficient of variability of number of kernel rows was determined for the inbred lines only.

COMPUTATION OF THE COEFFICIENTS OF CORRELATION

All of the coefficients of correlation of the zero order, partial correlations, and multiple correlations included in this report were calculated according to the methods suggested by Wallace and Snedecor (11). The class intervals shown in Table 2 were used in calculating all of the coefficients of correlation except where stated otherwise. No adjustments such as Sheppard's correction were made to correct for the fact that the data were coded.

ADJUSTING FOR HETEROGENEITY OF DATA

Some of the most puzzling problems with which the investigator has to deal in correlation studies have to do with adjusting for heterogeneity of material. In the few correlation studies within inbred lines which have been reported no attempts were made to adjust for heterogeneity of data. It may be that the data reported by these authors have been homogeneous and no adjustments were necessary. It is doubtful if this is true in every case, however. At least one example to the contrary may be quoted. In a recent publication by Nilsson-Leisner (7) the author reports a correlation of +0.9 between diameter of ears of parents and F_1 generations where the flints and dents were grouped together. He further makes the statement in explanation of this high correlation that the frequency distributions of the two kinds of corn do not even overlap in the correlation table (page 449). This fact in itself should be sufficient evidence to indicate that the two samples do not represent the same general population and, therefore, should not be grouped into the same correlation table.

Inbred lines from 14 varieties have been included in the present experiments. Some of these varieties differ widely in practically all of the characters studied. In order to group the inbreds from all of these varieties into the same correlation tables, it was necessary to make adjustment for heterogeneity of material. The method finally adopted was to express the values for the characters of each inbred line as deviations from the mean value of all lines of the variety from which the inbred originated. The author is not entirely satisfied that this is the best method that could have been used. It may be that the method of expressing the value of the characters of an inbred line in terms of per cent of the mean of all of the lines from the same variety would have been a more precise method. The method used, however, should definitely determine whether a deviation from the mean in a certain direction in one character is or is not associated with a deviation from the mean in a definite direction in another character.

In the F_1 crosses the same general method was used. The correlations within F_1 crosses were confined to those grown in 1926 and adjustments were made in these crosses only. In making these F_1 crosses the inbred lines had been grouped into three more or less uniform groups (white, early yellow and late yellow). In the F_1 crosses, therefore, the mean of each character for each of the groups was determined and the characters of each F_1 cross then were expressed as deviations from the mean of the group in which it was located.

COEFFICIENTS OF SIMPLE CORRELATION WITHIN INBRED LINES

The coefficients of simple correlation among the different characters studied in the inbred lines are shown in Table 3. All of these coefficients of correlation are between characters within the same generation. Coefficients which are three or more times their probable error are considered significant and are printed in bold face type.

TABLE 3. Coefficients of correlation among a number o

Symbol	Variable	A Date 1/4 tasseled	B Date 1/4 silked
1	2	3	4
A	Date 1/4 tasseled		0.8097
B	Date 1/4 silked		
C	Plant height		
D	Chlorophyll color		
E	Number of nodes per plant		
F	Number of nodes to upper ear		
G	Per cent of nodes below ear		
H	Per cent of plants smutted		
I	Number of suckers per 100 plants		
J	Per cent of plants standing erect at harvest		
K	Per cent of plants with two or more ears		
L	Number of ears per plant		
M	Per cent of ears moldy		
N	Ear length		
O	Ear diameter		
P	Ear shape index (diameter ÷ length)		
Q	Shrinkage per cent of the harvested ears		
R	Shelling per cent		
S	Mean number of kernel rows per ear		
T	Coefficient of variability of number of kernel rows		
X	Yield		

Note: Coefficients of 0.1652 are 3 times their P.E., those of 0.2
P.E., those of 0.3075 are 6 times their P.E., those of 0385
their P.E. Coefficients three or more times their P.E. are

among a number of characters within inbred lines of corn.

	A	B	C	D	E	F	G	H	I
	Date 1/4 tasseled	Date 1/4 silked	Plant height	Chlorophyll color	Number of nodes per plant	Number of nodes to upper ear	Per cent nodes below ear	Per cent of plants smutted	Number of suckers per 100 plants
	3	4	5	6	7	8	9	10	11
		0.8097	**0.3663**	-0.0277	**0.4449**	**0.4482**	0.1293	0.0607	0.1238
			.3595	.0605	**.3450**	**.3831**	.1455	.0034	.0991
				- .1086	**.5437**	**.4305**	.0082	- .0057	.050
					.0000	- .1500	- **.1746**	- .0875	.016
						.6488	- .0840	- .0822	.051
							.6700	- .0450	- .095
								.0162	- .157
									.190
el rows									

.E., those of 0.2159 are 4 times their P.E., those of 0.2634 are 5 tim
E., those of 03855 are 8 times their P.E., and those of 0.4509 are 10
s their P.E. are printed in bold face type.

	I	J	K	L	M	N	O	P	
	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length	Ear diameter	Ear shape index (diameter ÷ length)	Shrinkage per cent
	11	12	13	14	15	16	17	18	
7	0.1238	-0.1810	0.3202	0.1814	-0.0564	-0.1312	-0.2000	-0.0273	0
4	.0991	- .1094	.1855	.0464	- .0405	- .2099	- .2306	.0217	
7	.0505	.1120	.2570	.2671	- .0609	- .0308	- .0744	- .0282	
5	.0160	- .1250	- .1805	- .1766	- .0653	- .1322	- .0818	.0619	
2	.0514	- .1880	.3495	.2570	.1226	- .0805	- .1268	- .0030	
0	- .0953	- .1572	.4665	.2964	.0461	- .0116	- .0487	- .0177	
2	- .1574	- .0410	.2739	.1575	- .0753	.0397	.0313	- .0212	
.	.1908	.1184	- .0918	- .1403	.0000	- .1141	.0428	.1459	
....	....	.0456	.0785	.3447	- .0604	- .0275	- .2227	- .1085	
....	....	....	- .0488	.0897	- .2001	.1496	.1156	- .0804	-
....	....	....	....	.7901	.1079	- .1874	- .3582	- .0625	-
....	....	....	....	....	.0119	.0268	- .2887	- .2079	-
....	....	....	....	....	....	- .1504	.0561	.2608	
....	....	....	....	....	....	....	.2565	- .7618	-
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....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....

are 5 times their

are 10 times

O	P	Q	R	S	T	X
Ear diameter	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear	Coefficient of variability of number of kernel rows	Yield
17	18	19	20	21	22	23
-0.2000	-0.0273	0.3679	-0.1511	-0.0753	0.0393	-0.1516
- .2306	.0217	.4572	- .2636	.0131	- .0549	- .2621
- .0744	- .0282	.1186	- .1879	- .0248	- .1124	.2037
- .0818	.0619	.0202	.0050	.0094	- .0549	- .2073
- .1268	- .0030	.1956	- .0365	- .1314	.0964	.0633
- .0487	- .0177	.1738	- .0455	- .0459	.1373	.1580
.0313	- .0212	.0112	- .0333	.0541	.0470	.1153
.0428	.1459	.0675	- .0243	- .0158	- .0184	- .0702
- .2227	- .1085	.0838	.0000	- .1089	- .0786	.0975
.1156	- .0804	- .1531	- .0076	.0779	- .0153	.0728
- .3582	- .0625	.0186	.0000	- .2273	.0292	.1141
- .2887	- .2079	- .0970	.0685	- .2457	- .0041	.3124
.0561	.2608	.0420	.0691	- .0195	.1064	- .1580
.2565	- .7618	- .3967	.1425	- .1009	.2060	.3754
	.3138	- .0247	.3015	.5012	.0723	.3236
		.3667	.0281	.3727	- .1309	- .1722
			- .1442	.0981	.0695	- .2749
				.1310	.0431	.3857
					- .1162	.0429
						.1161

There are 210 coefficients of correlation recorded in Table 3. Of this number 65 may be considered significant, as judged by the fact that they are three or more times their probable error. A summary of the positive and negative correlations among the different variables, as indicated by the significant coefficients in Table 3 is given in Table 4.

TABLE 4. Summary of Table 3 showing the significant positive and negative coefficients of correlation among the different variables.

Symbol	Variable	Characters with which the variable indicated gave significant coefficients of correlation of the kind stated: Positive	Negative
A	Date 1/4 tasseled	BCEFKLQ	JO
B	Date 1/4 silked	ACEFKQ	NORX
C	Plant height	ABEFKLX	R
D	Chlorophyll color	--------	GKLX
E	Number of nodes per plant	ABCFKLQ	J
F	Number of nodes to upper ear	ABCEGKLQ	-----
G	Per cent of nodes below ear	FK	D
H	Per cent of plants smutted	I	-----
I	Number of suckers per 100 plants	HL	O
J	Per cent of plants standing erect at harvest	--------	AEM
K	Per cent of plants with two or more ears	ABCEFGL	DNOS
L	Number of ears per plant	ACEFIKX	DOPS
M	Per cent of ears moldy	P	J
N	Ear length	OTX	BKPQ
O	Ear diameter	NPRSX	ABIKL
P	Ear shape index (diameter ÷ length)	MOQS	LNX
Q	Shrinkage per cent of the harvested ears	ABEFP	NX
R	Shelling per cent	OX	BC
S	Mean number of kernel rows per ear	OP	KL
T	Coefficient of variability of number of kernel rows	N	-----
X	Yield	CLNOR	BDPQ

The most interesting correlations shown in Tables 3 and 4 are those with yield of the inbred line. Shelling per cent (R) gave the highest positive correlation with yield (0.3857). This is rather surprising as shelling per cent usually has given rather low correlations with yield in studies with open-pollinated varieties of corn, and it gave a low correlation with yield in the F_1 crosses as will be seen later. The high correlation shown here probably was due to the tendency among some inbred lines to produce poorly filled ears. The other characters which gave significant positive correlations with yield were ear length (N), 0.3754; ear diameter (O), 0.3236; number of ears per plant (L), 0.3124; and plant height (C), 0.2037.

The characters which gave significant negative correlations with yield were shrinkage per cent of the harvested ears (Q), -0.2749; date ½ silked (B), -0.2621; chlorophyll color (D), -0.2073; and ear shape index (P), -0.1722. The first two of these correlations indicate that late maturity was associated with low yields. The negative correlation with ear shape index indicates that the relatively long, slender ears were associated with the larger yields. In connection with the correlation between yield and chlorophyll color it should be remembered that grade 1 of chlorophyll color was the darkest green and grade 5 the lightest. A negative correlation between these two characters, therefore, indicates that dark green chlorophyll color was associated with larger yields.

Date ½ tasseled (A) and date ½ silked (B) gave significant positive correlations with plant height (C), number of nodes per plant (E), number of nodes to upper ear (F), per cent of plants with two or more ears (K) and shrinkage per cent of the harvested ears (Q). The correlation between date ½ tasseled and shrinkage per cent was 0.3679 and that between date ½ silked and shrinkage per cent was 0.4572. This seems to indicate that among these inbred lines date ½ silked was a better index of relative maturity than was date ½ tasseled.

Per cent of plants standing erect at harvest (J) gave three significant negative correlations of which the highest was with per cent of ears moldy (M). It would naturally be expected that those lines in which a large number of the plants were down and many of the ears resting on the ground, would have more moldy ears than the lines with erect plants.

Ear shape index (P) gave significant positive correlations with per cent of ears moldy (M), ear diameter (O), shrinkage per cent of the harvested ears (Q) and number of kernel rows per ear (S) and significant negative correlations with number of ears per plant (L) and ear length (N). The positive correlations with ear diameter and number of kernel rows per ear naturally would be expected. Those with percent of ears moldy and shrinkage per cent of the harvested ears indicate that the relatively short, thick ears were more inclined to be moldy and that they shrunk the most.

COEFFICIENTS OF PARTIAL AND OF MULTIPLE CORRELATION WITHIN INBRED LINES

Coefficients of partial correlation between yield and other characters of the inbred lines were determined for only part of the characters studied. The characters were divided into four groups for this purpose. These four groups of characters were as follows:

Group 1. Characters indicating the relative length of season required to reach maturity. These characters were date one-fourth tasseled (A), date one-fourth silked (B), and shrinkage per cent of the harvested ears (Q).

Group 2. Characters indicating the relative plant vigor of the different lines. The characters placed in this group were plant height (C), chlorophyll color (D), number of nodes per plant (E), and number of nodes to upper ear (F).

Group 3. Characters indicating the relative susceptibility to disease of the different lines. These characters included per cent of plants smutted (H), per cent of plants erect at harvest (J), and per cent of ears moldy (M).

Group 4. Characters of the harvested ears. This group included ear length (N), ear diameter (O), and shelling per cent (R).

Partial correlations were computed between each character of each group and yield of the inbred line, thus eliminating the effect of the variation of the remaining characters of the group. The coefficients of multiple correlation between all of the characters in each group and the yield of the inbred lines also were computed. These correlations are recorded in Table 5.

TABLE 5. Coefficients of partial and of multiple correlation between yield and four groups of the other characters of the inbred lines.

Group number	Designation of coefficient	Coefficients of correlation
	$r_{AX \cdot BQ}$	0.1082 ± 0.0572
	$r_{BX \cdot AQ}$	- .1836 ± .0559
1	$r_{QX \cdot AB}$	- .1814 ± .0559
	$R_{X \cdot ABQ}$	.3311 ± .0513
	$r_{CX \cdot DEF}$	0.1709 ± 0.0564
	$r_{DX \cdot CEF}$	- .1667 ± .0564
2	$r_{EX \cdot CDF}$	- .0949 ± .0575
	$r_{FX \cdot CDE}$	.1020 ± .0574
	$R_{X \cdot CDEF}$	.2961 ± .0528
	$r_{HX \cdot JM}$	-0.0769 ± 0.0575
	$r_{JX \cdot HM}$	.0516 ± .0577
3	$r_{MX \cdot JH}$	- .1453 ± .0566
	$R_{X \cdot HJM}$	.1803 ± .0558
	$r_{NX \cdot OR}$	0.3143 ± 0.0521
	$r_{OX \cdot NR}$	.1715 ± .0561
4	$r_{RX \cdot NO}$	.3138 ± .0521
	$R_{X \cdot NOR}$	.5248 ± .0418
	$R_{X \cdot ABCDEFKMNOQR}$	0.6900 ± 0.0311

The group of ear characters gave the highest multiple correlation with yield of the inbred lines and the group of characters indicating relative disease susceptibility the lowest. There was but little difference between the multiple correlations given by the remaining two groups. The multiple correlation between yield and 12 of the other characters also is recorded in Table 5. It was 0.6900 ± 0.0311.

Of the characters in Group 1, date one-fourth tasseled (A) gave a positive, though not significant, correlation with yield and date one-fourth silked (B) and shrinkage per cent (Q) each gave negative significant correlations with yield when the effect of the variation of the remaining characters of the group was eliminated. It is interesting to speculate why date one-fourth tasseled gave a positive partial correlation with yield and date one-fourth silked a negative partial correlation. When either one of these dates was held constant and the other varied, probably the most important effect was to vary the number of days from tasseling to silking.[1]

Both of the partial correlations mentioned seem to indicate that an increase in the number of days from

[1] Throughout this report the term "held constant" is used in the sense that the effect of the variation has been eliminated. This is the meaning commonly given to this term in partial correlation studies.

tasseling to silking was accompanied by a decrease in yield. If date one-fourth tasseled remains constant increasing date one-fourth silked increases the days from tasseling to silking and, according to the negative partial correlation between yield and date one-fourth silked, was accompanied by a decrease in yield. On the other hand, if date one-fourth silked remains constant decreasing the date one-fourth tasseled increases the days from tasseling to silking which likewise, according to the positive partial correlation between date one-fourth tasseled and yield, was accompaned by a decrease in yield.

Two of the characters in Group 2 gave positive partial correlations with yield and two gave negative. However, only one of the positive and one of the negative correlations were significant. Plant height (C) was positively associated with yield when chlorophyll color (D), number of nodes per plant (E) and number of nodes to upper ear (F) remained constant. When plant height and number of nodes to upper ear were held constant number of nodes per plant no longer appeared to be associated with yield. The same was true of number of nodes to upper ear for constant plant height and number of nodes per plant.

Chlorophyll color gave a negative partial correlation with yield when the other members of the group 2 were held constant. As has been previously explained, this indicates that the darker chlorophyll colors were associated with larger yields.

Only one of the members of Group 3 gave any appreciable correlation with yield when the other members of the group remained constant and it can not be considered significant. This was per cent of ears moldy (M) which gave a negative partial correlation of -0.1453 ± 0.0566.

The characters of Group 4 all gave significant positive partial correlations with yield. The partial correlation between ear length and yield for constant diameter and shelling per cent was 0.3143 ± 0.0521 and that between ear diameter and yield for constant length and shelling per cent was 0.1715 ± 0.0561. As previously mentioned the high correlation between shelling per cent and yield probably was due to the poorly filled ears that occurred in many inbred lines.

COEFFICIENTS OF SIMPLE CORRELATION WITHIN F_1 CROSSES

The coefficients of correlation calculated among the characters within F_1 generations are recorded in Table 6. Coefficients three or more times their probable errors are printed in bold face type. The correlations in this table were computed from the data on the F_1 crosses grown in 1926. A total of 461 F_1 crosses from the three 1926 yield groups are represented in these correlations.

TABLE 6. Coefficients of corr
characters within F_1 crosses

Sym-bol	Variable	A Date 1/4 tasseled	B Date 1/4 silked	C
1	2	3	4	
A	Date 1/4 tasseled	....	0.7505	0.1
B	Date 1/4 silked	....	....	.2
C	Plant height	....	....	....
E	Number of nodes per plant	....	....	....
F	Number of nodes to upper ear	....	....	....
G	Per cent of nodes below ear	....	....	....
H	Per cent of plants smutted	....	....	....
I	Number of suckers per 100 plants	....	....	....
J	Per cent of plants standing erect at harvest	....	....	....
K	Per cent of plants with two or more ears	....	....	....
L	Numbers of ears per plant	....	....	....
M	Per cent of ears moldy	....	....	....
N	Ear length	....	....	....
O	Ear diameter	....	....	....
P	Ear shape index (diameter ÷ length)	....	....	....
Q	Shrinkage per cent of the harvested ears	....	....	....
R	Shelling per cent	....	....	....
S	Mean number of kernel rows per ear	....	....	....
X	Yield			

Note: Coefficients of 0.0934 are 3 times their P.E., those of 0.1
those/6 times their P.E., those of 0.2372 are 8 times their
(of 0.1822 are)
Coefficients three or more times their P.E. are printed in

Coefficients of correlation among a number of
ers within F_1 crosses between inbred lines of corn.

	A	B	C	E	F	G	H	I	J	K
	Date 1/4 tasseled	Date 1/4 silked	Plant height	Number of nodes per plant	Number of nodes to upper ear	Per cent of nodes below ear	Per cent of plants smut-ted	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants with
	3	4	5	6	7	8	9	10	11	1
		0.7505	0.1531	0.4003	0.3906	0.1017	0.0711	0.0288	-0.1223	0.1
			.2593	.2801	.3124	.1231	.1321	-.0118	-.1449	.0
				.3814	.3003	-.0268	.0781	-.0206	-.1120	.1
					.7827	.0312	.0385	.0033	-.1879	.2
						.5644	.0539	.0166	-.1856	.2
							.0315	.0315	-.0026	.0
								.1202	-.0015	.0
									.0566	.2
rvest										.C
s										
s										

eir P.E., those of 0.1237 are 4 times their p.E., those of 0.1534 are
2372 are 8 times their P.E., and those of 0.2881 are 10 times their P.E.

ir P.E. are printed in bold face type.

J	K	L	M	N	O	P	Q	R	S
standing erect at harvest	Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length	Ear diameter	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear
11	12	13	14	15	16	17	18	19	20
1223	0.1824	0.0599	0.0731	0.2326	0.1042	-0.2134	0.1910	-0.1070	0.10
1449	.0726	-.0013	.0652	.2056	.1231	-.1672	.2724	-.1074	.14
1120	.1018	.0117	-.0455	.2842	.0186	-.2077	.1337	-.0663	-.13
1879	.2635	.0599	.0290	.2107	.0090	-.1920	.1681	-.0115	-.10
1856	.2364	.0638	.0780	.1528	.0599	-.1463	.2206	.0456	-.09
026	.0486	.0226	.0792	-.0510	.0481	.0318	.1139	.0942	.00
0015	.0681	.0521	.2815	-.1192	-.0361	.0733	.1387	.0130	.02
0566	.2035	.6508	.0852	-.0726	-.1112	.0390	.0766	.1071	-.05
.....	-.0891	.0449	-.2335	-.1721	.1586	.2044	-.1134	.0106	.16
.....	.....	.5339	-.0203	.1256	-.3151	.2713	.1670	-.1247	-.30
.....	.....	.....	-.0998	.0439	-.2197	.1787	.1362	-.0179	-.21
.....	.....	.....	.....	-.0934	-.0087	.0656	-.0155	.1177	.02
.....	.....	.....	.....	.....	-.1848	-.8572	.0977	-.1395	-.42
.....	.....	.....	.....	.....	.....	.5582	-.0255	.3143	.58
.....	.....	.....	.....	.....	.....	.....	-.0995	.2282	.58
.....	.....	.....	.....	.....	.....	.....	.....	-.1475	-.03
.....	.....	.....	.....	.....	.....	.....	.....	.....	.28
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

54 are 5 times their P.E.,
eir P.E.

	N	O	P	Q	R	S	X
	Ear length	Ear diameter	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear	Yield
	15	16	17	18	19	20	21
	0.2326	0.1042	-0.2134	0.1910	-0.1070	0.1013	0.1820
	.2056	.1231	-.1672	.2724	-.1074	.1477	.1579
	.2842	.0186	-.2077	.1337	-.0663	-.1394	.3292
	.2107	.0090	-.1920	.1681	-.0115	-.1005	.3489
	.1528	.0599	-.1463	.2206	.0456	-.0913	.3101
	-.0510	.0481	.0318	.1139	.0942	.0047	.0256
	-.1192	-.0361	.0733	.1387	.0130	.0240	-.2156
	-.0726	-.1112	.0390	.0766	.1071	-.0538	-.0014
	-.1721	.1586	.2044	-.1134	.0106	.1644	-.0545
	.1256	-.3151	.2713	.1670	-.1247	-.3068	-.0092
	.0439	-.2197	.1787	.1362	-.0179	-.2185	.0945
	-.0934	-.0087	.0656	-.0155	.1177	.0205	-.1762
	....	-.1848	-.8572	.0977	-.1395	-.4290	.4211
	....	....	.5582	-.0255	.3143	.5844	.2546
	....	....	....	-.0995	.2282	.5801	-.2676
	....	....	....	....	-.1475	-.0308	-.0595
	....	....	....	....	....	.2827	.0362
	....	....	....	....	....	....	-.0212

A larger percentage of the coefficients of correlation in Table 6 are significant than for the correlations within inbred lines. This may be due not to any material differences in the actual size of the coefficients but to the larger number of observations which resulted in smaller probable errors. Of the 171 correlations recorded, 100 would appear to be significant in that they are at least three times their probable errors. A summary of the data in Table 6 is given in Table 7. This table shows the different variables with which each character gave either significant positive or significant negative correlations and brings out more clearly the interrelations among the different variables.

TABLE 7. Summary of Table 6 showing the significant positive and negative coefficients of correlation among the different variables.

Symbol	Variable	Characters with which the variable indicated gave significant coefficients of correlation of the kind stated: Positive	Negative
A	Date 1/4 tasseled	BCEFGKNOQSX	JPR
B	Date 1/4 silked	ACEFGHNOQSX	JPR
C	Plant height	ABEFKNQX	JPS
E	Number of nodes per plant	ABCFKNQX	JPS
F	Number of nodes to upper ear	ABCEGKNQX	JP
G	Per cent of nodes below ear	ABFOR	--
H	Per cent of plants smutted	BIMQ	NX
I	Number of suckers per 100 plants	HKLR	O
J	Per cent of plants standing erect at harvest	OPS	ABCEFMNQ
K	Per cent of plants with two or more ears	ACEFILNQ	OPRS
L	Number of ears per plant	IKQX	MOPS
M	Per cent of ears moldy	HR	JLNX
N	Ear length	ABCEFKQX	HJMOPRS
O	Ear diameter	ABJPRSX	IKLN
P	Ear shape index (Diameter ÷ length)	JORS	ABCEFKLNQX
Q	Shrinkage per cent of harvested ears	ABCEFGHKLN	JPR
R	Shelling per cent	GIMOPS	ABKNQ
S	Mean number of kernel rows per ear	ABJOPR	CEKLN
X	Yield	ABCEFLNO	HMP

The coefficients of correlation of primary interest are those between yield and the other characters studied. It will be noticed from Tables 6 and 7 that, in general, yield was positively correlated with the characters indicating length of season required to reach maturity, plant vigor, and ear size. It was negatively correlated with the characters for disease and with ear shape index (P). The correlation between yield and shrinkage per cent of the harvested ears was negative though not significant. This was probably due to the fact that the season of 1926 was ideal for the ripening of the later kinds of corn so that practically all of the crosses matured fully.

The highest correlation between yield and the other characters of the F_1 crosses was the correlation of 0.4211 with ear length. Ear diameter gave a correlation of 0.2546 with yield and ear shape index a correlation of -0.2676. This would seem to indicate that while both of the characters length and diameter which go to make up size of ear were positively correlated with yield, increasing the size by increasing the length was a more effective method of producing higher yields than increasing the size by increasing the diameter.

A number of other interesting relationships are brought out in these two tables. In general, all of the characters indicating maturity or plant vigor were positively correlated among themselves. Most of them, also, were negatively correlated with per cent of plants standing erect at harvest (J) and ear shape index (P). Evidently the tall, vigorous plants were more likely to go down before harvest.

Per cent of plants erect at harvest (J) gave significant positive correlations with ear shape index (P) and diameter of ear (O) and a significant negative correlation with ear length. This is rather surprising as it indicates that the crosses with shorter, thicker ears were more erect at harvest. A possible explanation of this may be taken from the correlation between ear shape and yield which has been discussed above. This correlation indicated that crosses with short, thick ears were less productive than those with long, slender ears. This might account for their being more erect at harvest because they were supporting less weight of ear.

In order to determine whether there were any striking differences in the coefficients of correlation in the different yield groups, the correlations between the different characters and yield were computed for each group separately. The coefficients of correlation from each of the three experiments, and for comparison, the correlations for the three groups combined are recorded in Table 8.

TABLE 8. Coefficients of correla
the various other characters wi
yield groups of F_1 crosses grow

Character correlated with yield	Coefficient 90 white crosses
Date 1/4 tasseled	0.1566 ± 0.0694
Date 1/4 silked	.1060 ± .0703
Plant height	.2695 ± .0659
Number of nodes per plant	.1624 ± .0692
Number of nodes to upper ear	.1487 ± .0696
Per cent of nodes blow ear	.0380 ± .0710
Per cent of plants smutted	-.0926 ± .0705
Number of suckers per 100 plants	-.2622 ± .0662
Per cent of plants standing erect at harvest	-.1340 ± .0698
Per cent of plants with two or more ears	.0120 ± .0711
Number of ears per plant	.1969 ± .0683
Per cent of ears moldy	-.2840 ± .0654
Ear length	.4237 ± .0583
Ear diameter	.4108 ± .0591
Ear shape index (Diameter ÷ length)	-.1972 ± .0683
Shrinkage per cent of the harvested ears	-.1670 ± .0691
Shelling per cent	.4990 ± .0534
Mean number of kernel rows per ear	.0672 ± .0708

ients of correlation between yield and
er characters within the different
F_1 crosses grown in 1926.

Coefficient of correlation for the yield group indicated			
90 white crosses	90 early yellow crosses	281 later yellow crosses	All 461 crosses of the three groups combined
.1566 ± 0.0694	0.5151 ± 0.0522	0.0849 ± 0.0399	0.1820 ± 0.0390
.1060 ± .0703	.3670 ± .0615	.0965 ± .0398	.1579 ± .0392
.2695 ± .0659	.0892 ± .0705	.3965 ± .0339	.3292 ± .0366
.1624 ± .0692	.2614 ± .0662	.4204 ± .0331	.3489 ± .0362
.1487 ± .0696	.2424 ± .0669	.3703 ± .0347	.3101 ± .0284
.0380 ± .0710	-.0563 ± .0709	.0515 ± .0401	.0256 ± .0314
.0926 ± .0705	-.2585 ± .0663	-.2345 ± .0380	-.2156 ± .0299
.2622 ± .0662	.1404 ± .0697	-.0239 ± .0402	-.0014 ± .0314
.1340 ± .0698	.2208 ± .0676	-.1106 ± .0397	-.0545 ± .0313
.0120 ± .0711	-.0056 ± .0711	-.0168 ± .0402	-.0092 ± .0314
.1969 ± .0683	.2526 ± .0666	.0138 ± .0402	.0945 ± .0311
.2840 ± .0654	-.5484 ± .0497	.0134 ± .0402	-.1762 ± .0304
.4237 ± .0583	.6068 ± .0450	.3714 ± .0346	.4211 ± .0258
.4108 ± .0591	.4362 ± .0576	.1302 ± .0395	.2546 ± .0294
.1972 ± .0683	-.2693 ± .0659	-.2849 ± .0369	-.2676 ± .0292
.1670 ± .0691	.0963 ± .0704	-.0806 ± .0399	-.0595 ± .0313
.4990 ± .0534	.4926 ± .0538	.2023 ± .0385	.3062 ± .0285
.0672 ± .0708	.2854 ± .0653	-.1532 ± .0393	-.0212 ± .0314

For the most part the coefficients of correlation between the various characters and yield which are recorded in Table 8 are fairly consistent in the different yield groups. They vary somewhat in size in the different experiments but only in a few cases are they significant and positive in one experiment and significant and negative in another. The correlation between per cent of plants standing erect at harvest is positive in the early yellow crosses and negative in the later yellow crosses. It, also, is negative in the white crosses but is not significant. No explanation can be offered for this fact.

Practically the same situation also is true for the correlation between mean number of kernel rows per ear and yield. It is positive in the early yellow crosses and negative in the later crosses. There seems to be a reasonable explanation for this in that it is entirely conceivable that in both early and late crosses grown here at Ames, high yield might be associated with the higher rowed sorts of the early corn and the fewer rowed sorts of the later corn.

Date one-fourth tasseled and date one-fourth silked gave higher correlations with yield in the early crosses than in the later crosses. This naturally would be expected. Number of ears per plant gave higher positive correlations with yield in the early crosses than in the late. This was due, without doubt, to the fact that there was more variability as regards this character among the early crosses than among the late crosses. Most of the late crosses were single-eared. Per cent of ears moldy also gave higher correlations with yield in the two groups of early crosses than in the group of late crosses.

COEFFICIENTS OF PARTIAL AND OF MULTIPLE CORRELATION WITHIN THE F_1 CROSSES

Coefficients of partial and of multiple correlation were computed from the data on the F_1 crosses for the same four groups of variables which were used for the inbred lines.[1] The only deviation in the present case from the grouping previously used being that chlorophyll color was omitted since no data on chlorophyll color were taken on the F_1 crosses. The correlations computed for the F_1 crosses are recorded in Table 9.

1. It will be remembered that Group 1 included the characters date one-fourth tasseled (A), date one-fourth silked (B), and shrinkage per cent of the harvested ears (Q), which are indicative of the relative length of season required to reach maturity; Group 2 included the characters plant height (C), chlorophyll color (D), number of nodes per plant (E), and number of nodes to upper ear (F), which are indicative of the relative plant vigor; Group 3 included the characters per cent of plants smutted (H), per cent of plants erect at harvest (J), and per cent of ears moldy (M), which are indicative of the relative susceptibility to disease; and Group 4 included the characters ear length (N), ear diameter (O) and shelling per cent (R), all of which are characters of the harvested ears.

TABLE 9. Coefficients of partial and of multiple correlation between yield and four groups of the other characters of the F_1 crosses.

Group number	Designation of Coefficient	Coefficients of Correlation
	$r_{AX.BQ}$	0.0956 ± 0.0313
	$r_{BX.AQ}$	$.0535 \pm .0315$
1	$r_{QX.AB}$	$- .1063 \pm .0313$
	$R_{X.ABQ}$	$.2124 \pm .0302$
	$r_{CX.EF}$	0.2265 ± 0.0300
	$r_{EX.CF}$	$.1237 \pm .0311$
2	$r_{FX.CE}$	$.0644 \pm .0315$
	$R_{X.CEF}$	$.4126 \pm .0262$
	$r_{HX.JM}$	-0.1700 ± 0.0307
3	$r_{JX.HM}$	$- .0893 \pm .0314$
	$r_{MX.HJ}$	$- .1414 \pm .0310$
	$R_{X.HJM}$	$.2617 \pm .0294$
	$r_{NX.OR}$	0.4908 ± 0.0240
	$r_{OX.NR}$	$.3597 \pm .0275$
4	$r_{RX.NO}$	$- .0055 \pm .0316$
	$R_{X.NOR}$	$.5402 \pm .0224$
	$R_{X.ABCEFHMNOR}$	0.7078 ± 0.0159

As was true for the inbred lines, the group of ear characters (Group 4) gave the highest coefficient of multiple correlation with yield. The group of characters indicating plant vigor (Group 2) also gave a high multiple correlation with yield. The remaining two groups of characters gave significant though much lower correlations with yield. A coefficient of multiple correlation was computed between 10 of the characters studied and yield and is recorded in Table 9. This correlation was 0.7078 ± 0.0159.

In Group 1 the partial correlations were low although two of them perhaps were significant. Date one-fourth tasseled (A) gave a low though significant positive partial correlation with yield but that of date one-fourth silked (B) was not significant. It will be remembered that in the inbred lines date one-fourth silked (B) gave a significant negative partial correlation with yield. The partial correlation between shrinkage per cent of the harvested ears (Q) and yield for constant date one-fourth tasseled (A) and date one-fourth silked (B) was ~~negative and~~ significant although somewhat low.

In Group 2, which was composed of characters indicating plant vigor, each variable gave a positive partial correlation with yield when the effect of the variation of the other variables of the group was eliminated. That between plant height (C) and yield was the highest. The partial correlation between number of nodes to upper ear (F) and yield was too small to be considered significant.

The characters indicating relative susceptibility to disease all gave negative partial correlations with yield. Two of them, without doubt, were significant. That between per cent of plants erect at harvest (J) and yield, however, probably was not significant.

Two of the ear characters in Group 4 gave positive partial correlations with yield and one gave a negative correlation though it was not significant. The partial correlations with ear length (N) and ear diameter (O) were both higher than the partial correlations between yield and any of the other characters studied in the F_1 crosses.

CORRELATIONS BETWEEN THE CHARACTERS OF THE INBRED PARENTS AND THOSE OF THEIR F_1 CROSSES

In studying the relationships between inbred parents and F_1 crosses it was first decided to attack the problem by the three following methods:

1. Determine the coefficients of correlation between the characters of the F_1 cross and those of each parent separately.

2. Determine the coefficients of correlation between the characters of the F_1 cross and the mean value of these characters in their two parents.

3. Determine the coefficients of correlation between the characters of the inbred parent and the mean value of these characters in all of their crossbred progeny.

With the first method of computing the coefficients of correlation the F_1 crosses were paired first with one parent and then with the other. Each cross, therefore, appeared twice in each correlation table. With the second method the F_1 crosses were paired with the mean values for their two parents and appeared in each correlation table only once.

When computations of the coefficients of correlation by the first two methods were started it appeared that there should be a definite relation between the coefficients calculated by these two methods. Investigation showed that if there is no correlation between the two inbred parents of the F_1 crosses then $r_2 = r_1\sqrt{2}$, where r_1 is the correlation with each parent as determined by the first method and r_2 is the correlation with the mean value of the two parents as determined by the second method.

In the present material there should be no correlation between the two inbred parents of the different crosses. The F_1 crosses were made in a systematic order that amounted almost to a cross of each inbred line with all of the others which in itself would eliminate any possibility of correlation.

The coefficients of correlation between the characters of the F_1 crosses and those of each separate parent could be calculated with less work than could the correlations with the mean values of the two parents. For this reason they were calculated first and the correlations between the characters of the F_1 crosses and the mean value of the characters in their two parents then were computed from them by multiplying by $\sqrt{2}$.

CORRELATIONS WITH EACH INBRED PARENT

AND WITH THE MEAN OF THE TWO PARENTS

The coefficients of correlation between the different characters studied in the F_1 crosses and the same character in each inbred parent are shown in Table 10. The correlations between the characters of the F_1 crosses and the mean value of the same character in the two parents, also, are shown in this table. As would be expected, these latter correlations were not only higher but were more significant when judged in comparison with their probable errors than were the correlations with each parent.

TABLE 10. Coefficients of correlation betwe
characters in the F_1 cross and the same ch
the parental inbred lines.

Sym-bol	Character	Co With e parent sep
A	Date 1/4 tasseled	0.3051 ± 0.0
B	Date 1/4 silked	.2373 ± .0
C	Plant height	.3156 ± .0
E	Number of nodes per plant	.4236 ± .0
F	Number of nodes to upper ear	.4212 ± .0
G	Per cent of nodes below ear	.4131 ± .0
H	Per cent of plants smutted	.1676 ± .0
I	Number of suckers per 100 plants	.3928 ± .0
J	Per cent of plants standing erect at harvest	.5111 ± .0
K	Per cent of plants with two or more ears	.1752 ± .0
L	Number of ears per plant	.2566 ± .0
M	Per cent of ears moldy	.2161 ± .0
N	Ear length	.3027 ± .0
O	Ear diameter	.3482 ± .0
P	Ear shape index (diameter ÷ length)	.3390 ± .0
Q	Shrinkage per cent of the harvested ears	.2457 ± .0
R	Shelling per cent	.3873 ± .0
S	Mean number of kernel rows per ear	.4719 ± .0
X	Yield	.1447 ± .0

correlation between certain
ss and the same character in
s.

	Coefficients of correlation: With each parent separately	Coefficients of correlation: With the mean value of the two parents
	0.3051 ± 0.0213	0.4315 ± 0.0270
	.2373 ± .0221	.3356 ± .0295
	.3156 ± .0211	.4463 ± .0266
	.4236 ± .0193	.5991 ± .0213
	.4212 ± .0193	.5957 ± .0214
	.4131 ± .0195	.5842 ± .0219
	.1676 ± .0228	.2370 ± .0313
	.3928 ± .0198	.5555 ± .0229
st	.5111 ± .0173	.7228 ± .0159
	.1752 ± .0227	.2478 ± .0312
	.2566 ± .0219	.3629 ± .0288
	.2161 ± .0224	.3056 ± .0301
	.3027 ± .0213	.4281 ± .0271
	.3482 ± .0206	.4924 ± .0251
	.3390 ± .0208	.4794 ± .0256
	.2457 ± .0221	.3475 ± .0292
	.3873 ± .0200	.5477 ± .0232
	.4719 ± .0182	.6674 ± .0184
	.1447 ± .0230	.2046 ± .0318

It will be seen that the correlations were positive and significant in every case. The highest correlation was with per cent of erect plants although high correlations also were obtained for the characters, number of kernel rows per ear, number of nodes per plant, number of nodes to upper ear and per cent of nodes below ear. Yield gave the lowest correlation obtained.

Table 11 shows the coefficients of correlation between the yields of the F_1 crosses and the various characters studied in the inbred parents.

TABLE 11. Coefficients of correlation b
yield of the F_1 cross and certain char
in the parental inbred lines.

Sym-bol	Character in the inbred parent with which yield of the cross was correlated	Coe With e parent sep
A	Date 1/4 tasseled	0.1197 ±
B	Date 1/4 silked	.0953 ±
C	Plant height	.1342 ±
E	Number of nodes per plant	.1723 ±
F	Number of nodes to upper ear	.1406 ±
G	Per cent of nodes below ear	-.0538 ±
H	Per cent of plants smutted	-.0639 ±
I	Number of suckers per 100 plants	.0290 ±
J	Per cent of plants standing erect at harvest	-.0446 ±
K	Per cent of plants with two or more ears	.0673 ±
L	Number of ears per plant	.0827 ±
M	Per cent of ears moldy	-.0676 ±
N	Ear length	.1127 ±
O	Ear diameter	.0894 ±
P	Ear shape index (diameter ÷ length)	-.0979 ±
Q	Shrinkage per cent of the harvested ears	.0479 ±
R	Shelling per cent	.0689 ±
S	Mean number of kernel rows per ear	-.0048 ±
X	Yield	.1447 ±

Coefficients of correlation between
the F_1 cross and certain characters
arental inbred lines.

ith which yield of ated	Coefficients of Correlation: With each parent separately	With the mean value of the two parents
	0.1197 ± 0.0231	0.1693 ± 0.0322
	.0953 ± .0233	.1348 ± .0326
	.1342 ± .0230	.1898 ± .0320
	.1723 ± .0228	.2437 ± .0312
	.1406 ± .0230	.1988 ± .0319
	-.0538 ± .0234	-.0761 ± .0330
	-.0639 ± .0234	-.0904 ± .0329
	.0290 ± .0235	.0410 ± .0331
t at harvest	-.0446 ± .0234	-.0631 ± .0331
ore ears	.0673 ± .0234	.0952 ± .0329
	.0827 ± .0233	.1170 ± .0327
	-.0676 ± .0234	-.0956 ± .0329
	.1127 ± .0232	.1594 ± .0323
	.0894 ± .0233	.1264 ± .0327
th)	-.0979 ± .0232	-.1384 ± .0326
ted ears	.0479 ± .0234	.0677 ± .0330
	.0689 ± .0234	.0974 ± .0329
ar	-.0048 ± .0235	-.0068 ± .0332
	.1447 ± .0230	.2046 ± .0318

The correlations in Table 11 are much lower than those in Table 10 as is to be expected. Those characters in the inbred parents which gave the highest correlation with yield of the F_1 cross, listed in order according to the size of the coefficients were number of nodes per plant, yield, number of nodes to upper ear, plant height, date one-fourth tasseled and length of ear. All of these characters were, in a way, measures of vigor in the inbred plants so that it would appear that vigorous inbreds should give the most productive F_1 crosses.

CORRELATIONS BETWEEN CHARACTERS OF THE INBRED PARENT AND THE MEAN VALUE OF THESE CHARACTERS IN THE CROSSBRED PROGENY

Coefficients of correlation between the characters of the inbred parent and the mean yield of their crossbred progeny are recorded in Table 12. Correlations between the characters of the inbred parent and the mean value of the same character in the crossbred progeny are recorded in Table 13. The coefficients in these two tables differ considerably in the manner in which they were computed. in the case of the correlations in Table 12 the mean yield of the crosses, first was determined for each inbred line. These means then were adjusted for heterogeneity in the same manner as was previously described for the other data on the inbred lines. In making this adjustment a mean was computed for the lines from each variety and the means for the different lines then were expressed as deviations from the mean of their parent variety. In the case of the correlations in Table 13 no such adjustments were made. Instead the five different yield groups were kept separate and the coefficients of correlation were computed within each yield group.

The coefficients of correlation recorded in Table 12 between the characters studied in the parental inbred lines and the mean yield of their crossbred progeny have been computed separately for the crosses made in 1925, after three years of selfing and those made in 1926, after four years of selfing, and for both groups combined. In several cases the correlations after three and after four years of selfing differed markedly in size. These differences probably were due to the differences in the growing seasons of 1926 and 1927 when the two groups of crosses were compared for yield. In the season of 1926, when the crosses after three years of selfing were grown, there was a late fall. This gave a decided advantage to the sorts requiring a longer season. In the season of 1927, however, there was an early frost, this giving an advantage to the earlier maturing sorts.

TABLE 12. Coefficients of correlati
characters of the inbred parents a
their crossbred progeny.

Character in parent correlated with mean yield of crossbred progeny	Coefficie F_1 crosse after thi seli
Date 1/4 tasseled	0.2322
Date 1/4 silked	.1451
Plant height	.1601
Chlorophyll color	- .0737
Number of nodes per plant	.2901
Number of nodes to upper ear	.2362
Per cent of nodes below ear	- .0403
Per cent of plants smutted	- .1448
Number of suckers per 100 plants	.0250
Per cent of plants standing erect at harvest	- .0398
Per cent of plants with two or more ears	.2043
Number of ears per plant	.2045
Per cent of ears moldy	- .1333
Ear length	.1620
Ear diameter	.2307
Ear shape index (diameter ÷ length)	- .0909
Shrinkage in per cent of the harvested ears	.2365
Shelling per cent	.1907
Mean number of kernel rows per ear	.1276
Coefficient of variability of number of kernel rows	.1606
Yield	.3159

ients of correlation between the various
he inbred parents and the mean yield of
progeny.

d of cross	Coefficients of correlation for the groups indicated: F_1 crosses made after three years selfing	F_1 crosses made after four years selfing	Both groups taken together
	0.2322 ± 0.0758	-0.0357 ± 0.0878	0.1510 ± 0.0579
	.1451 ± .0785	- .0755 ± .0874	.0699 ± .0590
	.1601 ± .0781	.3160 ± .0791	.2087 ± .0567
	- .0737 ± .0797	- .1090 ± .0869	- .0846 ± .0589
	.2901 ± .0734	.2780 ± .0811	.2806 ± .0546
	.2362 ± .0757	.2248 ± .0835	.2236 ± .0563
	- .0403 ± .0800	.0321 ± .0878	- .0139 ± .0592
	- .1448 ± .0785	- .0325 ± .0878	- .1118 ± .0585
	.0250 ± .0801	- .1291 ± .0865	- .0196 ± .0592
	- .0398 ± .0800	.1066 ± .0869	.0090 ± .0592
	.2043 ± .0768	.1163 ± .0864	.1668 ± .0576
	.2045 ± .0768	.0835 ± .0873	.1594 ± .0577
	- .1333 ± .0787	.0491 ± .0877	- .0776 ± .0589
	.1620 ± .0781	- .2345 ± .0831	.0217 ± .0592
	.2307 ± .0759	- .1283 ± .0865	.0976 ± .0587
	- .0909 ± .0795	.0682 ± .0875	- .0444 ± .0591
	.2365 ± .0757	.0505 ± .0877	.1648 ± .0576
	.1907 ± .0772	- .1073 ± .0869	.0841 ± .0588
	.1276 ± .0789	- .0377 ± .0878	.0717 ± .0589
l rows	.1606 ± .0781	- .0047 ± .0879	.0963 ± .0587
	.3159 ± .0722	.1218 ± .0866	.2334 ± .0560

It will be noticed that all of the discrepancies occurred in those characters which indicate large sized ears and late maturity such as date one-fourth tasseled, date one-fourth silked, ear length, ear diameter, per cent of moisture in grain at harvest, shelling per cent and mean number of kernel rows. Most of these characters gave a positive correlation with mean yield of crosses after three years of selfing and no significant correlation or a negative correlation after four years of selfing.

A few of the characters such as plant height, number of nodes per plant, number of nodes to upper ear, per cent of plants with two or more ears and yield of the inbred line gave significant correlations with mean yield of crosses both after three and four years of selfing and for both groups taken together. Yield of the inbred lines showed the highest positive correlation with mean yield of crosses after three years of selfing, a significant positive correlation after four years of selfing and the second highest positive correlation for both groups taken together. The highest positive correlation for both groups taken together was with number of nodes per plant.

The coefficients of correlation between characters in the parental inbred lines and the mean value of the same character in their crossbred progeny are recorded in

Table 13. These are the highest correlations that were obtained, in fact many of them are high enough to be very valuable for predictive purposes. The fact that the data were not adjusted for varietal differences between the lines may account in part for these correlations being so high. Varietal differences, however, can not account for the high correlations in the group of white crosses grown in 1926. In this group 17 inbred lines were represented in the correlation studies. Three of these lines were from the parent variety Silver King and remaining 14 were from the variety Four County White. These two varieties are very closely related, Four County White being in reality practically a selected strain of Silver King.

TABLE 13. Coefficients of corre
in the inbred parents and the
character for all of their cro
ted for each of the five diffe

Character	Coefficients of corr — White crosses 1926	Early yellow crosses 1926
Date 1/4 tasseled	0.8620 ± 0.0421	0.7061 ± 0.0777
Date 1/4 silked	.8028 ± .0582	.5196 ± .1131
Plant height	.5194 ± .1196	.6282 ± .0938
Number of nodes per plant	.8878 ± .0345	.8555 ± .0415
Number of nodes to upper ear	.8061 ± .0574	.7535 ± .0670
Per cent of nodes below ear	.5807 ± .1084	.8924 ± .0314
Per cent of plants smutted	.7952 ± .0602	.2350 ± .1464
Number of suckers per 100 plants	.6909 ± .0855	.8792 ± .0352
Per cent of plants standing erect at harvest	.7693 ± .0669	.7904 ± .0581
Per cent of plants with two or more ears	.7728 ± .0658	.3153 ± .1395
Number of ears per plant	.4047 ± .1370	.5921 ± .1006
Per cent of ears moldy	.4618 ± .1289	.5605 ± .0874
Ear length	.3690 ± .1415	.6695 ± .0855
Ear diameter	.9834 ± .0052	.7825 ± .0601
Ear shape index (diameter ÷ length)	.4673 ± .1280	.1917 ± .1493
Shrinkage per cent of the harvested ears	.7797 ± .0642	.7054 ± .0778
Shelling per cent	.8226 ± .0530	.4978 ± .1136
Mean number of kernel rows per ear	.8517 ± .0450	.9158 ± .0250
Yield	.6728 ± .0897	.6400 ± .0915

ts of correlation between characters
ts and the mean value of the same
f their crossbred progeny, as compu-
five different yield groups.

nts of correlation in the yield group indicated						
yellow s 1926	Later yellow crosses 1926		White crosses 1927		Yellow crosses 1927	
0.0777	0.6513	± 0.0647	0.2773	± 0.1880	0.6075	± 0.0591
.1131	.5925	± .0731	.4471	± .1629	.5560	± .0647
.0938	.5329	± .0806	.5853	± .1339	.5982	± .0601
.0415	.6418	± .0663	----	----	----	----
.0670	.7190	± .0544	----	----	----	----
.0314	.7498	± .0494	----	----	----	----
.1464	.6918	± .0587	----	----	----	----
.0352	.7772	± .0445	----	----	----	----
.0581	.8769	± .0260	.5916	.1324	.4078	.0781
.1395	.5921	± .0731	----	----	----	----
.1006	.5774	± .0749	----	----	----	----
.0874	.2516	± .1054	.6510	.1173	.2406	.0882
.0855	.7962	± .0412	----	----	----	----
.0601	.7062	± .0564	----	----	----	----
.1493	.8461	± .0320	----	----	----	----
.0778	.6160	± .0699	.3575	.1776	.5022	.0700
.1156	.6860	± .0596	.8198	.0669	.1449	.0917
.0250	.8785	± .0257	----	----	----	----
.0915	.2534	± .1055	.4149	.1588	.4519	.0745

Most of the correlations in Table 13 are significant. They are all positive and of sufficient size to indicate that the characters of the inbred lines on the average were very definitely expressed in their F_1 crosses. This often can not be observed so well in individual crosses and was shown only slightly in the correlations between F_1 crosses and each inbred parent or between F_1 crosses and the mean of their two parents. The high correlations in Table 13 bring out effectively the advantages to be gained by using inbred lines in a number of similar crosses when they are to be compared. In fact, it was felt that the indications brought out here were of sufficient important to warrant the inclusion of a number of tables of data from the different yield groups to show more clearly the individuality or prepotency demonstrated by the different inbred lines. Before these tables are presented, however, there remains to be discussed the coefficients of partial correlation between inbred parents and F_1 crosses.

COEFFICIENTS OF PARTIAL AND OF MULTIPLE CORRELATION BETWEEN CHARACTERS OF THE INBRED PARENT AND THE MEAN YIELD OF THEIR CROSSBRED PROGENY

Coefficients of partial and of multiple correlation similar to those computed within the inbred lines and within the F_1 crosses have been calculated between the four groups of characters of the inbred parent and the mean yield of their crossbred progeny. Each of the different groups contained the same characters as were used in the correlations within inbred lines, with the exception that in the group of characters indicating plant vigor (Group 2) yield of the inbred parent was substituted for chlorophyll color.[1] The partial and multiple correlations computed are recorded in Table 14.

The highest multiple correlation (0.4207) with mean yield of the crossbred progeny was given by Group 2, the characters of the inbred parent indicating plant vigor. The characters in Group 1 gave the second highest multiple correlation. Group 3, which gave the highest multiple correlation with yield both within the inbred lines and within the F_1 crosses, gave the lowest multiple correlation in Table 14.

1. It will be recalled that Group 1 contained the characters indicating the relative length of season required to reach maturity, Group 2 contained the characters indicating relative plant vigor, Group 3 containted the characters indicating the relative susceptibility to disease, and Group 4 contained the characters of the harvested ears.

TABLE 14. Coefficients of partial and of multiple correlation between four groups of characters of the inbred parent and the mean yield of their crossbred progeny.

Group number	Designation of coefficient	Coefficient of correlation
1	$r_{AX \cdot BQ}$	0.2022 ± 0.0581
	$r_{BX \cdot AQ}$	- .1315 ± .0595
	$r_{QX \cdot AB}$	.1980 ± .0582
	$R_{X \cdot ABQ}$	.3102 ± .0545
	$r_{CX \cdot EFX}$	-0.0663 ± 0.0606
	$r_{EX \cdot GFX}$	.2184 ± .0579
2	$r_{FX \cdot CEX}$	.0253 ± .0608
	$r_{XX \cdot CEF}$	.3122 ± .0549
	$R_{X \cdot CEFX}$	.4207 ± .0499
	$r_{HX \cdot JM}$	-0.1393 ± 0.0594
3	$r_{JX \cdot HM}$	- .0518 ± .0604
	$r_{MX \cdot HJ}$	- .1425 ± .0593
	$R_{X \cdot HJM}$	.2032 ± .0578
	$r_{NX \cdot OR}$	0.1010 ± 0.0600
	$r_{OX \cdot NR}$	.1594 ± .0590
4	$r_{RX \cdot NO}$	.1241 ± .0596
	$R_{X \cdot NOR}$	.2809 ± .0556

Only a few of the coefficients of partial correlation computed for each of the characters in the different groups with the remaining characters in the group held constant can be considered as significant. In Group 1, the partial correlation between date one-fourth tasseled (A) and mean yield of crosses for constant date one-fourth silked (B) and shrinkage per cent (Q) was without doubt significant. That between shrinkage per cent of the harvested ears (Q) and mean yield of crosses for constant date one-fourth tasseled (A) and date one-fourth silked (B) also was large enough to be significant. The positive partial correlation between date one-fourth tasseled and mean yield of crosses and the negative partial correlation between date one-fourth silked and mean yield of crosses is in agreement with the same situation in the partial correlations within the inbred lines and probably is indicative of a negative correlation between the number of days from tasseling to silking in the inbred parents and the mean yield of their crosses.

Group 2 gave two significant partial correlations, one was between number of nodes per plant (E) and mean yield of crosses and the other was between yield of the inbred line (X) and mean yield of crosses. It is of interest to note that the highest partial correlation obtained with mean yield of crosses was this one of 0.3122 ± 0.0549 with yield of the inbred parent.

None of the characters in Group 3 or Group 4 gave significant partial correlations with mean yield of crosses. However, the fact that all of those in Group 3 were negative and all of those in Group 4 were positive probably indicates a general trend in each case.

DATA ON THE PREPOTENCY OF INBRED LINES USED AS THE PARENTS OF F_1 CROSSES

In the correlation studies that have been discussed up to this point there is one very important relation that has not been brought out clearly. This is what might be termed the prepotency of the inbred lines used as the parents of F_1 crosses. By this is meant the uniformity with which certain inbred lines impress upon their F_1 progeny characters which they may or may not exhibit themselves. Correlation studies between the F_1 cross and each inbred parent or between the F_1 cross and the mean value of its two parents may not bring out this relation at all. The correlations between the characters of the inbred parent and the mean value of these characters in their crossbred progeny recorded in Table 13 most nearly bring out this relation. However, it is a relation which can not always be expressed by a coefficient of correlation as the character expressed in the crossbred progeny may be hidden in the parent due to the influence of a single recessive factor.

In order to bring out more clearly this idea of the prepotency displayed by the different inbred lines a number of tables have been included which give in detail the data on the F_1 crosses and their inbred parents. The data on yield and per cent of plants erect at harvest are included for all of the five different yield groups. Data on a number of the other characters studied are included for only one yield group, namely the later yellow crosses grown in 1926.

DATA ON YIELDS

The results of the yield test of the various F_1 crosses and inbred parents are given in Tables 15 to 19 inclusive. In each table the numbers of the parent lines are shown along the top and left sides of the tables. The yield of each F_1 combination is given at the intersection of the row and column headed by the numbers of its parents. The mean yields of all of the F_1 crosses of each inbred line together with the yields of the parent inbred lines themselves are recorded along the right and lower edges of the tables.

The yields of the inbred lines have been included for comparison among themselves only. They should not be compared directly with the yields of the F_1 crosses as the yield experiment of inbreds was not comparable as to location with the 1926 yield experiment of crosses and was not comparable as to either season or location with the 1927 yield experiment of crosses. The yield experiment of inbred lines was located on more productive soil than the 1926 yield experiment of crosses so that the yields of the inbred lines are slightly higher in proportion than they should be. The season of 1927 was so much less favorable for corn production than that of 1926 that the acre yields of many of the crosses grown in 1927 were actually less than the yields of some of the better inbred lines grown in 1926.

TABLE 15. Yield in pounds per row of the F_1 crosses between inbred lines from varieties of white corn and of the parent lines as grown in 1926.

No. of parent line	11	12	13	14	15	16	17	18	19	20	Mean yield of crosses for each parent line	Yield of parent line (1)
1	10.87	13.46	9.90	11.75	13.54	11.67	10.85	12.16	11.93	14.61	12.07	-----
2	12.31	12.82	13.94	16.67	13.99	12.68	12.44	12.37	13.72	13.42	13.44	6.88
3	9.18	11.79	9.86	11.79	12.90	9.28	11.71	12.21	10.91	12.26	11.19	4.16
4	12.14	13.23	12.88	15.41	14.17	12.06	13.02	11.84	10.92	14.55	13.02	7.24
5	10.04	13.42	11.61	16.13	13.77	10.48	12.79	12.02	11.38	13.64	12.53	7.37
6	10.55	12.00	11.99	14.14	14.61	12.34	13.11	13.40	11.96	13.71	12.78	4.82
7	12.43	13.82	11.36	14.21	13.63	13.87	14.13	12.28	13.10	13.54	13.24	7.87
9	13.10	12.84	12.74	16.02	14.09	13.82	14.09	13.10	14.97	13.26	13.80	7.53
10	10.67	12.50	13.33	15.59	10.94	12.10	12.08	9.71	9.88	11.59	11.84	5.13
Mean yield of crosses for each parent line	11.25	12.88	11.96	14.63	13.52	12.03	12.69	12.12	12.09	13.40	12.66(2)	
Yield of parent line (1)	5.71	4.77	-- --	7.89	5.85	5.40	5.59	6.42	5.42	-- --		

P.E. of the difference between the yields of any two parent lines, ± 0.460.
P.E. of the difference between the yields of any two F_1 crosses, ± 0.627.
P.E. of the difference between means of 9 crosses, ± 0.192; and between means of 10 crosses, ± 0.182.
(1) Yields of the parent lines should be compared among themselves only, they are not comparable to the yields of the crosses.
(2) Mean yield of all crosses in the experiment.

TABLE 16. Yield in pounds per row o
between inbred lines from early va
low corn and of the parent lines a

Number of parent line	31	32	33	34	35	36	37
21	6.50	6.50	10.24	8.21	12.27	7.81	10.78
22	11.45	9.33	11.67	10.74	12.46	11.49	11.88
24	13.28	11.72	12.01	12.44	13.46	12.58	11.29
25	15.12	12.63	14.22	14.43	14.86	13.80	13.74
26	13.74	12.47	14.90	14.84	14.38	13.51	14.00
27	9.61	6.40	10.92	10.40	9.41	10.77	10.60
28	13.34	10.83	12.75	12.23	12.72	14.30	11.40
29	13.69	8.97	15.04	13.33	12.84	12.33	14.60
30	14.01	10.15	14.64	13.65	12.50	15.02	14.08
Mean yield of crosses for each parent line	12.30	9.89	12.93	12.25	12.77	12.40	12.49
Yield of parent line (1)	3.20	1.85	6.63	5.68	9.14	5.85	6.63

P.E. of the difference between the yields of any two parent lines,
P.E. of the difference between the yields of any two F_1 crosses, -
P.E. of the difference between means of 9 crosses, $\pm$ 0.154; and be
(1) Yields of the parent lines should be compared among themselves
(2) Mean yield of all crosses in the experiment.

er row of the F_1 crosses
early varieties of yel-
lines as grown in 1926.

37	38	39	40	Mean yield of crosses for each parent line	Yield of parent line (1)
10.78	10.06	8.61	10.02	9.10	2.45
11.88	13.54	12.00	10.40	11.50	8.19
11.29	13.34	13.23	10.72	12.41	4.45
13.74	14.34	14.50	12.88	14.05	8.74
14.00	13.52	13.70	13.17	13.82	7.92
10.60	10.69	10.14	8.00	9.65	4.33
11.40	12.09	13.77	10.57	12.40	5.02
14.60	14.87	10.31	10.16	12.61	2.58
14.08	12.28	12.60	9.92	12.88	5.33
12.49	12.75	12.10	10.65	12.05(2)	
6.63	7.45	3.09	2.83		

t lines, ± 0.460.
osses, ± 0.501.
; and between means of 10 crosses, ± 0.146.
emselves only, they are not comparable to the yields of the crosses.

TABLE 17. Yield in pounds per row of
between inbred lines from the later
yellow corn and of the parent lines
1926.

Number of parent line	41	42	43	50	53	63	64	6
45	16.38	15.76	16.81	21.42	-- --	15.33	12.79	15
46	13.31	13.64	15.62	13.77	14.31	12.78	11.77	15
47	13.99	13.37	14.60	13.46	12.66	-- --	16.14	15
48	14.52	17.60	18.45	10.09	20.74	16.05	15.69	15
49	16.23	19.35	19.02	13.70	16.19	14.86	17.80	17
51	16.61	10.97	18.05	10.94	15.68	13.88	15.71	14
52	13.62	15.14	16.47	14.41	15.92	12.86	13.89	16
54	14.15	16.10	16.67	14.68	14.35	12.83	16.11	15
55	13.81	14.98	15.99	13.80	13.95	12.85	16.33	16
56	13.75	13.19	15.53	-- --	-- --	11.69	-- --	16
57	15.06	17.41	18.01	15.67	-- --	15.01	17.68	15
58	14.71	16.49	17.04	16.63	15.00	15.04	18.02	17
59	15.44	18.29	19.93	16.30	-- --	14.60	17.29	19
60	15.21	16.52	16.43	14.61	17.50	12.07	18.40	17
61	14.80	12.96	16.73	14.67	14.27	13.24	16.75	15
62	13.26	15.85	14.30	14.09	13.23	12.39	16.58	15
66	15.99	17.16	18.30	17.97	19.57	15.07	18.53	18
67	11.83	13.65	15.28	12.44	15.22	11.51	17.82	15
68	11.97	13.11	17.23	16.20	16.48	9.53	18.56	20
69	13.96	16.18	18.29	16.54	18.71	16.04	16.33	17
70	13.64	15.49	18.03	16.02	16.59	14.83	15.98	17
72	12.35	15.47	15.71	15.98	17.28	12.64	16.73	18
73	12.18	18.47	15.43	15.00	-- --	13.77	16.23	18
74	14.15	16.12	16.90	17.46	17.45	13.61	15.92	16
76	14.39	15.34	16.89	15.71	15.38	13.57	15.68	16
77	17.14	20.44	16.50	18.03	17.54	15.11	17.83	19
78	13.60	13.36	15.81	15.88	16.39	14.25	17.32	17
79	12.92	12.95	15.81	17.05	18.62	15.99	17.49	18
80	14.70	16.46	17.67	14.73	17.48	14.11	16.93	16
Mean yield of crosses for each parent line	14.26	15.58	16.81	15.26	16.36	13.77	16.51	16
Yield of parent line(1)	-- --	-- --	7.62	1.83	6.84	8.44	9.62	7

P.E. of the difference between the yields of any two parent lines,
P.E. of the difference between the yields of any two F_1 crosses, ±
P.E. of the difference between means of 10 crosses, ± 0.182; and be
(1)Yield of the parent lines should be compared among themselves or
(2)Mean yield of all crosses in the experiment.

ls per row of the F_1 crosses
om the later varieties of
parent lines as grown in

53	64	65	71	75	Mean yield of crosses for each parent line	Yield of parent line[1]
5.33	12.79	15.87	18.59	19.39	16.93	8.50
2.78	11.77	15.16	11.60	19.28	14.12	7.56
- --	16.14	15.63	15.79	16.78	14.71	5.27
5.05	15.69	15.73	15.05	15.91	15.98	9.39
4.86	17.80	17.74	17.08	17.38	16.94	8.91
5.88	15.71	14.82	16.97	16.89	15.05	7.40
2.86	13.89	16.49	14.82	15.10	14.87	6.87
2.83	16.11	15.97	15.98	17.43	15.43	7.64
2.85	16.33	16.99	16.80	16.68	15.22	5.85
1.69	-- --	16.09	15.14	15.23	14.37	6.65
5.01	17.68	15.70	16.38	17.59	16.61	8.27
5.04	18.02	17.04	17.91	15.00	16.29	7.22
4.60	17.29	19.03	19.15	-- --	17.50	6.97
2.07	18.40	17.37	17.61	18.12	16.38	9.84
5.24	16.75	15.20	14.80	15.05	14.85	5.14
2.39	16.58	15.11	15.72	14.81	14.73	3.92
5.07	18.53	18.48	17.19	19.82	17.81	7.36
1.51	17.82	15.60	13.71	14.13	14.12	11.67
9.53	18.56	20.34	15.38	15.33	15.41	4.44
6.04	16.33	17.90	14.51	15.65	16.41	10.26
4.83	15.98	17.14	15.83	11.72	15.53	8.42
2.64	16.73	18.76	14.54	16.07	15.55	7.77
3.77	16.23	18.15	11.55	13.54	14.92	6.71
3.61	15.92	16.14	12.61	13.72	15.41	6.09
3.57	15.68	16.79	18.65	16.39	15.88	6.34
5.11	17.83	19.58	13.56	18.34	17.41	9.07
4.25	17.32	17.98	15.40	17.12	15.71	6.66
5.99	17.49	18.99	14.96	15.06	15.98	- --
4.11	16.93	16.10	16.93	15.71	16.08	8.60
3.77	16.51	16.96	15.70	16.19 [2]	15.73	
8.44	9.62	7.08	8.62	8.66		

arent lines, ± 0.460.
1 crosses, ± 0.627.
0.182; and between means of 29 crosses, ± 0.107.
themselves only, they are not comparable to the yields of the crosses.

TABLE 18. Yield in pounds per row of the F_1 crosses between inbred lines from varieties of white corn as grown in 1927 and of the parent lines as grown in 1926.

Number of inbred line	101	102	103	104	105	106	107	109	110	111	112	Mean yield of crosses for each parent line	Yield of parent line (1)
101	- --	11.33	11.45	10.60	10.64	10.78	11.33	11.03	11.17	10.97	11.50	11.08	7.17
102	11.33	-- --	11.64	12.39	9.54	11.62	12.89	9.25	12.30	13.06	14.54	11.86	5.32
103	11.45	11.64	-- --	10.36	11.33	11.67	11.13	11.76	11.40	10.08	11.18	11.20	7.64
104	10.60	12.39	10.36	-- --	10.69	10.86	11.87	10.99	11.64	11.31	-- --	10.08	7.40
105	10.64	9.54	11.33	10.69	-- --	10.50	12.45	10.89	11.91	-- --	13.16	11.23	5.11
106	10.78	11.62	11.67	10.86	10.50	-- --	13.65	11.35	12.18	10.46	11.88	11.51	6.65
107	11.33	12.89	11.13	11.87	12.45	13.65	-- --	12.06	12.87	12.21	12.40	12.29	6.30
109	11.03	9.25	11.76	10.99	10.89	11.35	12.06	-- --	12.31	10.87	12.69	11.32	6.18
110	11.17	12.30	11.40	11.64	11.91	12.18	12.87	12.31	-- --	12.50	12.57	12.09	6.31
111	10.97	13.06	10.08	11.31	-- --	10.46	12.21	10.87	12.50	-- --	11.22	11.42	4.26
112	11.50	14.54	11.18	-- --	13.16	11.88	12.40	12.69	12.57	11.22	-- --	12.35	- --
Mean yield of all crosses in the experiment												11.60	

P.E. of the difference between the yields of any two parent lines, $\pm$ 0.460.
P.E. of the difference between the yields of any two F_1 crosses, $\pm$ 0.563.
P.E. of the difference between means of 9 crosses, $\pm$0.173; and between means of 10 crosses $\pm$ 0.164.

(1) Yields of the parent lines should be compared among themselves only, they are not comparable to the yields of the crosses.

TABLE 19. Yield in pounds per r
between inbred lines from vari
as grown in 1927 and of parent
1926.

Number of parent line	121	140	143	150	153	157	160
114	9.11	11.85	9.27	10.97	9.99	8.76	10.57
116	10.21	10.04	10.34	10.54	8.82	10.10	10.64
117	8.76	11.26	10.34	10.79	11.54	11.38	9.93
118	8.54	12.87	10.70	9.59	11.16	9.44	10.18
119	9.94	11.67	11.21	9.28	10.70	10.52	10.90
120	10.17	13.06	9.96	11.08	11.13	11.00	11.59
123	9.51	10.30	10.18	10.66	11.09	9.14	10.12
124	10.99	12.75	13.43	10.83	12.46	12.69	12.85
125	11.73	-- --	11.07	10.89	11.18	9.78	11.77
126	11.68	13.37	13.18	9.50	12.47	10.62	13.21
128	11.74	11.86	11.62	11.31	12.56	12.27	12.27
129	10.16	11.94	10.79	11.68	11.52	11.49	10.44
130	10.32	11.31	10.37	10.14	10.95	10.83	11.08
132	9.83	12.44	10.61	10.85	11.39	11.10	11.20
133	9.00	11.23	8.82	8.57	8.96	10.26	9.72
135	13.21	12.57	12.34	12.06	12.40	14.04	12.99
136	12.43	10.41	11.54	11.16	13.20	11.41	12.14
139	12.18	9.81	11.53	11.76	11.43	12.25	12.10
141	11.80	11.99	12.79	9.31	11.45	10.54	11.55
142	11.83	11.64	11.38	12.43	11.99	11.63	11.72
144	12.07	10.32	10.51	11.31	11.20	11.53	11.26
146	11.54	13.87	13.26	12.49	11.84	10.34	13.72
147	9.85	10.38	8.13	10.16	10.82	7.90	10.72
149	10.68	12.02	9.77	9.02	9.09	10.87	10.56
151	-- --	-- --	9.72	10.90	10.60	9.02	11.18
154	10.36	13.05	11.06	11.81	11.31	10.83	11.23
155	12.67	12.78	9.55	10.58	11.59	11.46	10.44
156	9.76	10.12	8.98	10.83	10.44	12.29	11.05
158	9.73	11.97	10.95	12.00	9.12	8.74	10.71
159	9.44	9.37	8.96	8.27	8.93	8.62	6.57
161	10.09	12.81	11.16	10.83	12.23	9.86	11.24
162	10.76	9.74	8.49	10.10	9.26	10.50	8.50
164	9.17	13.19	9.13	11.26	10.83	9.54	10.84
165	9.25	11.69	9.53	9.68	9.62	9.36	9.52
166	10.68	10.26	11.55	10.63	10.69	9.50	10.88
167	10.22	12.48	10.41	9.82	10.62	9.49	9.80
169	10.88	12.70	10.94	9.64	10.65	11.16	11.21
170	8.97	9.22	9.42	9.54	7.31	10.01	10.46
172	9.93	8.90	10.20	11.06	10.05	10.95	10.87
173	9.00	8.63	9.53	9.66	8.96	8.65	10.78
174	9.80	11.64	11.67	11.33	11.45	10.10	10.63
175	9.54	-- --	9.70	10.28	11.06	8.88	10.36

ounds per row of t
from varieties c
of parent lines

157	160	168
3.76	10.57	10.07
0.10	10.64	8.67
1.38	9.93	9.48
9.44	10.18	10.70
0.52	10.90	11.13
1.00	11.59	10.24
9.14	10.12	10.97
2.69	12.85	12.68
9.78	11.77	11.01
0.62	13.21	11.38
2.27	12.27	11.13
1.49	10.44	10.92
0.83	11.08	11.57
1.10	11.20	10.71
0.26	9.72	11.73
4.04	12.99	10.99
1.41	12.14	12.92
2.25	12.10	10.29
0.54	11.55	12.07
1.63	11.72	12.21
1.53	11.26	10.98
0.34	13.72	10.86
7.90	10.72	10.30
0.87	10.56	11.01
9.02	11.18	9.65
0.83	11.23	12.54
1.46	10.44	11.25
2.29	11.05	10.00
8.74	10.71	10.16
8.62	6.57	8.58
9.86	11.24	9.89
10.50	8.50	8.93
9.54	10.84	9.30
9.36	9.52	9.24
9.50	10.88	8.90
9.49	9.80	9.24
11.16	11.21	9.50
10.01	10.46	7.12
10.95	10.87	11.15
8.65	10.78	8.81
10.10	10.63	10.61
8.88	10.36	8.96

pounds per ro
nes from varie
and of parent

157	160
8.76	10.57
10.10	10.64
11.38	9.93
9.44	10.18
10.52	10.90
11.00	11.59
9.14	10.12
12.69	12.85
9.78	11.77
10.62	13.21
12.27	12.27
11.49	10.44
10.83	11.08
11.10	11.20
10.26	9.72
14.04	12.99
11.41	12.14
12.25	12.10
10.54	11.55
11.63	11.72
11.53	11.26
10.34	13.72
7.90	10.72
10.87	10.56
9.02	11.18
10.83	11.23
11.46	10.44
12.29	11.05
8.74	10.71
8.62	6.57
9.86	11.24
10.50	8.50
9.54	10.84
9.36	9.52
9.50	10.88
9.49	9.80
11.16	11.21
10.01	10.46
10.95	10.87
8.65	10.78
10.10	10.63
8.88	10.36

unds per row of the F_1 crosses
from varieties of yellow corn
of parent lines as grown in

57	160	168	171	Mean yield of crosses for each parent line	Yield of parent line(1)
.76	10.57	10.07	9.99	10.06	4.91
.10	10.64	8.67	9.22	9.84	5.24
.38	9.93	9.48	10.19	10.41	7.34
.44	10.18	10.70	9.65	10.31	5.66
.52	10.90	11.13	10.69	10.68	9.41
.00	11.59	10.24	11.53	11.08	5.71
.14	10.12	10.97	11.22	10.35	9.83
.69	12.85	12.68	12.02	12.30	9.38
.78	11.77	11.01	9.79	10.90	12.17
.62	13.21	11.38	11.26	11.85	15.76
.27	12.27	11.13	10.69	11.61	8.48
.49	10.44	10.92	11.48	11.16	8.87
.83	11.08	11.57	11.63	10.91	2.02
.10	11.20	10.71	12.05	11.13	12.04
.26	9.72	11.73	10.36	9.85	6.89
.04	12.99	10.99	11.29	12.43	9.52
.41	12.14	12.92	9.67	11.65	7.99
.25	12.10	10.29	11.18	11.39	11.21
.54	11.55	12.07	9.02	11.17	8.72
.63	11.72	12.21	11.06	11.76	6.82
.53	11.26	10.98	9.66	10.98	9.43
.34	13.72	10.86	12.50	12.27	4.72
7.90	10.72	10.30	9.88	9.79	4.83
.87	10.56	11.01	10.46	10.39	9.53
9.02	11.18	9.65	10.05	10.16	7.92
.83	11.23	12.54	10.34	11.39	8.42
1.46	10.44	11.25	10.38	11.19	7.69
2.29	11.05	10.00	10.91	10.49	6.88
8.74	10.71	10.16	10.10	10.39	6.28
8.62	6.57	8.58	9.11	8.65	5.13
9.86	11.24	9.89	11.66	11.09	8.51
0.50	8.50	8.93	10.39	9.63	8.38
9.54	10.84	9.30	9.48	10.30	3.71
9.36	9.52	9.24	9.83	9.75	6.21
9.50	10.88	8.90	9.61	10.30	10.74
9.49	9.80	9.24	10.47	10.28	2.14
1.16	11.21	9.50	11.57	10.92	9.48
0.01	10.46	7.12	9.05	9.01	4.83
0.95	10.87	11.15	9.35	10.27	5.20
8.65	10.78	8.81	7.58	9.07	2.80
0.10	10.63	10.61	10.03	10.81	-- --
8.88	10.36	8.96	10.36	9.89	-- --

Number of parent line	121	140	143	150	153	157	160	168	171
114	9.11	11.85	9.27	10.97	9.99	8.76	10.57	10.07	9.99
116	10.21	10.04	10.34	10.54	8.82	10.10	10.64	8.67	9.22
117	8.76	11.26	10.34	10.79	11.54	11.38	9.93	9.48	10.19
118	8.54	12.87	10.70	9.59	11.16	9.44	10.18	10.70	9.65
119	9.94	11.67	11.21	9.28	10.70	10.52	10.90	11.13	10.69
120	10.17	13.06	9.96	11.08	11.13	11.00	11.59	10.24	11.53
123	9.51	10.30	10.18	10.66	11.09	9.14	10.12	10.97	11.22
124	10.99	12.75	13.43	10.83	12.46	12.69	12.85	12.68	12.02
125	11.73	-- --	11.07	10.89	11.18	9.78	11.77	11.01	9.79
126	11.68	13.37	13.18	9.50	12.47	10.62	13.21	11.38	11.26
128	11.74	11.86	11.62	11.31	12.56	12.27	12.27	11.13	10.69
129	10.16	11.94	10.79	11.68	11.52	11.49	10.44	10.92	11.48
130	10.32	11.31	10.37	10.14	10.95	10.83	11.08	11.57	11.63
132	9.83	12.44	10.61	10.85	11.39	11.10	11.20	10.71	12.05
133	9.00	11.23	8.82	8.57	8.96	10.26	9.72	11.73	10.36
135	13.21	12.57	12.34	12.06	12.40	14.04	12.99	10.99	11.29
136	12.43	10.41	11.54	11.16	13.20	11.41	12.14	12.92	9.67
139	12.18	9.81	11.53	11.76	11.43	12.25	12.10	10.29	11.18
141	11.80	11.99	12.79	9.31	11.45	10.54	11.55	12.07	9.02
142	11.83	11.64	11.38	12.43	11.99	11.63	11.72	12.21	11.06
144	12.07	10.32	10.51	11.31	11.20	11.53	11.26	10.98	9.66
146	11.54	13.87	13.26	12.49	11.84	10.34	13.72	10.86	12.50
147	9.85	10.38	8.13	10.16	10.82	7.90	10.72	10.30	9.88
149	10.68	12.02	9.77	9.02	9.09	10.87	10.56	11.01	10.46
151	-- --	-- --	9.72	10.90	10.60	9.02	11.18	9.65	10.05
154	10.36	13.05	11.06	11.81	11.31	10.83	11.23	12.54	10.34
155	12.67	12.78	9.55	10.58	11.59	11.46	10.44	11.25	10.38
156	9.76	10.12	8.98	10.83	10.44	12.29	11.05	10.00	10.91
158	9.73	11.97	10.95	12.00	9.12	8.74	10.71	10.16	10.10
159	9.44	9.37	8.96	8.27	8.93	8.62	6.57	8.58	9.11
161	10.09	12.81	11.16	10.83	12.23	9.86	11.24	9.89	11.66
162	10.76	9.74	8.49	10.10	9.26	10.50	8.50	8.93	10.39
164	9.17	13.19	9.13	11.26	10.83	9.54	10.84	9.30	9.48
165	9.25	11.69	9.53	9.68	9.62	9.36	9.52	9.24	9.83
166	10.68	10.26	11.55	10.63	10.69	9.50	10.88	8.90	9.61
167	10.22	12.48	10.41	9.82	10.62	9.49	9.80	9.24	10.47
169	10.88	12.70	10.94	9.64	10.65	11.16	11.21	9.50	11.57
170	8.97	9.22	9.42	9.54	7.31	10.01	10.46	7.12	9.05
172	9.93	8.90	10.20	11.06	10.05	10.95	10.87	11.15	9.35
173	9.00	8.63	9.53	9.66	8.96	8.65	10.78	8.81	7.58
174	9.80	11.64	11.67	11.33	11.45	10.10	10.63	10.61	10.03
175	9.54	-- --	9.70	10.28	11.06	8.88	10.36	8.96	10.36
176	8.51	10.98	9.96	9.97	9.86	9.49	9.87	9.81	10.51
Mean yield of crosses for each parent line	10.38	11.46	10.56	10.57	10.79	10.43	10.92	10.41	10.40
Yield of parent line (1)	8.48	9.38	11.58	8.98	5.28	6.51	9.15	5.56	5.21

P.E. of the difference between the yields of any two parent lines, ± 0.460.
P.E. of the difference between the yields of any two F_1 crosses, ± 0.617.
P.E. of the difference between means of 9 crosses, ± 0.190; and between means
(1) Yields of the parent lines should be compared among themselves only, they
(2) Mean yield of all crosses in the experiment.

53	157	160	168	171	for each parent line	line[1]
.99	8.76	10.57	10.07	9.99	10.06	4.91
.82	10.10	10.64	8.67	9.22	9.84	5.24
.54	11.38	9.93	9.48	10.19	10.41	7.34
.16	9.44	10.18	10.70	9.65	10.31	5.66
.70	10.52	10.90	11.13	10.69	10.68	9.41
.13	11.00	11.59	10.24	11.53	11.08	5.71
.09	9.14	10.12	10.97	11.22	10.35	9.83
2.46	12.69	12.85	12.68	12.02	12.30	9.38
1.18	9.78	11.77	11.01	9.79	10.90	12.17
2.47	10.62	13.21	11.38	11.26	11.85	15.76
2.56	12.27	12.27	11.13	10.69	11.61	8.48
1.52	11.49	10.44	10.92	11.48	11.16	8.87
0.95	10.83	11.08	11.57	11.63	10.91	2.02
1.39	11.10	11.20	10.71	12.05	11.13	12.04
8.96	10.26	9.72	11.73	10.36	9.85	6.89
2.40	14.04	12.99	10.99	11.29	12.43	9.52
5.20	11.41	12.14	12.92	9.67	11.65	7.99
1.43	12.25	12.10	10.29	11.18	11.39	11.21
1.45	10.54	11.55	12.07	9.02	11.17	8.72
1.99	11.63	11.72	12.21	11.06	11.76	6.82
1.20	11.53	11.26	10.98	9.66	10.98	9.43
1.84	10.34	13.72	10.86	12.50	12.27	4.72
0.82	7.90	10.72	10.30	9.88	9.79	4.83
9.09	10.87	10.56	11.01	10.46	10.39	9.53
0.60	9.02	11.18	9.65	10.05	10.16	7.92
1.31	10.83	11.23	12.54	10.34	11.39	8.42
1.59	11.46	10.44	11.25	10.38	11.19	7.69
0.44	12.29	11.05	10.00	10.91	10.49	6.88
9.12	8.74	10.71	10.16	10.10	10.39	6.28
8.93	8.62	6.57	8.58	9.11	8.65	5.13
2.23	9.86	11.24	9.89	11.66	11.09	8.51
9.26	10.50	8.50	8.93	10.39	9.63	8.38
0.83	9.54	10.84	9.30	9.48	10.30	3.71
9.62	9.36	9.52	9.24	9.83	9.75	6.21
0.69	9.50	10.88	8.90	9.61	10.30	10.74
0.62	9.49	9.80	9.24	10.47	10.28	2.14
0.65	11.16	11.21	9.50	11.57	10.92	9.48
7.31	10.01	10.46	7.12	9.05	9.01	4.83
0.05	10.95	10.87	11.15	9.35	10.27	5.20
8.96	8.65	10.78	8.81	7.58	9.07	2.80
1.45	10.10	10.63	10.61	10.03	10.81	-- --
1.06	8.88	10.36	8.96	10.36	9.89	-- --
9.86	9.49	9.87	9.81	10.51	9.88	-- --
0.79	10.43	10.92	10.41	10.40	10.65[2]	
5.28	6.51	9.15	5.56	5.21		

two parent lines, $\pm$ 0.460.
two F_1 crosses, $\pm$ 0.617.
es, $\pm$ 0.190; and between means of 43 crosses, $\pm$ 0.086.
ed among themselves only, they are not comparable to the yields of the crosses.

The correlations between the yields of the inbred parents and the mean yields of their F_1 crosses for each of the five yield groups already has been given in Table 13. These coefficients between the parent lines and F_1 crosses in each table were as follows: for Table 15, 0.6728 ± 0.0897; for Table 16, 0.6400 ± 0.0915; for Table 17, 0.2534 ± 0.1053; for Table 18, 0.4149 ± 0.1686; and for Table 19, 0.4519 ± 0.0745. The correlations for Tables 15, 16 and 19 are significant. Those for Tables 17 and 18 are not significant. While these correlations indicate a relationship between yields of the parents and yields of crosses they do not bring out sufficiently the uniformity in the performance of the crosses of different parent lines.

Each of these tables contains excellent demonstrations of the differences in the ability of different inbred lines to produce high yielding crosses. In Table 15 inbred lines number 11 to 20 were all included in comparable crosses. Inbred line 14 had the highest mean yield of crosses. It will be noticed that all of the yields of 16 pounds or over had number 14 as one parent. Comparing line 14 as a parent with line 13 it will be seen that in every comparable cross of these two lines number 14 had the higher yielding cross. The same comparison is true with lines 11, 16 and 17.

In Table 16 inbred line 25 gave the highest mean yield of crosses. Comparing the individual crosses with comparable crosses of lines 21, 22, 24 and 27 it will be seen that in every case inbred 25 had the higher yielding cross.

In Table 17 inbred line 66 had the highest mean yield of crosses. Comparing the crosses of this inbred line with comparable crosses of lines 46, 47, 52, 54, 55, 56, 61, 62, 67, 70, 74, 78 and 80, it will be seen that in every case inbred line 66 had the higher yielding cross.

Now if we assume that lines 41, 42, 43, 50, 53, 63, 64, 65, 71 and 75 were the lines being tested and the inbred lines listed down the left side of Table 17 were the testers we find that most of these lines were used in 28 or 29 comparable crosses. Number 65 had the highest mean yield of crosses. Comparing line 65 with line 63 there were 28 comparable crosses and in 27 cases line 65 had the higher yielding cross. Lines 43 and 63 also were used in 28 comparable crosses and in 27 of the 28 comparisons line 43 had the higher yielding cross.

In Table 18 inbred lines 112 and 107 gave the highest mean yield of crosses. Comparing the individual crosses in these two lines with the crosses of the other lines we find that the crosses of line 112 outyielded the comparable crosses of lines 103 and 111 in every case, those of line 104 in eight out of nine cases and those of lines 101 and 109 in seven out of eight cases. The crosses of line 107 outyielded all comparable crosses of line 104 and outyielded the comparable crosses of lines 101, 103 and 106 in eight out of nine cases.

In Table 19 lines 124, 135 and 146 gave the highest mean yield of crosses. The crosses of line 135 outyielded every comparable cross of 20 of the remaining 42 lines. Those of lines 124 and 146 outyielded every comparable cross of 17 of the remaining 42 lines. In two more cases the crosses of line 124 outyielded all but one cross of another line and this one remaining cross was a tie.

DATA ON PER CENT OF PLANTS STANDING ERECT AT HARVEST

The data on the per cent of plants that were standing erect at harvest are given for the F_1 crosses and their inbred parents in Tables 20 to 24 inclusive. The per cent of erect plants was determined for each kind of corn from the total number of plants and the total number of erect plants in all six replications.

In the following five tables as in the previous tables of yields, comparisons should be made within the F_1 crosses and within the inbred lines only. The data on the inbred lines are not directly comparable to those on the F_1 crosses.

TABLE 20. Per cent of plants erect at harvest in the F_1 crosses between inbred lines from varieties of white corn and in the parent lines as grown in 1926.

Number of parent line	11	12	13	14	15	16	17	18	19	20	Mean of crosses for each parent line	Per cent erect in parent line
1	56.9	57.6	88.9	99.0	31.5	95.7	93.2	69.7	97.3	76.0	76.6	----
2	17.5	42.2	38.5	72.2	8.7	57.0	58.0	11.7	43.7	42.8	39.2	30.3
3	86.1	64.0	81.8	91.2	39.0	98.8	89.7	76.9	97.0	51.0	77.6	53.2
4	34.4	66.9	79.7	93.1	19.9	73.6	90.3	40.7	66.2	42.4	60.7	11.4
5	47.7	31.0	26.7	60.8	3.9	45.7	56.0	16.9	22.7	30.2	34.2	2.6
6	77.8	90.6	96.5	89.7	63.1	97.7	90.4	50.0	89.8	80.0	82.6	48.3
7	82.9	87.0	92.7	91.6	26.4	90.0	97.3	26.4	86.6	74.8	75.6	98.3
9	43.0	27.6	32.6	64.5	28.6	39.7	58.0	9.3	22.8	25.9	35.2	8.5
10	53.3	72.0	86.8	100.0	33.0	67.1	89.0	39.3	71.1	47.0	65.9	45.8
Mean of crosses for each parent line	55.5	59.9	69.4	84.7	28.2	73.9	80.2	37.9	66.4	52.2	60.8(1)	
Per cent erect in parent line	17.4	4.2	----	72.9	0.8	32.5	98.4	10.6	48.7	38.3		

(1)Mean per cent erect for all crosses in the experiment.

TABLE 21. Per cent of plants erect at harvest in the F_1 crosses between inbred lines from early varieties of yellow corn and in the parent lines as grown in 1926.

Number of parent line	31	32	33	34	35	36	37	38	39	40	Mean of crosses for each parent line	Per cent erect in parent line
21	40.5	59.2	45.6	42.5	55.6	69.6	66.5	23.3	0.0	27.0	43.0	25.6
22	58.4	62.2	68.4	66.3	74.1	89.2	72.1	59.5	70.4	65.9	68.6	36.7
24	51.8	50.0	56.1	69.2	64.5	94.0	83.5	55.0	71.2	43.6	63.9	58.4
25	87.6	81.7	90.8	83.9	87.6	90.4	88.4	92.4	92.3	84.9	88.0	100.0
26	66.3	60.2	52.9	58.6	74.9	68.7	69.2	24.0	60.5	46.6	58.2	63.2
27	94.4	97.7	55.7	80.5	72.2	83.0	97.2	90.9	79.1	71.0	82.2	91.5
28	59.2	67.7	58.4	76.0	74.4	83.6	81.5	69.6	63.5	40.9	67.5	71.8
29	58.5	50.0	31.1	68.2	70.5	89.6	57.7	64.4	32.0	49.4	57.1	16.3
30	80.6	64.1	72.2	81.1	74.6	90.2	76.8	72.5	51.2	36.1	69.9	42.1
Mean of crosses for each parent line	66.4	65.9	59.0	69.6	72.0	84.3	77.0	61.3	57.8	51.7	66.5[1]	
Per cent erect in parent line	21.1	49.1	33.9	65.6	74.0	96.0	47.9	40.9	2.0	4.4		

[1] Mean per cent erect for all crosses in the experiment.

TABLE 22. Per cent of plants erect at h
crosses between inbred lines from the
of yellow corn and in the parent lines

Number of parent line	41	42	43	50	53	63	64
45	89.6	63.4	32.9	77.9	-- -	58.0	50.0
46	96.6	92.3	82.5	92.0	70.5	96.7	95.1
47	28.9	13.8	42.5	80.9	42.2	-- -	19.6
48	77.3	50.0	71.8	70.4	100.0	77.4	60.9
49	99.6	97.5	75.2	100.0	100.0	82.7	80.8
51	67.9	53.5	74.6	81.6	97.7	72.6	56.8
52	90.2	57.4	49.0	50.4	81.5	53.1	44.9
54	58.7	46.3	15.5	66.5	44.4	61.3	36.6
55	77.0	66.4	39.2	61.6	74.5	62.5	5.4
56	78.4	58.3	66.0	-- -	-- -	60.9	-- -
57	92.0	83.8	94.5	96.6	-- -	96.9	80.5
58	75.0	42.5	23.3	54.0	68.6	55.6	30.0
59	83.7	77.7	74.8	97.7	-- -	90.6	63.8
60	76.6	41.1	30.3	68.8	48.9	21.1	43.7
61	66.1	44.3	36.8	41.7	51.1	66.2	49.4
62	94.0	95.3	86.1	98.0	99.2	96.4	90.9
66	64.8	56.2	65.0	56.3	93.8	75.9	75.6
67	95.5	85.3	61.4	83.8	100.0	96.2	72.1
68	93.5	78.0	67.3	97.2	98.1	93.2	86.2
69	84.3	55.4	54.2	56.2	84.0	51.5	52.6
70	94.0	89.1	46.5	89.1	83.0	87.9	84.8
72	92.1	89.5	62.7	73.5	96.4	67.3	65.0
73	99.1	73.8	84.2	100.0	----	94.4	83.9
74	76.1	86.7	52.0	80.9	91.7	70.9	38.4
76	53.9	49.0	25.3	70.5	79.2	53.5	56.2
77	95.0	81.4	62.4	82.8	92.8	78.3	69.5
78	95.4	85.4	84.9	97.6	98.5	97.0	74.1
79	90.3	84.0	64.8	95.5	72.2	90.0	51.8
80	84.4	82.0	58.9	85.4	85.7	80.2	54.5
Mean of crosses for each parent line	81.4	68.3	58.1	78.8	81.4	74.6	59.8
Per cent erect in parent line	-- -	-- -	27.4	78.7	94.8	61.8	37.7

(1) Mean per cent erect for all crosses in the experiment.

lants erect at harvest in the F_1
lines from the later varieties
the parent lines as grown in 1926.

53	63	64	65	71	75	Mean of crosses for each parent line	Per cent erect in parent line
-- -	58.0	50.0	6.3	64.6	72.2	57.2	49.1
70.5	96.7	95.1	85.2	68.9	96.4	87.6	92.1
42.2	-- -	19.6	45.3	45.8	72.6	43.5	9.9
00.0	77.4	60.9	69.2	76.5	72.2	72.6	61.2
00.0	82.7	80.8	68.3	83.8	97.8	88.6	55.0
97.7	72.6	56.8	45.9	64.7	80.5	69.6	63.2
81.5	53.1	44.9	34.7	35.5	69.5	55.6	15.2
44.4	61.3	36.6	28.3	56.7	69.9	48.4	8.5
74.6	62.5	5.4	25.7	50.6	79.2	54.2	12.5
-- -	60.9	-- -	30.1	67.8	73.8	62.2	33.9
-- -	96.9	80.5	93.0	94.7	98.5	92.3	93.6
68.6	55.6	30.0	34.6	33.8	69.0	48.6	14.4
-- -	90.6	63.8	64.6	65.5	-- -	77.3	90.2
48.9	21.1	43.7	10.2	41.2	73.7	45.6	52.3
51.1	66.2	49.4	16.0	42.4	67.6	48.2	0.0
99.2	96.4	90.9	77.4	97.3	97.2	93.2	91.3
93.8	75.9	75.6	40.3	78.0	73.5	67.9	1.6
00.0	96.2	72.1	73.8	73.4	85.4	82.7	80.9
98.1	93.2	86.2	84.8	98.6	77.0	87.4	100.0
84.0	51.5	52.6	15.7	56.1	65.4	57.5	14.2
83.0	87.9	84.8	53.4	93.7	86.9	80.8	78.2
96.4	67.3	65.0	54.0	62.8	86.7	75.0	65.7
----	94.4	83.9	56.5	89.8	96.0	86.4	100.0
91.7	70.9	38.4	35.4	62.9	89.5	68.4	36.2
79.2	53.5	56.2	8.0	40.6	65.2	50.1	8.3
92.8	78.3	69.5	72.3	76.0	92.8	80.3	88.4
98.5	97.0	74.1	67.8	81.0	96.8	87.8	99.1
72.2	90.0	51.8	51.6	81.3	82.6	76.4	-- -
85.7	80.2	54.5	44.6	78.6	86.0	74.0	44.3
81.4	74.6	59.8	48.0	67.7	81.2	69.7 (1)	
94.8	61.8	37.7	1.5	60.5	85.3		

periment.

TABLE 23. Per cent of plants erect at harvest in the F_1 crosses between inbred lines from varieties of white corn as grown in 1927 and in the parent lines as grown in 1926.

Number of parent line	101	102	103	104	105	106	107	109	110	111	112	Mean of crosses for each parent line	Per cent erect in parent line
101	----	97.2	98.8	96.4	98.8	91.8	94.2	97.7	94.9	94.9	85.6	95.0	68.7
102	97.2	----	93.4	92.6	98.2	92.5	92.6	99.2	96.6	88.8	86.4	93.8	79.8
103	98.8	93.4	----	87.1	99.6	87.5	93.6	94.4	91.2	87.9	83.1	91.7	81.5
104	96.4	92.6	87.1	----	90.8	93.5	100.0	97.6	96.9	72.6	----	91.9	65.1
105	98.8	98.2	99.6	90.8	----	99.6	97.6	100.0	95.6	----	94.5	97.2	51.8
106	91.8	92.5	87.5	93.5	99.6	----	90.4	94.8	90.4	87.8	67.7	89.6	7.6
107	94.2	92.6	93.6	100.0	97.6	90.4	----	97.5	91.1	82.8	92.8	93.3	73.8
109	97.7	99.2	94.4	97.6	100.0	94.8	97.5	----	98.4	74.1	94.6	94.8	73.9
110	94.9	96.6	91.2	96.9	95.6	90.4	91.1	98.4	----	98.4	88.6	94.2	53.7
111	94.9	88.8	87.9	72.6	----	87.8	82.8	74.1	98.4	----	87.1	86.0	38.4
112	85.6	86.4	83.1	----	94.5	67.7	92.8	94.6	88.6	87.1	----	86.7	27.6
Mean per cent erect for all crosses in the experiment												92.3	

TABLE 24. Per cent of plants erect at
between inbred lines from varieties o
1927 and in the parent lines as grown

Number of inbred line	121	140	143	150	153	157	160	168
114	80.5	62.0	82.8	76.6	88.8	55.6	76.7	84.1
116	96.7	89.4	90.8	91.3	98.1	69.5	93.5	92.2
117	85.1	57.8	76.5	69.5	66.1	51.2	81.1	84.2
118	93.9	63.2	80.0	72.2	86.8	49.8	73.6	89.4
119	92.3	71.4	86.8	66.0	94.9	68.2	86.0	78.4
120	54.0	22.2	54.0	45.8	62.3	28.0	67.8	75.1
123	91.3	51.2	85.6	89.8	92.4	75.9	84.8	100.
124	94.7	55.0	93.2	96.3	98.5	61.5	96.3	95.
125	84.2	-- -	72.9	68.0	80.9	63.6	89.1	84.
126	80.0	69.4	89.4	72.0	85.8	70.4	84.4	86.
128	91.9	77.6	95.4	85.9	97.0	79.6	93.8	84.
129	85.1	62.4	86.0	71.2	88.3	63.3	87.2	81.
130	63.0	64.6	74.9	74.3	82.0	45.4	65.3	86.
132	80.4	64.9	85.8	78.9	91.6	63.5	75.9	86.
133	71.8	66.5	77.8	79.1	79.2	61.6	88.3	76.
135	80.4	47.0	72.8	64.8	72.7	52.4	68.1	62.
136	64.9	40.6	51.8	25.2	74.6	34.5	46.4	46.
139	55.4	55.5	39.5	44.5	75.9	36.8	50.6	57.
141	53.3	65.2	72.3	49.6	80.6	61.5	63.1	75.
142	62.2	32.7	59.0	35.0	59.7	34.3	65.1	76.
144	60.9	47.1	85.0	59.8	74.6	46.5	77.3	61.
146	82.8	72.0	64.2	73.4	90.9	59.0	70.0	84.
147	90.5	83.7	86.4	87.9	89.7	80.9	87.7	84.
149	88.4	43.1	88.3	80.5	90.1	68.2	87.7	76.
151	-- -	-- -	31.9	42.1	71.7	30.4	36.0	59.
154	72.7	66.2	57.6	50.0	80.8	62.9	58.6	74.
155	97.8	69.7	71.5	91.0	86.2	76.0	89.6	79.
156	77.8	88.0	82.5	78.0	82.6	73.3	87.6	76.
158	89.0	58.3	83.8	71.3	80.3	69.6	68.9	75.
159	92.6	87.9	98.3	89.1	93.1	74.2	80.1	91.
161	98.0	74.1	78.5	94.8	95.6	91.2	85.4	97.
162	53.2	31.0	36.7	43.5	69.9	33.6	66.0	36.
164	98.2	94.2	94.4	85.1	96.8	62.6	92.9	78.
165	67.0	78.2	88.6	82.4	79.9	63.3	79.6	87.
166	73.6	53.1	84.2	72.1	78.9	65.7	82.0	60.
167	86.2	43.3	65.9	37.0	84.3	50.2	44.3	67.
169	85.3	76.7	77.7	73.4	77.7	72.3	60.1	83.
170	94.7	86.1	84.3	82.9	95.0	77.4	86.2	93.

s erect at harvest in the F_1 crosses
varieties of yellow corn as grown in
es as grown in 1926.

160	168	171	Mean of crosses for each parent line	Per cent erect in parent line
76.7	84.1	53.3	73.4	43.8
93.5	92.2	80.5	89.0	89.9
81.1	84.2	45.5	68.6	34.2
73.6	89.4	57.1	74.0	47.7
86.0	78.4	69.0	79.2	58.4
67.8	75.1	38.2	49.7	30.2
84.8	100.0	67.6	82.1	86,8
96.3	95.9	73.3	85.0	98.3
89.1	84.9	61.9	75.7	59.4
84.4	86.0	83.3	80.1	87.5
93.8	84.1	74.2	86.6	95.5
87.2	81.7	49.8	75.0	89.3
65.3	86.9	40.5	66.3	88.1
75.9	86.2	71.6	77.6	86.5
88.3	76.3	48.4	72.1	44.5
68.1	62.1	49.2	63.3	65.9
46.4	46.0	23.7	45.3	81.8
50.6	57.0	36.4	50.2	23.1
63.1	75.1	33.0	61.5	56.3
65.1	76.6	16.3	49.0	57.0
77.3	61.6	40.2	61.4	60.9
70.0	84.4	46.2	71.4	22.8
87.7	84.9	47.0	82.1	79.3
87.7	76.6	61.2	76.0	99.2
36.0	59.9	17.5	41.4	77.5
58.6	74.3	60.5	64.8	87.4
89.6	79.0	45.6	78.5	82.9
87.6	76.1	61.2	78.6	81.2
68.9	75.0	43.8	71.1	92.1
80.1	91.7	80.6	87.5	91.8
85.4	97.8	73.3	87.6	99.2
66.0	36.9	20.7	43.5	26.7
92.9	78.2	72.7	86.1	90.7
79.6	87.3	52.2	75.4	91.5
82.0	60.4	52.7	69.2	72.4
44.3	67.6	46.2	58.3	52.6
60.1	83.9	36.4	71.5	55.6
86.2	93.5	62.1	84.7	41.1

Table 24 continued

Number of inbred line	121	140	143	150	153	157	160	168
172	82.1	86.5	58.7	61.3	60.5	61.2	72.9	54.
173	68.0	48.7	58.8	46.0	71.6	30.2	75.1	76.
174	82.8	37.6	86.7	66.0	77.2	72.1	68.8	82.
175	85.4	-- -	68.0	72.3	83.6	36.2	68.4	51.
176	79.3	51.5	71.5	54.0	87.9	54.7	91.5	76.
Mean of crosses for each parent line	80.2	62.4	75.1	68.6	82.7	59.0	75.7	77.
Per cent erect in parent line	17.5	83.1	80.5	23.2	77.8	82.7	57.9	93.

(1) Mean per cent erect for all crosses in the experiment.

157	160	168	171	Mean of crosses for each parent line	Per cent erect in parent line
1.2	72.9	54.2	42.5	64.4	37.0
0.2	75.1	76.3	26.8	55.7	39.8
2.1	68.8	82.1	43.9	68.6	100.0
6.2	68.4	51.9	57.3	65.4	87.1
4.7	91.5	76.3	35.0	66.9	44.1
9.0	75.7	77.0	51.1	70.2(1)	
2.7	57.9	93.9	52.8		

eriment.

The correlations between per cent of plants standing erect at harvest in the parent lines and the mean per cent of plants standing erect at harvest in their crossbred progeny have been given already in Table 13. They were as follows: Table 20, 0.7693 ± 0.0669; Table 21, 0.7904 ± 0.0581; Table 22, 0.8769 ± 0.0260; Table 23, 0.5916 ± 0.1324; and Table 24, 0.4078 ± 0.0781. These correlations are all significant and some of them are very high.

From the data in Tables 20 to 24 inclusive it will be seen that the various inbred lines have reacted in the same general manner as regards per cent of erect plants that they did in regard to yield. All of the crosses from some inbred lines gave a high percentage of erect plants while all of the crosses from other lines gave a low percentage of erect plants. Good comparisons of these two extremes may be found in each table. Examples of lines in comparable crosses, one of which gave high percentages of erect plants and the other low percentages of erect plants are as follows: Table 20, lines 6 and 5 and also lines 15 and 14; Table 21, lines 25 and 21 and also lines 36 and 40; Table 22, lines 46 and 47, 57 and 58, 62 and 60, and 53 and 65; Table 23, lines 105 and 111; Table 24, lines

116 and 120, 128 and 136, 159 and 151, 164 and 162, and 153 and 171. Lines number 153 and 171 were used in 43 comparable crosses. The mean per cent of erect plants for line 153 was 82.7 and for line 171 was 51.1. The difference was 31.6. Comparing each of the comparable pairs of crosses of these two lines we find that in all of the 43 comparisons line 153 had the higher percentage of erect plants.

There may be some objection to comparing these two lines on the grounds that one was a dent corn and the other a flint (see Appendix, Table 1). Lines 153 and 157, however, were both from dent varieties. They, also, were used in 43 comparable pairs of crosses and in 42 of the comparisons line 153 had the higher percentage of erect plants. The difference between the means of all crosses for these two lines was 23.7.

DATA ON SOME OF THE OTHER CHARACTERS STUDIED

Tables similar to those showing yield and per cent of erect plants have been made for all of the other characters for which coefficients of correlation were given in Table 13. However, it has not been considered advisable to include all of these tables on each experiment in the present report. Instead, a fairly complete set of the tables have been included for the crosses between the inbred lines from the later varieties of yellow corn that were grown in 1926. As previously stated these lines had been inbred for three generations at the time the crosses were made. In cases where there were comparable data on crosses made after three and after four generations of inbreeding there appeared to be no significant difference in reaction. This was sufficiently well brought out in the tables on yield and per cent of erect plants which already have been discussed. It was felt, therefore, that the different tables from one experiment would show fairly completely the differences that may be expected in the performance of different inbred lines.

The methods of taking records reported in the following tables already have been explained in detail and, therefore, will not be discussed here. In most cases it is sufficiently clear as to what is meant by each of the characters mentioned.

Table 25 shows the data on date one-fourth tasseled and Table 26 the data on date one-fourth silked. In both of these tables the dates are recorded as dates in July, August 1, 2, 3, etc. being recorded as July 32, 33, 34, etc. The dates recorded in the tables are the means of the dates for the different replications.

TABLE 25. Date in July on which
tasseled in the F_1 crosses bet
the later varieties of yellow
lines as grown in 1926.

Number of parent line	41	42	43	50	53	63	64
45	24.5	22.0	23.5	25.0	--	23.0	23.0
46	24.5	22.0	23.5	26.5	24.5	23.5	22.5
47	24.0	22.0	24.5	24.5	23.0	--	22.5
48	25.0	23.0	23.5	24.0	23.0	23.5	23.0
49	25.5	22.0	23.0	27.0	25.0	23.5	21.5
51	24.5	22.0	24.5	25.5	23.5	23.0	23.5
52	26.0	23.0	25.5	27.0	25.5	24.0	25.5
54	24.5	22.0	24.0	22.0	23.0	23.0	25.0
55	22.5	21.5	24.0	24.5	23.0	23.0	23.0
56	24.0	22.0	24.0	--	--	23.0	--
57	25.0	23.0	25.0	23.0	--	23.0	25.5
58	25.0	23.5	25.0	27.0	23,5	23.0	24.5
59	25.0	23.0	25.0	24.0	--	22.0	24.5
60	25.0	23.0	29.0	26.5	27.0	23.0	27.0
61	26.0	25.5	27.5	25.5	27.5	25.5	26.0
62	23.0	20.5	27.0	23.0	22.0	22.0	22.0
66	24.5	22.5	28.5	27.0	24.5	23.0	25.5
67	28.0	22.0	30.0	25.5	25.0	25.0	23.5
68	23.0	21.5	26.5	22.5	23.0	23.0	23.0
69	25.5	25.5	29.0	29.5	27.0	25.0	26.0
70	23.0	20.5	26.0	24.0	23.0	21.5	22.0
72	24.0	21.0	25.5	23.0	24.0	24.5	23.0
73	30.5	24.0	25.5	27.5	--	23.5	27.5
74	28.5	23.5	29.0	29.0	26.5	26.0	24.5
76	28.0	22.0	28.5	29.0	24.0	23.0	24.0
77	29.0	24.5	31.0	29.5	26.5	26.5	26.0
78	27.0	24.0	27.0	27.5	24.0	22.0	23.0
79	26.5	23.5	27.0	25.5	27.0	23.5	24.5
80	23.0	20.5	25.0	23.0	23.5	22.5	21.5
Mean of crosses for each parent line	25.3	22.6	26.1	25.6	24.5	23.5	24.0
Date 1/4 tasseled for parent line	--	--	33.3	35.0	33.0	29.7	31.7

(1) Mean date 1/4 tasseled for all crosses in the experiment.

uly on which 1/4 of the plants were
crosses between inbred lines from
s of yellow corn and for the parent
1926.

63	64	65	71	75	Mean of crosses for each parent line	Date 1/4 tasseled for parent line
23.0	23.0	23.5	26.5	22.0	23.7	32.7
23.5	22.5	23.0	28.0	23.5	24.2	34.5
--	22.5	23.0	24.5	23.5	23.5	28.7
23.5	23.0	23.0	28.5	23.0	24.0	33.3
23.5	21.5	23.0	27.0	24.5	24.2	31.0
23.0	23.5	24.5	29.0	26.0	24.6	31.0
24.0	25.5	26.0	25.5	25.0	25.3	36.7
23.0	25.0	23.0	25.0	23.5	23.5	30.7
23.0	23.0	24.0	24.0	23.5	23.3	32.0
23.0	--	24.0	24.0	24.0	23.6	30.0
23.0	25.5	23.0	26.5	27.0	24.6	31.3
23.0	24.5	25.0	24.5	25.0	24.6	30.0
22.0	24.5	24.5	25.5	--	24.2	28.3
23.0	27.0	29.0	26.5	26.0	26.2	29.0
25.5	26.0	27.5	28.5	26.0	26.6	32.7
22.0	22.0	25.0	23.5	23.5	23.2	29.0
23.0	25.5	26.5	26.0	27.0	25.5	35.0
25.0	23.5	26.0	26.0	24.5	25.6	30.0
23.0	23.0	23.5	22.5	24.0	23.2	28.7
25.0	26.0	27.5	28.0	27.0	27.0	34.7
21.5	22.0	23.0	23.5	24.5	23.1	31.0
24.5	23.0	24.0	24.0	25.0	23.8	29.3
23.5	27.5	29.0	31.0	30.0	27.6	36.3
26.0	24.5	30.5	30.5	29.0	27.7	35.0
23.0	24.0	26.0	26.0	26.5	25.7	34.7
26.5	26.0	29.5	26.5	26.5	27.6	36.3
22.0	23.0	25.0	25.5	25.5	25.0	36.0
23.5	24.5	27.0	28.0	29.0	26.2	--
22.5	21.5	24.5	23.5	23.5	23.0	26.7
23.5	24.0	25.3	26.1	25.3	24.8(1)	
29.7	31.7	33.7	36.3	36.0		

experiment.

TABLE 26. Date in July on which
silked in the F_1 crosses betwe
the later varieties of yellow
lines as grown in 1926.

Number of parent line	41	42	43	50	53	63	64	
45	23.5	24.5	24.5	26.0	-- -	23.5	24.0	
46	25.0	23.5	24.5	27.0	26.0	23.5	22.5	
47	26.0	24.5	25.5	26.5	26.0	-- -	24.5	
48	23.0	25.0	24.0	25.0	24.0	25.0	23.5	
49	25.0	23.5	23.0	26.0	25.5	24.0	22.5	
51	25.0	24.0	25.5	28.0	24.5	24.5	26.0	
52	26.0	26.5	28.0	28.0	27.0	26.0	27.0	
54	25.0	23.5	25.5	22.5	24.0	24.0	26.0	
55	23.0	25.0	24.5	26.5	24.5	24.0	26.0	
56	24.5	23.0	24.5	-- -	-- -	23.5	-- -	
57	25.0	24.0	25.5	23.0	-- -	23.5	26.5	
58	24.0	26.0	27.0	26.5	25.0	24.5	27.5	
59	26.0	25.0	28.0	25.5	-- -	24.5	26.0	
60	26.0	26.0	30.5	29.0	29.0	24.0	30.5	
61	27.0	29.0	28.0	27.0	28.0	25.5	29.5	
62	23.5	22.5	28.0	23.5	23.5	23.5	24.5	
66	27.0	25.0	30.5	28.0	26.0	24.5	27.5	
67	29.0	24.5	30.5	27.0	27.0	27.5	29.0	
68	26.0	24.5	30.0	24.0	26.0	25.0	26.0	
69	28.0	26.0	31.0	29.0	28.5	26.0	27.5	
70	23.5	23.5	26.0	27.0	24.0	23.0	24.5	
72	27.5	26.5	29.5	27.0	27.5	29.0	29.0	
73	30.5	28.0	30.5	29.0	-- -	27.0	31.0	
74	30.0	27.0	33.0	30.0	29.5	28.0	28.5	
76	29.5	26.5	30.0	30.0	27.0	25.0	28.0	
77	30.0	26.0	33.0	29.0	28.0	27.5	28.0	
78	27.0	24.0	29.0	27.5	25.0	23.5	23.5	
79	29.0	28.5	31.0	28.5	30.0	27.0	29.0	
80	24.5	23.0	28.0	25.0	26.0	24.5	23.5	
Mean of crosses for each parent line	26.2	25.1	27.9	26.8	26.3	25.0	26.5	
Date 1/4 silked for parent line	-- -	-- -	36.3	33.0	35.0	30.3	32.3	

(1) Mean date 1/4 silked for all crosses in the experiment.

July on which 1/4 of the plants were
crosses between inbred lines from
ies of yellow corn and for the parent
n 1926.

63	64	65	71	75	Mean of crosses for each parent line	Date 1/4 silked for parent line
23.5	24.0	24.5	28.0	23.5	24.7	32.3
23.5	22.5	25.0	30.0	24.5	25.2	34.3
-- -	24.5	25.5	26.5	25.5	25.6	30.3
25.0	23.5	23.0	29.0	25.0	24.6	35.3
24.0	22.5	24.0	27.5	25.0	24.6	34.7
24.5	26.0	27.5	30.0	28.0	26.3	34.3
26.0	27.0	28.5	27.0	26.0	27.0	38.3
24.0	26.0	26.0	25.5	26.0	24.8	31.0
24.0	26.0	27.0	25.0	25.0	25.0	31.3
23.5	-- -	25.0	27.0	25.0	24.6	29.3
23.5	26.5	24.0	25.5	27.0	24.9	31.7
24.5	27.5	28.0	27.0	27.5	26.3	30.3
24.5	26.0	27.0	27.0	-- -	26.1	30.0
24.0	30.5	32.0	28.5	29.0	28.4	32.0
25.5	29.5	30.5	28.0	27.0	28.0	36.3
23.5	24.5	27.5	26.5	26.0	24.9	30.7
24.5	27.5	28.5	28.0	29.5	27.4	38.3
27.5	29.0	29.5	31.0	27.0	28.2	33.0
25.0	26.0	29.0	28.0	29.0	26.8	34.3
26.0	27.5	30.0	29.0	29.0	28.4	35.7
23.0	24.5	26.0	26.0	29.0	25.2	34.3
29.0	29.0	28.0	30.0	30.5	28.4	35.0
27.0	31.0	30.5	33.5	33.0	30.3	43.0
28.0	28.5	34.0	34.5	33.0	30.8	38.3
25.0	28.0	30.5	30.5	30.5	28.8	39.0
27.5	28.0	31.0	27.5	29.0	28.9	38.3
23.5	23.5	26.5	26.5	28.0	26.0	36.7
27.0	29.0	30.5	33.0	33.0	30.0	-- -
24.5	23.5	27.5	26.0	27.0	25.5	30.7
25.0	26.5	27.8	28.3	27.8	26.8(1)	
30.3	32.3	38.0	40.0	39.0		

eriment.

The coefficient of correlation between date ½ tasseled in the inbred parents and the mean date ½ tasseled for their crossbred progeny for the lines recorded in Table 25 was 0.6513 ± 0.0647. This was the lowest correlation obtained for the three yield groups grown in 1926 but it was higher than those for the two groups grown in 1927.

The correlation for date ½ silked from the data in Table 26 was 0.5925 ± 0.0731. This was the second highest correlation obtained between date ½ silked in the parent and average date ½ silked in the F_1 crosses. The group of white crosses grown in 1926 gave a correlation of 0.8028 ± 0.0582.

With the exception of the white crosses grown in 1927 all of the yield groups gave a slightly higher coefficient of correlation between parent and crossbred progeny for date ½ tasseled than for date ½ silked (See Table 13). Date ½ silked is influenced more by adverse weather conditions than is date ½ tasseled and this may explain the lower coefficients of correlation.

The data in Tables 25 and 26 give a very good illustration of the degree to which different inbred lines may influence in their F_1 crosses the characters of date ½ tasseled and date ½ silked. In Table 25, for instance, it will be seen that the crosses of inbred line number 42 averaged 3.5 days earlier in tasseling than those of line 43. While this may appear to be a rather small difference, an examination of the data on the individual crosses shows that it was a very constant difference. There were 29 comparable pairs of crosses and in every case the cross of line 42 was slightly earlier than that of line 43.

The data in Table 26 on date $\frac{1}{4}$ silked appear to be slightly more variable than those in date $\frac{1}{4}$ tasseled. In comparing the same two lines for date $\frac{1}{4}$ silked it will be seen that in the 29 comparisons line 43 was the later in silking in 24 cases, line 42 was the later in 4 cases and in one case they silked on the same date.

Data on the number of days between tasseling and silking are recorded in Table 27. These data were not computed for any of the other yield groups and no correlations for this character were given in Table 13. The coefficient of correlation between inbred parents and the mean value for their crossbred progeny for the data in Table 27 was 0.6597 $\pm$ 0.0635.

Here again it will be seen that different inbred lines appear to have transmitted very definite tendencies to their F_1 crosses. The average number of days from tasseling to silking for inbred line number 41 was 0.8 and for inbred line number 42 was 2.5. In 26 cases of the 29 comparable crosses in which these two inbred lines were used, line 42 required more days from tasseling to silking than did line 41, two comparisons were a tie and in only one case was the value for the line 41 cross greater than that for the line 42 cross.

It is interesting to note that 5 of the inbred parents and 10 of the F_1 crosses recorded in Table 27 silked before they tasseled. This is indicated in the table by a negative number of days from tasseling to silking. The usual occurrence in corn is for the silks to appear about two or three days after the tassel has started to shed pollen. It is possible that in carrying on the inbred lines by self-pollination there has been an unconscious selection of the earlier silking plants, since the plants that silk and tassel at about the same time are the most desirable for selfing.

TABLE 27. Days from tasselin
between inbred lines from t
corn and in the parent line

Number of parent line	41	42	43	50	53	63	64
45	-1.0	2.5	1.0	1.0	- -	0.5	1.0
46	.5	1.5	1.0	.5	1.5	.0	.0
47	2.0	2.5	1.0	2.0	3.0	- -	2.0
48	-2.0	2.0	.5	1.0	1.0	1.5	.5
49	- .5	1.5	.0	-1.0	.5	.5	1.0
51	.5	2.0	1.0	2.5	1.0	1.5	2.5
52	.0	3.5	2.5	1.0	1.5	2.0	1.5
54	.5	1.5	1.5	.5	1.0	1.0	1.0
55	.5	3.5	.5	2.0	1.5	1.0	3.0
56	.5	1.0	.5	- -	- -	.5	- -
57	.0	1.0	.5	.0	- -	.5	1.0
58	-1.0	2.5	2.0	- .5	1.5	1.5	3.0
59	1.0	2.0	3.0	1.5	- -	2.5	1.5
60	1.0	3.0	1.5	2.5	2.0	1.0	3.5
61	1.0	3.5	.5	1.5	.5	.0	3.5
62	.5	2.0	1.0	.5	1.5	1.5	2.5
66	2.5	2.5	2.0	1.0	1.5	1.5	2.0
67	1.0	2.5	.5	1.5	2.0	2.5	5.5
68	3.0	3.0	3.5	1.5	3.0	2.0	3.0
69	2.5	.5	2.0	- .5	1.5	1.0	1.5
70	.5	3.0	.0	3.0	1.0	1.5	2.5
72	3.5	5.5	4.0	4.0	3.5	4.5	6.0
73	.0	4.0	5.0	1.5	- -	3.5	3.5
74	1.5	3.5	4.0	1.0	3.0	2.0	4.0
76	1.5	4.5	1.5	1.0	3.0	2.0	4.0
77	1.0	1.5	2.0	- .5	1.5	1.0	2.0
78	.0	.0	2.0	.0	1.0	1.5	.5
79	2.5	5.0	4.0	3.0	3.0	3.5	4.5
80	1.5	2.5	3.0	2.0	2.5	2.0	2.0
Mean of crosses for each parent line	.8	2.5	1.8	1.2	1.8	1.6	2.4
Value for parent line	- -	- -	3.0	-2.0	2.0	.6	.6

(1) Mean number of days from tasseling to silking for all crosses

seling to silking in the F_1 crosses
rom the later varieties of yellow
lines as grown in 1926.

64	65	71	75	Mean of crosses for each parent line	Value for parent line
1.0	1.0	1.5	1.5	1.0	-0.4
.0	2.0	2.0	1.0	1.0	- .2
2.0	2.5	2.0	2.0	2.1	1.6
.5	.0	.5	2.0	.7	2.0
1.0	1.0	.5	.5	.4	3.7
2.5	3.0	1.0	2.0	1.7	3.3
1.5	2.5	1.5	1.0	1.7	1.6
1.0	3.0	.5	2.5	1.3	.3
3.0	3.0	1.0	1.5	1.8	- .7
- -	1.0	3.0	1.0	1.1	- .7
1.0	1.0	-1.0	.0	.3	.4
3.0	3.0	2.5	2.5	1.7	.3
1.5	2.5	1.5	- -	1.9	2.0
3.5	3.0	2.0	3.0	2.2	3.0
3.5	3.0	- .5	1.0	1.4	3.6
2.5	2.5	3.0	2.5	1.8	1.7
2.0	2.0	2.0	2.5	2.0	3.3
5.5	3.5	5.0	2.5	2.6	3.0
3.0	5.5	5.5	5.0	3.5	5.6
1.5	2.5	1.0	2.0	1.4	1.0
2.5	3.0	2.5	4.5	2.2	3.3
6.0	4.0	6.0	5.5	4.6	5.7
3.5	1.5	2.5	3.0	2.7	6.7
4.0	3.5	4.0	4.0	3.0	3.3
4.0	4.5	4.5	4.0	3.0	4.3
2.0	1.5	1.0	2.5	1.4	2.0
.5	1.5	1.5	2.5	1.0	.7
4.5	3.5	5.0	4.0	3.8	- -
2.0	3.0	2.5	3.5	2.4	4.0
2.4	2.5	2.2	2.5	2.0(1)	
.6	4.3	3.7	3.0		

crosses in the experiment.

The data on plant height are given in Table 28. The coefficient of correlation between parent and mean of the crosses was 0.5329 $\pm$ 0.0806 for the lines recorded in this table. All but one of the other yield groups gave higher correlations than this group.

Of the inbred lines shown in Table 28 line 41 was outstanding for the fact that all of its F_1 crosses were short. It is possible that this line was homozygous for some dominant genes producing short plants. Leaving line 41 out of consideration, the remaining lines differed but little in the mean height of their F_1 crosses although what differences there were appear to be significant. As an example, lines 63 and 64 may be compared. The mean height of crosses for line 64 was 0.91 foot greater than that of line 63. These two lines were used in 27 comparable crosses and in 25 of the comparisons the cross of line 64 was the taller of the two crosses.

TABLE 28. Plant height in the F_1 cross
the later varieties of yellow corn an
as grown in 1926.

Number of parent line	41	42	43	50	53	63	64	65
45	7.25	8.00	8.25	8.00	----	7.50	8.00	8.50
46	7.25	9.00	8.25	8.25	8.50	8.00	8.75	9.00
47	7.00	8.00	8.25	7.75	8.00	----	8.00	9.00
48	6.00	7.50	8.00	8.00	7.50	6.75	7.75	8.50
49	7.50	8.00	8.25	8.00	8.00	7.75	8.25	8.50
51	7.75	8.25	8.50	8.25	8.00	8.00	9.00	9.00
52	7.00	8.50	8.50	7.75	8.25	7.75	8.50	9.50
54	6.25	8.00	8.00	7.25	7.00	7.00	8.00	8.50
55	6.25	8.00	7.75	7.00	7.75	7.00	8.00	8.50
56	6.50	7.25	7.50	----	----	7.00	----	8.00
57	6.50	8.00	7.50	7.50	----	7.75	7.75	7.50
58	7.00	8.50	7.75	8.00	8.00	7.50	8.50	9.00
59	7.00	7.75	8.00	7.75	----	7.00	7.75	9.00
60	7.00	8.25	8.25	7.50	8.00	7.00	8.75	8.50
61	7.25	8.00	8.00	7.25	8.25	7.00	8.25	8.00
62	6.75	7.75	7.75	7.50	7.75	7.00	7.50	7.75
66	7.50	8.25	8.75	8.25	8.00	7.25	8.25	8.50
67	6.25	8.25	7.50	8.00	8.00	8.75	8.50	8.50
68	5.75	8.00	7.75	8.25	7.75	7.25	8.25	8.50
69	6.50	8.00	7.75	8.25	8.00	7.75	8.25	8.50
70	6.25	8.25	8.00	8.25	8.00	7.00	8.25	8.25
72	6.50	8.75	8.75	8.50	8.00	7.50	9.00	9.00
73	7.50	8.50	8.00	8.25	- --	7.75	9.25	9.25
74	7.00	8.25	8.00	8.75	8.50	7.50	8.50	8.75
76	7.00	8.00	7.50	8.25	8.25	7.25	8.25	8.25
77	7.50	9.00	8.50	8.75	8.75	7.50	9.50	9.75
78	6.50	8.25	7.75	8.25	8.00	7.50	8.50	9.25
79	7.75	8.50	8.00	8.75	9.50	8.00	9.00	9.25
80	6.75	8.25	7.75	8.00	8.00	7.75	8.00	8.25
Mean of crosses for each parent line	6.86	8.17	8.02	8.01	8.07	7.46	8.37	8.65
Height of parent line	- --	- --	7.00	7.00	7.00	5.33	7.83	7.67

(1) Mean plant height for all crosses in the experiment.

the F_1 crosses between inbred lines from
llow corn and for the parent lines

3	64	65	71	75	Mean of crosses for each parent line	Height of parent line
50	8.00	8.50	9.00	8.25	8.08	5.00
00	8.75	9.00	9.25	8.25	8.45	7.67
--	8.00	9.00	9.00	8.75	8.19	6.50
75	7.75	8.50	8.00	7.50	7.55	7.17
75	8.25	8.50	9.00	8.25	8.15	7.00
00	9.00	9.00	9.25	8.75	8.48	7.17
75	8.50	9.50	8.50	8.25	8.25	6.67
00	8.00	8.50	8.00	8.25	7.62	5.67
00	8.00	8.50	8.25	8.00	7.65	6.17
00	----	8.00	8.50	7.75	7.50	6.33
75	7.75	7.50	8.25	8.00	7.64	8.50
50	8.50	9.00	9.00	8.50	8.18	6.17
.00	7.75	9.00	9.00	----	7.91	6.50
.00	8.75	8.50	8.50	8.25	8.00	6.83
.00	8.25	8.00	8.75	8.25	7.90	6.00
.00	7.50	7.75	8.50	8.00	7.62	6.00
.25	8.25	8.50	8.50	8.00	8.12	6.33
.75	8.50	8.50	8.50	7.50	8.00	7.00
.25	8.25	8.50	8.50	7.50	7.75	5.67
.75	8.25	8.50	8.50	8.50	8.00	7.33
.00	8.25	8.25	8.00	7.75	7.80	6.67
.50	9.00	9.00	7.75	8.25	8.20	7.33
.75	9.25	9.25	9.00	8.50	8.44	7.33
.50	8.50	8.75	8.50	7.75	8.15	7.17
.25	8.25	8.25	8.50	8.00	7.92	7.67
.50	9.50	9.75	9.00	8.25	8.65	8.33
.50	8.50	9.25	9.00	8.00	8.10	7.00
.00	9.00	9.25	9.50	8.50	8.68	- --
.75	8.00	8.25	8.50	7.50	7.90	7.17
.46	8.37	8.65	8.64	8.11	8.03 (1)	
.33	7.83	7.67	7.33	7.33		

iment.

The data on per cent of ears moldy are recorded in Table 29. The group of inbred lines in this table gave one of the lowest parent-progeny correlations for this character. It was only 0.2516 $\pm$ 0.1054 and can not be considered significant.

However, an examination of these data shows that the different inbred lines exhibited wide differences and very definite tendencies in regard to the per cent of moldy ears in the harvested crop. Some lines had a high per cent of mold in nearly all of their crosses while other had a low per cent. A very good comparison may be made between the crosses of line 53 and those of either line 43 or 75. In either case there were 24 comparable crosses. In each of the comparisons with line 75, the cross with line 53 had a lower percentage of moldy ears than that with 75 and in 23 of the 24 comparisons with line 43 the cross with line 53 had the lower percentage of moldy ears.

The data in this table afford good illustrations of how certain inbred lines may uniformly transmit to their offspring characters they do not express themselves. Lice number 58 was an outstanding example. This inbred line had the highest per cent of moldy ears (73.4) and yet only one other line in comparable crosses, line 59, had a lower mean per cent of moldy ears for all of its crosses. With the possible exception of the cross with line 43, all of the crosses of line 58 were uniformly low in per cent of ears moldy.

TABLE 29. Per cent of ears moldy in th
lines from the later varieties of yel
lines as grown in 1926.

Number of parent line	41	42	43	50	53	63	64
45	15.7	7.7	23.9	8.0	---	15.1	0
46	7.0	14.8	8.2	5.9	3.2	14.0	8
47	.0	14.5	22.4	4.0	6.7	----	8
48	17.3	6.0	21.4	12.5	4.5	25.6	21
49	4.8	6.9	9.6	5.3	7.8	15.5	9
51	6.0	8.1	11.3	8.3	3.0	12.4	13
52	11.5	7.2	17.7	7.1	8.9	18.1	7
54	7.6	6.6	31.0	7.5	1.9	13.1	10
55	26.5	9.9	27.0	7.4	19.4	24.1	6
56	3.7	15.3	11.2	----	----	9.0	--
57	5.0	6.8	8.6	8.5	----	11.5	8
58	4.5	7.7	17.5	2.8	7.0	6.4	4
59	7.9	3.5	4.8	7.0	----	11.5	9
60	5.7	6.8	11.1	12.2	5.7	19.0	3
61	3.1	10.3	8.7	3.0	9.0	10.0	7
62	7.1	8.3	12.1	6.3	2.4	12.3	3
66	18.7	14.0	12.7	8.4	5.4	12.2	17
67	9.2	7.9	22.4	16.4	7.7	15.2	5
68	8.0	9.0	19.6	4.6	4.8	6.8	2
69	6.7	14.9	22.5	14.5	13.1	24.1	11
70	19.2	9.5	27.7	13.3	2.7	20.8	18
72	6.5	9.4	24.9	9.8	3.8	16.0	9
73	3.1	10.2	15.1	9.6	----	5.9	4
74	11.7	9.6	24.4	4.6	8.2	14.2	11
76	7.5	12.8	26.9	7.4	5.0	16.7	8
77	12.6	16.2	42.2	15.5	8.6	22.9	9
78	4.8	5.4	16.8	6.7	7.4	5.7	11
79	10.1	10.1	13.0	4.7	.0	6.7	10
80	9.7	8.0	10.8	8.6	5.6	14.9	16
Mean of crosses for each parent line	9.0	9.6	18.1	8.2	6.3	14.3	9
Per cent moldy ears for parent line	----	----	9.0	9.0	7.7	25.6	23

(1)Mean per cent of ears moldy for all crosses in the experiment

of ears moldy in the F_1 crosses between inbred
ter varieties of yellow corn and in the parent
1926.

0	53	63	64	65	71	75	Mean of crosses for each parent line	Per cent moldy ears in parent line
8.0	---	15.1	0.0	32.3	12.3	5.9	13.4	26.4
5.9	3.2	14.0	8.3	6.8	4.7	16.9	9.0	5.5
4.0	6.7	----	8.6	7.2	4.0	13.8	9.0	24.3
2.5	4.5	25.6	21.9	9.2	12.9	36.0	16.7	40.5
5.3	7.8	15.5	9.1	8.3	6.2	17.8	9.1	22.8
8.3	3.0	12.4	13.0	17.9	13.1	12.0	10.5	36.8
7.1	8.9	18.1	7.9	10.5	9.9	21.1	12.0	21.3
7.5	1.9	13.1	10.3	11.1	8.4	14.5	11.2	22.6
7.4	19.4	24.1	6.8	19.8	12.3	21.1	17.4	30.4
----	----	9.0	----	9.9	4.2	6.7	8.6	26.4
8.5	----	11.5	8.4	18.6	3.7	12.4	9.3	7.3
2.8	7.0	6.4	4.2	5.8	4.2	11.2	7.1	73.4
7.0	----	11.5	9.8	6.6	4.5	----	7.0	31.9
12.2	5.7	19.0	3.0	10.4	7.6	10.5	9.2	30.1
3.0	9.0	10.0	7.6	7.0	6.3	16.0	8.1	26.9
6.3	2.4	12.3	3.3	7.4	7.1	4.5	7.1	26.4
8.4	5.4	12.2	17.9	13.8	14.7	38.4	15.6	26.7
16.4	7.7	15.2	5.8	14.1	11.3	22.6	13.3	12.7
4.6	4.8	6.8	2.7	4.3	6.1	9.8	7.6	13.1
14.5	13.1	24.1	11.8	17.8	14.3	26.7	16.6	38.5
13.3	2.7	20.8	18.6	23.8	11.1	29.5	17.6	23.9
9.8	3.8	16.0	9.1	8.0	8.6	18.7	11.5	17.5
9.6	----	5.9	4.0	3.5	4.2	12.4	7.6	19.1
4.6	8.2	14.2	11.4	8.5	9.7	35.4	13.8	34.8
7.4	5.0	16.7	8.2	7.8	3.5	14.4	11.0	14.6
15.5	8.6	22.9	9.8	12.6	10.9	25.7	17.7	26.2
6.7	7.4	5.7	11.2	8.3	8.7	11.8	8.7	3.1
4.7	.0	6.7	10.1	5.5	7.9	23.4	9.2	----
8.6	5.6	14.9	16.2	10.2	9.7	20.4	11.4	25.6
8.2	6.3	14.3	9.2	11.3	8.3	18.2	11.3 (1)	
9.0	7.7	25.6	23.2	18.4	14.4	64.5		

es in the experiment.

The data on mean ear length are recorded in Table 30. The data in this table gave the highest correlation of those between ear length of the inbred lines and mean ear length of all of the crosses of which they were parents. The correlation in this case was 0.7962 $\pm$ 0.0412. In the group of white crosses grown in 1926 the correlation was not significant.

The mean length of ear for the crosses from different lines varied from 17.9 cm. for line 62 to 22.8 cm. for line 45. As in the characters previously discussed, the different inbred lines appear to have contributed very definite tendencies to their F_1 crosses as regards ear length. The F_1 crosses of line 65 averaged 4.0 cm. longer than those of line 71. There were 29 comparable crosses and in 28 cases the cross involving line 65 had the longer ears.

TABLE 30. Mean ear length in centimeters for t
between inbred lines from the later varieties
corn and for the parent lines as grown in 192

Number of parent line	41	42	43	50	53	63	64	65
45	23.9	21.8	22.9	23.9	----	21.0	28.7	24
46	20.8	19.4	22.7	21.2	18.6	18.2	24.3	21
47	20.5	16.8	21.0	19.5	17.3	----	22.4	22
48	20.0	22.0	22.9	20.0	18.1	17.9	22.4	23
49	20.9	19.4	20.9	20.7	19.5	17.8	21.8	23
51	20.4	18.4	20.9	20.0	18.9	18.2	22.3	21
52	18.6	19.6	21.1	20.3	20.2	17.7	20.9	22
54	19.7	19.5	21.1	20.5	18.0	16.5	20.1	23
55	18.7	17.5	19.5	18.7	18.2	16.1	19.7	21
56	19.1	18.1	21.7	----	----	16.3	----	23
57	18.3	18.5	20.0	19.2	----	18.8	21.9	17
58	19.7	18.5	19.7	19.2	18.1	16.8	21.5	23
59	19.1	20.3	22.8	19.3	----	17.6	21.7	23
60	19.4	17.5	19.3	18.7	17.8	17.2	21.0	21
61	23.2	20.1	22.2	23.1	20.5	18.9	23.5	23
62	17.3	17.9	17.7	18.9	16.8	15.0	20.2	20
66	19.2	20.0	21.1	19.6	18.1	15.7	20.6	22
67	21.2	20.6	21.3	21.5	19.3	19.7	25.4	19
68	19.4	19.2	22.9	21.0	19.5	18.3	24.5	25
69	19.5	18.8	20.1	20.6	18.5	17.7	21.6	21
70	18.6	18.3	22.1	19.1	18.7	16.9	21.8	22
72	18.6	17.4	19.2	19.3	17.4	16.8	22.0	22
73	17.6	19.1	20.0	19.3	----	15.9	20.9	20
74	20.4	20.2	21.8	21.2	20.9	19.6	19.3	23
76	16.6	18.2	20.5	19.4	17.7	14.9	20.6	21
77	19.2	19.4	20.4	20.6	18.4	17.0	21.7	23
78	20.1	18.2	21.1	21.9	19.2	18.5	23.9	24
79	18.0	18.8	20.3	20.7	21.6	19.4	23.3	24
80	19.3	19.9	20.9	19.2	19.8	17.7	21.3	21
Mean of crosses for each parent line	19.6	19.1	21.0	20.2	18.8	17.6	22.1	22
Ear length of parent line	----	----	16.5	17.3	11.8	12.7	20.2	18

[1]Mean ear length in centimeters for all crosses in the experiment.

ength in centimeters for the F_1 crosses
from the later varieties of yellow
ent lines as grown in 1926.

50	53	63	64	65	71	75	Mean of crosses for each parent line	Ear length of parent line
23.9	----	21.0	28.7	24.1	21.8	17.5	22.8	21.2
21.2	18.6	18.2	24.3	21.8	19.2	20.8	20.7	15.1
19.5	17.3	----	22.4	22.9	18.8	20.7	20.0	13.2
20.0	18.1	17.9	22.4	23.8	19.1	19.6	20.6	15.9
20.7	19.5	17.8	21.8	23.2	18.3	20.5	20.3	13.0
20.0	18.9	18.2	22.3	21.3	18.4	19.6	19.8	14.5
20.3	20.2	17.7	20.9	22.8	17.4	18.8	19.7	13.9
20.5	18.0	16.5	20.1	23.1	18.6	19.9	19.7	15.0
18.7	18.2	16.1	19.7	21.8	18.0	19.4	18.8	12.7
----	----	16.3	----	23.4	19.4	18.6	19.5	14.4
19.2	----	18.8	21.9	17.1	19.3	18.5	19.1	12.4
19.2	18.1	16.8	21.5	23.4	18.5	17.7	19.3	12.5
19.3	----	17.6	21.7	23.9	19.7	----	20.6	15.2
18.7	17.8	17.2	21.0	21.6	17.9	19.0	18.9	14.0
23.1	20.5	18.9	23.5	23.0	19.0	20.3	21.4	14.0
18.9	16.8	15.0	20.2	20.2	17.5	17.7	17.9	12.7
19.6	18.1	15.7	20.6	22.6	16.8	16.5	19.0	12.4
21.5	19.3	19.7	25.4	19.9	19.9	19.9	21.4	16.1
21.0	19.5	18.3	24.5	25.5	19.8	19.9	21.0	14.9
20.6	18.5	17.7	21.6	21.1	18.3	19.0	19.5	16.6
19.1	18.7	16.9	21.8	22.2	18.6	17.2	19.4	14.4
19.3	17.4	16.8	22.0	22.6	17.5	16.9	18.8	13.8
19.3	----	15.9	20.9	20.4	16.3	18.5	18.7	11.6
21.2	20.9	19.6	19.3	23.4	16.8	18.0	20.2	13.5
19.4	17.7	14.9	20.6	21.6	18.5	19.3	18.7	14.1
20.6	18.4	17.0	21.7	23.5	19.4	20.0	20.0	14.8
21.9	19.2	18.5	23.9	24.9	19.9	21.2	20.9	14.5
20.7	21.6	19.4	23.3	24.6	18.4	19.1	20.4	----
19.2	19.8	17.7	21.3	21.5	18.3	18.6	19.6	14.9
20.2	18.8	17.6	22.1	22.6	18.6	19.0	19.9 (1)	
17.3	11.8	12.7	20.2	18.5	12.9	14.0		

rosses in the experiment.

Table 31 contains the data on diameter of ear. All of the correlations between diameter of ear of the parents and the mean diameter of ear of their crossbred progeny were higher than for length of ear. The correlation for diameter of ear for the white crosses grown in 1926 was 0.9834 $\pm$ 0.0052. This is an extremely high correlation and is the highest one obtained for any character. The correlation for Table 31 was 0.7062 $\pm$ 0.0564.

The extreme range of variation for the crosses in this experiment was only 1.21 cm. (from 4.08 to 5.29). The range for the mean ear diameter for all crosses for the different inbred lines was from 4.45 cm. for line 67 to 5.04 for line 77. In spite of this small variation, however, the differences between different lines were, in many cases, remarkably constant. For example, the crosses of line 64 averaged 0.28 cm. smaller diameter than those of line 71. There were 28 comparable crosses and in 26 cases line 71 had ears with the greater diameter.

TABLE 31. Mean ear diameter in centimeters for
between inbred lines from the later varieties
and for the parent lines as grown in 1926.

Number of parent line	41	42	43	50	53	63	64	65
45	4.93	4.75	4.64	4.87	----	5.03	4.67	4.
46	4.75	4.51	4.77	4.78	4.84	4.73	4.74	4.
47	4.93	4.55	4.68	4.67	4.47	----	4.49	4.
48	4.53	4.87	4.59	4.60	4.50	4.55	4.39	4.
49	4.69	4.78	4.81	4.53	4.76	4.79	4.62	4.
51	4.91	4.82	4.99	4.76	4.87	4.88	4.90	4.
52	4.52	4.77	4.64	4.51	4.61	4.63	4.43	4.
54	4.52	4.64	4.84	4.59	4.53	4.62	4.51	4.
55	4.73	4.82	4.92	4.79	5.00	5.04	4.60	4.
56	4.62	4.58	4.74	----	----	4.80	----	4.
57	4.86	4.95	4.87	4.79	----	4.86	4.76	5.
58	4.93	4.64	4.63	4.82	4.73	4.75	4.62	4.
59	4.93	4.93	4.81	4.71	----	4.72	4.51	4.
60	4.58	4.80	4.66	4.66	4.83	4.73	4.56	4.
61	4.75	4.43	4.52	4.54	4.53	4.63	4.35	4.
62	4.75	4.82	4.78	4.80	5.03	4.89	4.78	4.
66	4.59	4.80	4.72	4.82	4.78	4.54	4.64	4.
67	4.41	4.51	4.46	4.49	4.42	4.47	4.26	4.
68	4.41	4.51	4.66	4.51	4.58	4.77	4.60	4.
69	4.94	5.02	4.92	5.01	5.00	5.16	4.84	4.
70	4.88	4.88	4.93	4.66	4.91	5.06	4.55	4.
72	4.70	4.96	5.03	4.93	5.16	5.15	5.20	4.
73	4.70	4.76	4.94	4.98	----	5.08	5.02	4.
74	4.71	4.87	4.72	4.75	4.67	4.71	4.22	4.
76	4.70	4.84	4.77	4.97	4.79	4.77	4.52	4.
77	5.03	5.18	4.91	5.20	4.91	4.98	4.81	4.
78	4.49	4.40	4.59	4.53	4.39	4.74	4.37	4.
79	4.59	4.79	4.37	4.90	4.80	4.77	4.58	4.
80	4.61	4.76	4.69	4.61	4.56	4.72	4.59	4.
Mean of crosses for each parent line	4.71	4.76	4.74	4.74	4.74	4.81	4.61	4.
Ear diameter of parent line	----	----	3.90	4.15	3.99	4.57	4.18	3.

(1) Mean ear diameter in centimeters for all crosses in the experimen

meter in centimeters for the F_1 crosses
from the later varieties of yellow corn
pes as grown in 1926.

)	53	63	64	65	71	75	Mean of crosses for each parent line	Ear diameter of parent line
.87	----	5.03	4.67	4.51	4.90	4.08	4.71	3.76
.78	4.84	4.73	4.74	4.67	4.58	5.04	4.74	4.08
.67	4.47	----	4.49	4.57	4.90	4.92	4.69	3.91
.60	4.50	4.55	4.39	4.46	4.61	4.59	4.57	3.51
.53	4.76	4.79	4.62	4.59	4.92	4.92	4.74	3.86
.76	4.87	4.88	4.90	4.77	5.11	5.04	4.90	4.30
.51	4.61	4.63	4.43	4.62	4.76	4.76	4.62	3.71
.59	4.53	4.62	4.51	4.61	4.71	4.74	4.63	3.81
.79	5.00	5.04	4.60	4.84	5.06	5.18	4.90	4.27
---	----	4.80	----	4.61	4.97	4.96	4.75	3.86
.79	----	4.86	4.76	5.00	5.29	4.99	4.93	4.39
.82	4.73	4.75	4.62	4.73	4.89	4.68	4.74	4.09
.71	----	4.72	4.51	4.61	4.95	----	4.77	4.15
.66	4.83	4.73	4.56	4.71	4.61	4.67	4.68	4.11
.54	4.53	4.63	4.35	4.31	4.76	4.71	4.55	3.77
.80	5.03	4.89	4.78	4.74	5.20	4.84	4.86	3.88
.82	4.78	4.54	4.64	4.68	4.83	4.76	4.72	4.16
.49	4.42	4.47	4.26	4.49	4.46	4.53	4.45	3.72
.51	4.58	4.77	4.60	4.60	4.81	4.69	4.61	3.61
.01	5.00	5.16	4.84	4.90	5.11	4.94	4.98	4.55
.66	4.91	5.06	4.55	4.60	4.95	4.61	4.80	4.13
.93	5.16	5.15	5.20	4.96	5.07	5.06	5.02	4.65
.98	----	5.08	5.02	4.88	5.16	4.98	4.94	4.25
.75	4.67	4.71	4.22	4.56	4.68	4.91	4.68	3.70
.97	4.79	4.77	4.52	4.54	5.00	4.83	4.77	4.00
.20	4.91	4.98	4.81	4.90	5.15	5.28	5.04	4.64
.53	4.39	4.74	4.37	4.57	4.77	4.74	4.56	3.75
.90	4.80	4.77	4.58	4.63	4.91	4.73	4.71	----
.61	4.56	4.72	4.59	4.58	4.82	4.73	4.66	4.15
.74	4.74	4.81	4.61	4.66	4.89	4.82	4.75(1)	
.15	3.99	4.57	4.18	3.68	3.92	4.00		

crosses in the experiment.

The data on ear shape index are contained in Table 32. Only two of the three correlations between parent and mean of crossbred progeny for this character were significant. The one for Table 32 was 0.8461 $\pm$ 0.0320 and was the highest one obtained.

Ear shape index was obtained by dividing the mean ear diameter by the mean ear length. The high index indicates an ear whose diameter was large as compared with its length while a small index indicates a relatively long slender ear. The mean ear shape indexes for the various inbred lines shown in Table 32 ranged in size from 0.275 for line 63 to 0.208 for line 65. An examination of Tables 30 and 31 shows that the greater part of this difference in ear shape index between these two lines was due to the difference in ear length. The mean ear length for the crosses of line 65 was 5 cm. greater than that for the crosses of line 63 while the mean ear diameter of the crosses of line 63 was only 0.15 cm. greater than that of the crosses of line 65.

TABLE 32. Ear shape index (diameter ÷ length)
between inbred lines from the later varietie
and for the parent lines as grown in 1926.

Number of parent line	41	42	43	50	53	63	64	65
45	0.207	0.218	0.203	0.204	----	0.240	0.163	0.1
46	.228	.232	.210	.226	0.260	.261	.195	.2
47	.240	.270	.222	.239	.258	---	.201	.2
48	.227	.221	.200	.230	.248	.254	.196	.1
49	.225	.246	.230	.219	.244	.269	.212	.1
51	.241	.261	.239	.237	.258	.269	.220	.2
52	.243	.244	.220	.223	.228	.261	.212	.2
54	.229	.238	.230	.224	.252	.280	.224	.2
55	.253	.276	.252	.256	.274	.312	.234	.2
56	.242	.253	.219	---	----	.295	---	.1
57	.265	.267	.244	.249	---	.259	.217	.2
58	.250	.251	.234	.252	.262	.282	.215	.2
59	.258	.243	.211	.244	---	.269	.207	.1
60	.236	.275	.241	.249	.272	.275	.217	.2
61	.205	.220	.204	.197	.221	.245	.185	.1
62	.275	.269	.270	.253	.300	.326	.237	.2
66	.239	.240	.224	.246	.263	.289	.225	.
67	.208	.219	.210	.209	.230	.227	.168	.1
68	.227	.235	.204	.215	.235	.260	.188	.1
69	.253	.267	.245	.243	.270	.291	.225	.
70	.262	.266	.223	.243	.263	.299	.209	.
72	.253	.285	.262	.256	.296	.308	.236	.
73	.268	.249	.247	.258	---	.320	.240	.
74	.231	.241	.217	.224	.223	.240	.218	.
76	.283	.266	.233	.255	.271	.321	.219	.
77	.262	.267	.241	.252	.267	.293	.221	.
78	.222	.242	.218	.207	.228	.256	.183	.
79	.254	.255	.215	.236	.222	.246	.197	.
80	.239	.239	.224	.240	.230	.266	.215	.
Mean of crosses for each parent line	.242	.250	.227	.235	.253	.275	.210	.
Ear shape index of parent line	---	---	.237	.240	.338	.360	.207	.

(1)Mean ear shape index for all crosses in the experiment.

ndex (diameter ÷ length) for the F_1 crosses
from the later varieties of yellow corn
lines as grown in 1926.

)	53	63	64	65	71	75	Mean of crosses for each parent line	Ear shape index of parent line
204	----	0.240	0.163	0.187	0.224	0.233	0.209	0.178
226	0.260	.261	.195	.214	.238	.242	.231	.270
239	.258	---	.201	.200	.251	.238	.236	.296
230	.248	.254	.196	.187	.242	.234	.224	.221
219	.244	.269	.212	.198	.269	.240	.235	.298
237	.258	.269	.220	.224	.277	.257	.248	.296
223	.228	.261	.212	.203	.274	.253	.236	.268
224	.252	.280	.224	.200	.254	.239	.237	.255
256	.274	.312	.234	.222	.282	.268	.263	.377
---	----	.295	---	.197	.256	.266	.247	.267
249	---	.259	.217	.292	.274	.269	.260	.354
252	.262	.282	.215	.202	.264	.264	.248	.328
244	---	.269	.207	.193	.251	---	.234	.272
249	.272	.275	.217	.219	.257	.246	.249	.293
197	.221	.245	.185	.187	.250	.232	.215	.270
253	.300	.326	.237	.235	.296	.274	.274	.305
246	.263	.289	.225	.207	.287	.289	.251	.335
209	.230	.227	.168	.178	.224	.228	.210	.230
215	.235	.260	.188	.180	.244	.235	.222	.242
243	.270	.291	.225	.232	.279	.260	.256	.273
243	.263	.299	.209	.208	.266	.268	.251	.288
256	.296	.308	.236	.219	.290	.300	.270	.337
258	---	.320	.240	.239	.315	.269	.267	.367
224	.223	.240	.218	.194	.279	.274	.234	.274
255	.271	.321	.219	.211	.271	.251	.258	.284
.252	.267	.293	.221	.209	.266	.264	.254	.313
.207	.228	.256	.183	.183	.239	.224	.220	.259
.236	.222	.246	.197	.188	.267	.247	.233	----
.240	.230	.266	.215	.210	.263	.254	.238	.279
.235	.253	.275	.210	.208	.264	.254	.242(1)	
.240	.338	.360	.207	.199	.305	.286		

the experiment.

The data on the shrinkage per cent of the ears harvested from the different crosses are given in Table 33. The correlation between inbred parent and mean of the crossbred progeny for the data in this table was 0.6160 $\pm$ 0.0699.

After shrinking until air dry there remained as an average of all of the crosses in the experiment reported about 5.6 per cent moisture in the grain.

Due to the favorable weather conditions in the fall of 1926, practically all of the crosses matured. As a result the mean shrinkage per cent for the crosses of the different inbred lines showed a total range of only 8.4 per cent (from 21.0 to 29.4). In spite of the comparatively small differences, however, those which did exist were significant in many cases. For example, lines 71 and 75 showed a difference of 6.9 in the mean shrinkage per cent for all of the crosses of which they were parents. These two lines were used in 28 comparable crosses and in 27 cases the cross with line 71 as a parent had the higher shrinkage per cent.

A comparison of Table 33 with Tables 25 and 26 shows that in general those inbred lines that had a high mean shrinkage per cent were later in silking and tasseling. There were a few outstanding exceptions, however. For example, line 71, which had the highest mean shrinkage per cent and line 75, which had a fairly low mean shrinkage per cent differed only 0.8 day in their mean date tasseled and 0.5 day in their mean date silked.

TABLE 33. Shrinkage per cent of the h
between inbred lines from the later
for the parent lines as grown in 19

Number of parent line	41	42	43	50	53	63	64
45	21.8	21.2	24.1	19.2	-- -	22.7	23.6
46	20.3	19.5	23.2	18.9	24.7	20.6	35.9
47	23.5	22.6	24.4	22.6	27.8	-- -	25.6
48	25.3	23.4	22.8	28.3	26.5	20.0	24.9
49	21.2	21.1	18.1	23.9	23.2	20.9	26.0
51	21.9	23.3	21.1	22.5	19.6	18.9	26.1
52	26.8	25.9	20.5	23.7	23.9	22.6	25.5
54	22.4	22.6	24.6	20.0	28.3	22.5	26.3
55	24.9	22.1	24.6	24.4	24.5	19.5	28.7
56	19.0	22.5	14.7	-- -	-- -	21.9	-- -
57	24.6	22.7	26.9	23.2	-- -	22.4	28.3
58	25.2	21.6	25.6	20.7	21.1	17.8	24.8
59	27.0	21.4	20.4	22.2	-- -	24.5	27.3
60	27.6	19.6	26.9	21.1	25.6	26.1	24.0
61	21.7	21.6	21.9	21.9	21.0	22.7	24.6
62	24.7	22.9	22.3	20.6	24.5	20.2	24.4
66	23.0	19.3	25.0	22.6	22.6	24.2	26.0
67	22.9	33.6	25.1	21.7	26.8	22.7	25.4
68	27.9	25.2	24.0	23.9	25.4	27.6	25.7
69	23.9	20.2	21.9	21.3	23.8	23.5	27.9
70	23.7	23.1	24.1	21.6	27.4	22.7	30.0
72	26.7	25.3	25.7	25.8	28.9	24.8	27.7
73	20.4	18.0	22.3	23.2	-- -	21.6	25.1
74	27.7	21.1	22.9	22.4	19.3	20.7	25.7
76	23.2	21.9	24.1	21.4	25.1	24.9	27.2
77	19.6	17.8	24.5	20.0	21.0	21.4	22.9
78	26.7	25.4	27.0	22.8	24.7	23.9	25.2
79	23.7	24.9	24.5	23.6	26.4	23.0	28.9
80	26.6	24.1	23.9	24.8	23.2	23.4	25.1
Mean of crosses for each parent line	23.9	22.6	23.4	22.4	24.4	22.4	26.4
Shrinkage per cent for parent line	-- -	-- -	25.2	18.2	18.6	18.5	17.9

(1) Mean per cent of shrinkage for all crosses in the experime

ent of the harvested ears for the F_1 crosses
om the later varieties of yellow corn and
grown in 1926.

63	64	65	71	75	Mean of crosses for each parent line	Shrinkage percent for parent line
22.7	23.6	25.6	27.9	21.9	23.1	16.1
20.6	35.9	19.4	25.4	20.8	22.9	15.1
-- -	25.6	21.5	29.2	18.8	24.0	16.9
20.0	24.9	22.9	30.2	21.0	24.5	18.8
20.9	26.0	26.2	27.6	21.5	23.0	26.0
18.9	26.1	24.0	27.6	20.2	22.5	19.7
22.6	25.5	26.2	32.0	23.1	25.0	24.1
22.5	26.3	25.2	27.4	20.0	23.9	15.5
19.5	28.7	30.2	29.0	22.2	25.0	18.3
21.9	-- -	22.3	22.7	23.9	21.0	16.0
22.4	28.3	17.0	29.7	24.0	24.3	24.7
17.8	24.8	20.2	23.3	20.4	22.1	16.3
24.5	27.3	26.1	32.2	-- -	25.1	24.6
26.1	24.0	28.3	28.7	21.0	24.9	19.6
22.7	24.6	22.9	28.5	19.3	22.6	16.4
20.2	24.4	23.9	31.3	25.4	24.0	24.5
24.2	26.0	23.9	31.6	23.3	24.2	33.6
22.7	25.4	26.6	28.9	23.2	25.7	18.5
27.6	25.7	24.5	30.2	24.8	25.9	28.8
23.5	27.9	24.1	25.3	21.2	23.3	19.7
22.7	30.0	28.5	30.3	23.8	25.5	24.0
24.8	27.7	30.2	31.3	25.8	27.2	29.4
21.6	25.1	19.3	30.6	26.6	23.0	22.9
20.7	25.7	30.3	38.0	27.0	25.6	26.8
24.9	27.2	24.2	24.4	22.1	23.8	23.7
21.4	22.9	22.5	37.6	20.6	22.8	17.9
23.9	25.2	23.8	29.2	21.3	25.0	22.6
23.0	28.9	23.3	32.1	24.4	25.5	-- -
23.4	25.1	28.8	28.8	22.9	25.2	21.8
22.4	26.4	24.6	29.4	22.5	24.2(1)	
18.5	17.9	24.5	35.4	19.0		

the experiment.

The data on shelling per cent are recorded in Table 34. From the data in this table a correlation of 0.6860 ± 0.0596 was computed between parent and mean of crossbred progeny. Two of the remaining yield groups gave higher and two gave lower correlations than this.

Here again the differences between the mean values for all crosses for the different lines were small though there is no doubt that most of them were significant. They ranged from 84.0 for line 51 to 88.2 for line 70. A good example of the consistency of the differences between the crosses from different inbred lines may be had by comparing the crosses of lines 64 and 75. The mean shelling per cent of the cosses of line 64 was 84.6 and for those of line 75 was 88.1. There were 27 comparable crosses and in every case line 75 had the higher shelling per cent.

TABLE 34. Shelling percentage of the F
inbred lines from the later varietie
and parent lines as grown in 1926.

Number of parent line	41	42	43	50	53	63	64
45	87.8	87.3	87.1	86.2	-- -	87.6	85.1
46	85.4	84.8	84.9	83.9	85.2	86.1	83.6
47	84.6	84.2	85.5	84.0	86.2	-- -	83.0
48	88.2	87.1	86.1	84.8	86.1	87.2	83.8
49	87.0	87.7	87.1	84.3	84.0	86.2	84.9
51	85.3	82.8	85.6	80.0	83.9	84.2	82.5
52	84.7	83.9	86.1	82.8	84.9	84.5	83.3
54	88.1	88.2	87.9	86.7	86.4	87.3	85.1
55	87.3	86.8	87.9	86.1	86.5	86.4	86.6
56	85.2	85.8	86.8	-- -	-- -	86.0	-- -
57	85.8	86.1	86.9	83.3	-- -	85.8	83.1
58	87.9	86.6	86.5	84.4	86.3	87.2	84.0
59	86.7	85.6	86.8	83.6	-- -	86.2	84.5
60	85.0	85.5	86.2	83.4	85.5	86.1	85.5
61	84.7	84.8	85.7	82.4	84.3	84.9	82.9
62	86.3	86.0	87.3	83.8	85.7	85.1	84.6
66	87.2	88.1	86.3	86.1	86.6	86.5	86.7
67	85.3	85.7	86.8	84.5	85.9	84.9	84.9
68	84.8	85.0	84.2	84.7	84.7	87.0	84.8
69	86.1	86.7	87.6	86.3	85.6	87.4	85.6
70	88.7	87.5	88.2	86.9	87.4	88.8	86.4
72	85.8	84.2	87.0	84.7	84.9	85.3	83.7
73	84.3	85.6	85.5	83.6	-- -	86.0	83.1
74	84.5	84.2	83.6	84.8	84.9	84.9	82.6
76	85.3	87.1	87.7	85.4	85.1	86.1	85.0
77	87.0	87.1	86.2	87.6	85.6	86.9	86.3
78	85.8	85.7	85.9	83.3	81.7	89.4	85.0
79	87.0	86.5	84.5	84.7	87.2	88.4	86.3
80	87.1	87.8	87.3	85.2	85.4	89.1	85.2
Mean of crosses for each parent line	86.2	86.0	86.4	84.6	85.5	86.5	84.6
Shelling per cent for parent line	-- -	-- -	81.2	76.2	77.0	83.5	80.7

(1) Mean shelling percentage for all crosses in the experiment.

ercentage of the F_1 crosses between
the later varieties of yellow corn
s grown in 1926.

53	63	64	65	71	75	Mean of crosses for each parent line	Shelling percent of parent line
-- -	87.6	85.1	86.1	88.5	88.5	87.1	85.1
85.2	86.1	83.6	83.5	85.6	88.8	85.2	82.1
86.2	-- -	83.0	83.9	86.4	86.7	84.9	84.6
86.1	87.2	83.8	84.9	86.2	89.0	86.3	84.1
84.0	86.2	84.9	85.3	86.4	88.3	86.2	83.1
83.9	84.2	82.5	83.2	85.9	86.4	84.0	83.2
84.9	84.5	83.3	84.3	87.2	88.5	85.0	82.6
86.4	87.3	85.1	87.9	88.7	89.6	87.6	85.9
86.5	86.4	86.6	85.9	89.4	90.1	87.3	89.1
-- -	86.0	-- -	85.6	86.4	87.7	86.2	80.0
-- -	85.8	83.1	88.5	85.7	88.6	86.0	81.3
86.3	87.2	84.0	85.6	88.7	88.5	86.6	84.0
-- -	86.2	84.5	84.0	86.6	-- -	85.5	83.0
85.5	86.1	85.5	84.8	88.2	87.6	85.8	86.2
84.3	84.9	82.9	83.5	85.7	86.6	84.6	79.8
85.7	85.1	84.6	85.3	86.7	87.6	85.8	81.6
86.6	86.5	86.7	87.3	87.5	88.3	87.1	88.3
85.9	84.9	84.9	84.5	86.3	87.5	85.6	84.2
84.7	87.0	84.8	85.7	86.5	86.7	85.4	83.3
85.6	87.4	85.6	86.8	88.2	89.6	87.0	87.8
87.4	88.8	86.4	87.9	90.0	90.0	88.2	88.8
84.9	85.3	83.7	86.0	88.2	87.8	85.8	86.1
-- -	86.0	83.1	86.4	85.2	86.4	85.1	82.2
84.9	84.9	82.6	83.7	86.7	86.6	84.8	80.6
85.1	86.1	85.0	86.6	88.0	88.6	86.5	84.0
85.6	86.9	86.3	86.3	86.1	89.0	86.8	86.6
81.7	89.4	85.0	85.1	86.4	87.7	85.6	81.2
87.2	88.4	86.3	86.8	86.8	88.8	86.7	-- -
85.4	89.1	85.2	86.2	87.7	88.7	87.0	85.6
85.5	86.5	84.6	85.6	87.1	88.1	86.1(1)	
77.0	83.5	80.7	75.6	84.7	87.9		

n the experiment.

The data on mean number of kernel rows per ear are recorded in Table 35. This character gave the most uniformly high correlation between parent and mean of cross-bred progeny of any of the characters studied in the 3 yield groups for which it was computed. These correlations were 0.8517 ± 0.0450, 0.9158 ± 0.0250 and 0.8785 ± 0.0257. The last named correlation was computed from the data in Table 35.

The average number of rows per ear for the F_1 crosses in this experiment ranged from 12.1 to 21.7. The values for the means of all crosses for the different inbred lines ranged from 14.0 to 18.8. Examination of the data in Table 35 shows that the different inbred lines exhibited very definite effects in their F_1 crosses. Line 64 produced a cross with a relatively low number of rows per ear while 63 produced a cross with a relatively high number of rows per ear. These two inbred lines were used in 27 comparable crosses and in every case the cross involving line 63 had a higher number of rows per ear than that involving line 64.

TABLE 35. Mean number of kernel rows per ear
between inbred lines from the later varieti
and for the parent lines as grown in 1926.

Number of parent line	41	42	43	50	53	63	64
45	15.3	13.4	13.5	13.8	----	15.6	12.1
46	16.1	15.9	16.6	16.5	15.8	16.8	14.4
47	16.5	16.0	16.2	15.4	16.5	-- -	13.9
48	15.7	15.5	14.5	14.6	15.4	16.7	13.0
49	15.5	15.1	15.6	14.5	15.2	16.7	13.7
51	15.7	14.8	15.6	14.8	14.0	16.0	13.3
52	16.8	16.0	16.6	15.8	16.1	17.8	14.3
54	15.6	15.1	15.8	15.4	14.7	16.1	13.4
55	17.6	16.3	18.1	15.2	16.4	18.9	14.5
56	16.1	15.8	16.6	-- -	-- -	17.5	-- -
57	16.6	17.4	16.8	15.7	-- -	17.0	14.5
58	18.3	16.4	17.3	17.9	16.1	18.6	15.0
59	19.3	17.9	18.5	16.5	-- -	18.4	14.7
60	17.4	17.4	17.6	17.7	16.9	20.1	15.5
61	15.5	15.7	16.1	15.1	13.8	16.9	13.6
62	17.9	16.6	17.0	17.0	17.1	19.4	15.1
66	16.3	16.5	16.5	15.8	15.6	17.7	14.1
67	15.7	16.0	16.6	16.3	14.7	16.8	13.4
68	16.0	14.9	16.4	14.9	14.9	17.3	14.1
69	16.8	16.1	17.3	16.6	16.4	18.4	14.7
70	19.6	18.9	19.3	18.9	18.9	21.7	15.3
72	17.9	17.4	18.5	17.9	17.3	19.2	15.7
73	19.0	17.2	18.3	18.8	-- -	20.8	15.8
74	16.7	16.1	17.0	16.9	15.5	18.2	14.9
76	18.7	17.9	18.0	17.7	17.3	20.8	16.0
77	18.6	17.7	17.6	17.9	16.5	18.9	16.0
78	15.1	15.3	15.8	14.7	14.1	16.3	13.6
79	17.2	17.1	16.1	17.9	17.2	18.1	15.3
80	16.0	15.5	15.2	14.9	15.4	18.1	14.3
Mean of crosses for each parent line	16.9	16.3	16.7	16.2	15.9	18.0	14.4
Mean kernel rows of parent line	----	----	13.6	15.1	13.0	19.0	12.1

(1) Mean number of kernel rows per ear for all crosses in the experi

f kernel rows per ear for the F_1 crosses
rom the later varieties of yellow corn
es as grown in 1926.

	53	63	64	65	71	75	Mean of crosses for each parent line	Mean kernel rows of parent line
8	----	15.6	12.1	13.2	14.5	14.3	14.0	10.6
5	15.8	16.8	14.4	15.3	16.9	16.2	16.0	16.0
4	16.5	-- -	13.9	15.9	16.9	16.0	15.9	13.9
6	15.4	16.7	13.0	14.0	15.9	14.0	14.9	12.4
5	15.2	16.7	13.7	14.8	16.2	15.2	15.2	14.7
8	14.0	16.0	13.3	14.3	15.7	15.2	14.9	13.8
8	16.1	17.8	14.3	15.9	17.5	16.9	16.4	14.3
4	14.7	16.1	13.4	14.3	15.3	14.9	15.1	12.9
2	16.4	18.9	14.5	16.7	17.6	17.8	16.9	17.5
-	-- -	17.5	-- -	15.0	17.8	16.6	16.5	15.5
7	-- -	17.0	14.5	19.0	17.5	16.5	16.8	16.4
9	16.1	18.6	15.0	16.8	17.6	17.5	17.2	16.4
5	-- -	18.4	14.7	16.0	18.0	-- -	17.4	16.0
.7	16.9	20.1	15.5	16.4	18.6	16.3	17.4	17.4
.1	13.8	16.9	13.6	14.6	16.8	15.5	15.4	12.7
.0	17.1	19.4	15.1	17.0	18.2	16.7	17.2	16.8
.8	15.6	17.7	14.1	15.2	17.1	15.9	16.1	16.7
.3	14.7	16.8	13.4	15.2	16.1	15.0	15.6	13.7
.9	14.9	17.3	14.1	15.9	16.3	15.1	15.6	14.2
.6	16.4	18.4	14.7	15.1	16.8	16.5	16.5	15.5
.9	18.9	21.7	15.3	17.5	18.7	18.8	18.8	20.4
.9	17.3	19.2	15.7	17.3	19.4	17.7	17.8	21.0
.8	-- -	20.8	15.8	18.4	19.5	18.2	18.4	19.3
.9	15.5	18.2	14.9	16.0	17.5	16.4	16.5	14.2
.7	17.3	20.8	16.0	17.1	18.2	18.2	18.1	17.6
.9	16.5	18.9	16.0	16.5	18.0	18.3	17.5	18.3
.7	14.1	16.3	13.6	15.1	16.4	15.2	15.2	12.9
.9	17.2	18.1	15.3	16.9	18.5	18.1	17.3	----
.9	15.4	18.1	14.3	14.7	16.7	15.4	15.6	16.4
.2	15.9	18.0	14.4	15.9	17.2	16.4	16.4(1)	
.1	13.0	19.0	12.1	14.6	15.9	15.2		

crosses in the experiment.

One striking comparison between the crosses of two inbred lines not shown in the tables previously discussed, is to be found in the crosses of lines 168 and 171. These crosses were grown in the yield experiment of yellow corn in 1927. The data on the date ½ tasseled, date ½ silked, shrinkage per cent, shelling per cent and yield of the crosses of these two lines are shown in Table 36. They differed only 0.3 day in the mean of all crosses for the date ½ tasseled and 1.8 days for date ½ silked and yet the value for mean shrinkage per cent for line 171 was 9.5 higher than that for line 168. The mean yield and the mean shelling per cent of the crosses of thesetwo lines were almost exactly the same. It will be noted that the data on the inbred lines themsevles showed practically the same situation. There was not quite the difference in shrinkage per cent, however, and line 171 had a slightly lower shelling per cent than did line 168.

The most striking comparison between two comparable crosses was to be had with the crosses with line 130. The cross 171 x 130 tasseled 6.5 days earlier and silked 5 days earlier than the cross 168 x 130 and yet the shrinkage per cent of 171 x 130 was nearly double that of 168 x 130 (26.4 as compared with 14.0). The yield and shelling per cent of the two crosses was almost exactly the same.

Some of the differences between the crosses of these two lines may be accounted for by the fact that one was a dent corn and the other a flint. Line 168 was derived from Walden Yellow Dent, a late, rather rough, yellow dent, while line 171 came from Argentine Flint. The crosses of line 171 had the most moisture at harvest and it may be thought that since they had a flint corn for one parent they probably had a large sappy cob. The fact that the crosses of both lines had the same shelling per cent, however, would discredit this supposition.

TABLE 36. Records on the date 1/4 tasseled, da
shrinkage per cent of the harvested ears, she
and yield for the F_1 crosses of two of the in
varieties of yellow corn as grown in 1927.

Number of parent line	Date 1/4 tasseled		Date 1/4 silked		Shri per
	168	171	168	171	168
114	27.0	25.5	31.5	33.5	11.8
116	25.0	27.0	28.0	32.0	11.2
117	31.5	35.5	36.0	39.5	10.4
118	31.0	38.0	35.5	41.5	10.7
119	31.5	33.5	35.5	38.5	11.9
120	31.0	36.5	35.0	42.5	10.2
123	31.0	31.5	37.0	37.5	13.0
124	31.5	31.0	34.0	34.5	12.9
125	35.5	33.0	39.5	37.0	13.9
126	32.0	37.0	36.5	41.0	12.1
128	34.5	32.5	37.0	38.0	10.3
129	35.5	33.0	38.0	38.5	17.0
130	38.5	32.0	43.0	38.0	14.0
132	32.5	34.0	36.5	41.0	11.5
133	37.0	35.0	39.5	42.5	12.0
135	34.0	31.5	39.5	37.5	10.4
136	31.0	36.0	35.0	42.0	11.8
139	33.0	33.0	36.5	38.5	14.8
141	33.5	35.5	37.5	40.0	12.8
142	29.0	32.0	32.5	39.0	12.6
144	37.5	38.0	40.5	42.0	15.1
146	37.0	37.5	39.5	42.5	15.6
147	30.0	37.5	35.0	42.0	13.6
149	33.5	30.0	38.0	38.0	13.1
151	32.5	34.0	36.5	39.0	14.3
154	31.0	31.0	35.5	37.5	12.4
155	35.5	34.0	38.0	40.0	14.6
156	32.0	29.0	36.5	36.0	12.1
158	34.0	34.0	38.0	39.5	15.7
159	31.0	32.0	38.0	39.5	14.8
161	31.0	28.0	34.5	36.0	16.9
162	34.0	36.0	39.5	42.0	11.9
164	27.0	29.0	34.0	34.5	11.0
165	31.0	32.5	37.0	38.5	14.7
166	38.0	34.0	43.5	41.0	17.9
167	39.0	35.5	42.0	40.0	13.9
169	32.0	30.0	37.0	35.5	18.2
170	32.0	33.0	36.5	40.5	14.5

on the date 1/4 tasseled, date 1/4 silked,
nt of the harvested ears, shelling per cent
e F_1 crosses of two of the inbred lines from
low corn as grown in 1927.

d	Date 1/4 silked		Shrinkage: per cent		Shelling Per cent		Yield	
	168	171	168	171	168	171	168	171
	31.5	33.5	11.8	14.6	84.2	82.1	10.07	9.99
	28.0	32.0	11.2	21.0	81.1	85.2	8 .67	9.72
	36.0	39.5	10.4	25.2	84.6	83.2	9.48	10.19
	35.5	41.5	10.7	24.5	84.2	82.4	10.70	9.65
	35.5	38.5	11.9	23.7	80.6	80.7	11.18	10.69
	35.0	42.5	10.2	18.4	79.5	83.4	10.24	11.53
	37.0	37.5	13.0	24.6	85.8	86.4	10.97	11.22
	34.0	34.5	12.9	19.7	84.0	83.9	12.68	12.02
	39.5	37.0	13.9	22.0	84.6	83.0	11.01	9.79
	36.5	41.0	12.1	22.8	84.8	83.6	11.38	11.26
	37.0	38.0	10.3	22.4	84.0	83.3	11.13	10.69
	38.0	38.5	17.0	20.7	83.5	82.6	10.92	11.48
	43.0	38.0	14.0	26.4	83.7	83.4	11.57	11.63
	36.5	41.0	11.5	19.8	83.6	84.5	10.71	12.05
	39.5	42.5	12.0	25.3	84.1	85.7	11.73	10.36
	39.5	37.5	10.4	23.3	85.2	86.2	10.99	11.29
	35.0	42.0	11.8	22.6	83.3	82.9	12.92	9.67
	36.5	38.5	14.8	24.9	82.7	81.9	10.29	11.18
	37.5	40.0	12.8	28.8	82.6	80.7	12.07	9.02
	32.5	39.0	12.6	30.2	83.0	81.3	12.21	11.06
	40.5	42.0	15.1	24.2	83.0	81.6	10.98	9.66
	39.5	42.5	15.6	22.6	84.7	84.8	10.86	12.50
	35.0	42.0	13.6	23.1	85.1	85.0	10.30	9.88
	38.0	38.0	13.1	27.6	84.9	85.5	11.01	10.46
	36.5	39.0	14.3	25.6	85.1	84.4	9.65	10.05
	35.5	37.5	12.4	31.7	84.0	82.9	12.54	10.34
	38.0	40.0	14.6	25.7	82.3	84.6	11.25	10.38
	36.5	36.0	12.1	19.0	83.1	84.6	10.00	10.91
	38.0	39.5	15.7	26.6	82.2	83.8	10.16	10.10
	38.0	39.5	14.8	18.3	82.7	83.2	8.58	9.11
	34.5	36.0	16.9	24.3	83.9	84.3	9.89	11.66
	39.5	42.0	11.9	23.9	81.1	82.8	6.93	10.39
	34.0	34.5	11.0	15.3	83.2	81.1	9.30	9.48
	37.0	38.5	14.7	25.5	86.9	85.1	9.24	9.83
	43.5	41.0	17.9	23.9	81.7	81.4	8.90	9.61
	42.0	40.0	13.9	25.0	82.3	83.7	9.24	10.47
	37.0	35.5	18.2	26.8	81.5	85.7	9.50	11.57
	36.5	40.5	14.5	19.8	86.4	85.4	7.12	9.05

Table 36 continued

Number of parent line	Date 1/4 tasseled		Date 1/4 silked		
	168	171	168	171	1
172	31.5	35.0	34.5	40.0	1
173	36.5	30.0	42.5	38.5	1
174	33.0	33.5	37.5	38.0	1
175	37.5	36.0	43.0	40.0	1
176	31.0	32.5	34.5	36.5	1
Mean of crosses for each parent line	32.9	33.2	37.1	38.9	1
Data for parent line	44.0	46.0	49.5	51.0	1

Date 1/4 silked 168	171	Shrinkage per cent 168	171	Shelling Per cent 168	171	Yield 168	171
34.5	40.0	15.9	21.1	84.2	85.1	11.15	9.35
42.5	38.5	16.9	21.5	80.5	80.2	8.81	7.58
37.5	38.0	13.5	21.8	83.0	81.2	10.61	10.03
43.0	40.0	19.3	22.0	81.8	83.1	8.96	10.36
34.5	36.5	12.0	18.6	83.6	83.8	9.81	10.51
37.1	38.9	13.6	23.1	83.4	83.5	10.41	10.40
49.5	51.0	15.8	20.1	81.8	77.4	5.56	5.21

DISCUSSION

The principal benefit of practical value to be derived from correlation studies such as those that have been discussed is the determination of the relative value of the different characters studied as indexes of selection for increasing yields. A number of significant correlations were obtained between yield and other characters within the inbred lines, within the F_1 crosses and between yield of the F_1 cross and characters of the inbred parent. While these correlations indicate very definite tendencies, they are all too small to be of much value for selection purposes.

A summary of the characters which gave significant correlations with yield in the different groups of material studied is given in Table 37. The positive correlations in practically every case were with characters indicative of general plant vigor. The most important negative correlation was with ear shape index (P).

TABLE 37. Summary of the significant positive and negative coefficients of correlation between yield and the other characters studied.

Material in which the correlations were computed	Characters with which yield gave significant coefficients of correlation of the kind stated: Positive	Negative
Within inbred lines	CLNOR	BDPQ
Within F_1 crosses	ABCEFLNO	HMP
F_1 crosses with each parent	ABCEFLNOX	P
F_1 crosses with mean values of both parent	ABCEFLNOX	P
Inbred parents with means of cross-bred progeny (crosses after 3 and 4 years of selfing grouped together)	CEFX	

The positive correlations between yields of the F_1 crosses and so many of the characters of the parent which are indicative of vigor in the inbred line is very interesting. Most inbred lines that have been selfed for a number of generations are lacking in vigor and productiveness and would make the commercial production of F_1 seed an expensive process. It is encouraging to note that the most productive F_1 crosses may be expected from the most productive inbred parents. Large yields from the inbred parents will, of course, make for the most economical production of crossed seed.

The relative importance in relation to yield of the four groups of characters for which multiple and partial correlations were computed is summarized in Table 38. In this table the four groups of characters are ranked according to the size of multiple correlation between the characters in the group and yield.

TABLE 38. Rank of the coefficients of multiple correlation between four groups of characters and yield.

Group number	Properties of the lines of which the characters in the groups are a relative measure	Rank of the coefficient of multiple correlation in the material indicated: Within inbred lines	Within F_1 crosses	Inbred parent with mean yield of crosses
1	Maturity	2	4	2
2	Plant vigor	3	2	1
3	Disease	4	3	4
4	Ear size	1	1	3

The characters indicating relative size of the harvested ears were most closely correlated with yield within the inbred lines and within the F_1 crosses. Characters of the inbred parents indicating relative plant vigor were most closely correlated with the mean yield of their crossbred progeny.

All of the correlations between the same characters in the parent and in the progeny were positive so that it is evident that characters which are desired in the F_1 crosses should be selected for in the inbred lines. This was very strongly brought out in the correlations recorded in Table 13, between characters of the inbred parents and the mean value of the same character in their crossbred progeny. It was further emphasized in the tables giving the detailed data on the parent lines and their F_1 crosses.

The high correlations obtained between characters of the inbred parents and the mean values of these characters in their crossbred progeny would seem to indicate that on the average the characters of the parent are very definitely expressed in the crossbred progeny. There are exceptions to this rule in many individual F_1 crosses where the two parent lines may happen to "nick" well, but in general it would appear that those inbred lines should be selected as parents whose characters conform most closely to those desired in the cross.

There may be two more or less distinct objects in comparing inbred lines in different crossbred combinations, (1) to locate high yielding individual F_1 crosses, and (2) to locate inbred lines which will give relatively high yields in every combination. The ultimate use in commercial corn production of the inbred lines tested will determine the object of any particular comparison. If the inbred lines tested are to be used in F_1 crosses for the commercial production of corn then the chance high yielding combination may be what is desired. However, if the inbred lines are to be used in double crosses, multiple crosses, or in the building up of synthetic varieties it would seem that those lines which give relatively high yields in practically all combinations would be of more value.

Inbred lines which give good yields in practically any combination in which they are used must carry a fairly large number of dominant yield factors. It may be possible that they simply carry a few uncommon yield factors which supplement those brought in by the general run of inbred lines. However, the latter does not seem to be the more reasonable supposition. On the other hand, two inbred parents that happen to "nick" well may neither one contain many yield factors. It only would be necessary to assume that the few dominant yield factors they do contain should be entirely different so that they supplement each other.

It has always seemed to the author that the inbred lines which would give fairly large yields in every combination would be the most desirable even though none of the combinations yielded as much as the chance combinations of some other inbred line whose crosses on the whole averaged low. It was with this idea in mind that the crossing experiments were planned so that inbred lines would be arranged in groups and each group tested in similar crosses.

From the data which have been presented on yield, it is evident that inbred lines differ greatly in their ability to produce high yielding F_1 crosses. Some inbred lines as lines number 14, 25, 66, 112 and 135 gave high yielding crosses in practically all combinations. Other lines as lines number 10, 31, 68, 102 and 141 varied greatly and gave some very high yielding crosses and some very poor crosses. Still other lines such as numbers 3, 21, 67, 104 and 159 were poor in practically all crosses.

What has been said of yield also may be said of all of the other characters studied. In previous tables examples have been pointed out of inbred lines which show strikingly different effects in their F_1 crosses. Most of the inbred lines studied show a surprisingly definite and consistent reaction in their different crosses. This is all the more striking when it is considered that those lines used in making the crosses tested in 1926 had been inbred for only three generations and were still quite variable as regards plant and ear characters. The uniformity displayed in their reaction in different F_1 crosses, however, shows that a very definite comparison of the relative desirability of different inbred lines may be had after three generations of inbreeding.

The uniformly good performance of the crosses of some of the inbred lines is very encouraging and gives a good indication of what may be expected from this method of corn breeding. The prepotency shown by the different lines in their F_1 crosses is quite remarkable and suggests that even after only three or four generations of inbreeding they must be homozygous for many of the factors that go to make up yield and other desirable characters. The data presented in the foregoing tables indicate that the production of good crosses is not entirely due to chance combinations, but that there is a very definite similarity in the behavior of different crosses of a single line. On the basis of the yield comparisons reported in Tables 15 to 19 inclusive it would be possible to predict with practical certainty that future crosses of some of the lines tested would yield more than comparable crosses of other lines tested.

SUMMARY

Data on 42 inbred lines from 14 varieties and on 461 F_1 crosses were studied as to possible relations between yield and some of the characters of the plants or harvested ears. Data on 897 F_1 crosses and on 130 of their 140 inbred parents were studied as to possible relations between characters of the parent and the same character in the cross and between characters of the parent and yield of the cross.

1. Within the inbred lines yield was correlated positively with plant height, number of ears per plant, ear length, ear diameter and shelling percent and negatively with date 1/4 silked, chlorophyll color, ear shape index and shrinkage per cent of the harvested ears.

2. Within the F_1 crosses yield was correlated positively with date 1/4 tasseled, date 1/4 silked, plant height, number of nodes per plant, number of nodes to upper ear, number of ears per plant, ear length, and ear diameter and negatively with per cent of plants smutted, per cent of ears moldy and ear shape index.

3. Yield of the F_1 cross was correlated positively with the following characters in each parent and with the mean value of the same characters in the two parents; date

1/4 tasseled, date 1/4 silked, plant height, number of nodes per plant, number of nodes to upper ear, number of ears per plant, ear length, ear diameter, and yield. It was correlated negatively with ear shape index.

4. The mean yield of the crossbred progeny was correlated positively with plant height, number of nodes per plant, number of nodes to upper ear and yield in the parent inbred line.

5. Positive correlations between characters in the inbred parents and the same characters in the crossbred progeny were obtained for 19 different characters. The correlations between characters of the inbred parent and the mean value of these characters in their crossbred progeny were sufficiently high in many cases to be of value for predictive purposes.

6. Different inbred lines were found to show marked individuality or prepotency in their crossbred progeny for practically all of the characters studied.

7. This prepotency or uniformity of reaction in F_1 crosses of some of the inbred lines is not brought out well in many cases in parent-progeny correlations as some lines show prepotency for characters they do not themselves express.

8. The data indicate that the production of high yielding F_1 crosses is not due entirely to the chance combination of different parents but that there is a very definite similarity in the behavior of different crosses having a common parent.

9. The extremely productive crosses of some of the inbred lines included in these experiments is very promising and gives some indication of what may be expected from these methods of corn breeding.

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APPE

TABLE 1. The crossing block row numbers, the mean values of the different charac bred lines used in the crossing experin the present paper.

Crossing block row number	Pedigree number	Parent variety
1(2)	5-3-1-1	Four County White
2	13-1-4-2	" " "
3	20-5-1-2	" " "
4	27-1-2-4	" " "
5	36-1-4-2	" " "
6	63-4-3-5	" " "
7	82-1-1-5	" " "
9	111-4-5-5	Silver King
10	122-2-3-4	" "
11	10-4-2-1	Four County White
12	16-1-4-1	" " "
13(2)	24-3-1-6	" " "
14	31-5-5-2	" " "
15	40-1-2-1	" " "
16	74-5-5-4	" " "
17	87-3-2-1	" " "
18	107-4-4-1	" " "
19	115-3-2-3	Silver King
20(2)	497-3-4-1	Western Flint
Mean for all of the crosses in this group		
21	129-4-2-4	C. I. 133
22	147-3-4-1	" " "

PPENDIX

rs, pedigree numbers, parent varieties and
racters in the crossbred progeny of the in-
riments and correlation studies reported in

Number of crosses averaged	Mean values of the different characters in the crossbred pro										
	Date 1/4 tasseled (3)	Date 1/4 silked (3)	Plant height	Number of nodes per plant	Number of nodes to upper ear	Per cent of nodes below ear	Per cent of plants smutted	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants with two or more ears	Number of ears per
1925 CROSSING BLOCK											
White Corn											
10	18.4	22.0	6.90	13.4	7.9	59.0	2.5	6.5	76.6	1.1	1.0
10	20.6	22.4	6.60	14.0	8.2	58.3	8.8	2.4	39.2	1.3	.9
10	16.0	19.2	6.95	12.2	8.6	55.5	1.8	3.1	77.6	1.8	1.0
10	17.6	22.0	7.00	12.8	7.8	60.5	6.5	2.7	60.7	1.7	1.0
10	17.1	19.2	6.90	12.8	7.4	57.9	5.0	2.5	34.2	1.4	.9
10	18.1	20.4	6.95	13.3	7.8	58.9	2.1	4.8	82.6	1.0	1.0
10	17.5	19.4	7.00	13.0	7.8	60.2	1.7	4.7	75.6	1.8	1.0
10	17.1	19.2	7.20	13.0	7.4	56.5	1.4	3.9	35.2	3.0	1.0
10	16.5	19.0	6.70	12.6	7.2	56.9	2.8	8.3	65.9	1.2	1.0
9	16.4	19.4	6.90	13.2	7.6	57.1	2.2	3.4	55.5	1.3	.9
9	16.9	19.5	6.65	12.6	7.2	57.5	3.1	5.6	59.9	1.6	1.0
9	17.0	19.2	6.95	12.4	7.6	60.8	1.0	1.8	69.4	.6	.9
9	15.7	18.6	7.10	12.7	7.0	55.3	.9	3.1	84.7	.3	1.0
9	17.1	20.2	6.90	13.0	7.7	58.9	2.8	4.3	28.2	2.0	1.0
9	16.0	18.1	7.10	13.0	7.6	58.3	1.1	2.8	73.9	.5	.9
9	17.2	19.8	6.80	12.5	7.4	59.0	.5	4.6	80.2	1.2	1.0
9	18.9	20.7	6.60	13.5	8.0	59.1	8.1	6.3	37.9	2.5	1.0
9	17.0	19.9	6.85	12.8	7.2	56.7	9.2	4.4	66.4	1.7	1.0
9	24.4	26.8	7.20	14.4	8.6	59.4	7.5	6.9	52.2	4.2	1.0
--	17.7	20.2	6.91	13.0	7.6	58.2	3.6	4.3	60.8	1.6	1.0
Early Yellow Corn											
10	17.4	19.6	7.5	13.9	8.0	57.4	15.1	5.5	43.0	2.7	0.9
10	18.0	21.0	7.2	13.4	8.2	60.9	17.8	6.5	68.6	3.9	1.0

ossbred progeny from each inbred line

Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length in cm.	Ear diameter in cm.	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear	Yield in pounds per row
1.1	1.019	11.2	16.2	4.58	0.282	26.4	84.6	16.0	12.07
1.3	.989	21.2	18.9	4.54	.242	25.0	86.5	14.8	13.44
1.8	1.009	18.7	16.5	4.38	.267	22.2	85.3	14.2	11.19
1.7	1.000	18.8	18.0	4.55	.254	24.5	86.2	14.4	13.02
1.4	.980	17.8	15.9	4.64	.293	24.2	87.7	14.2	12.53
1.0	1.007	14.8	17.3	4.60	.267	23.2	85.0	14.5	12.78
1.8	1.030	13.2	17.6	4.66	.265	20.5	85.9	15.2	13.24
3.0	1.028	12.2	17.7	4.44	.252	21.5	87.4	14.1	13.80
1.2	1.010	17.4	16.3	4.61	.285	23.9	86.1	14.4	11.84
1.3	.994	14.5	16.3	4.46	.274	23.4	86.0	14.8	11.25
1.6	1.041	10.3	16.7	4.62	.281	20.2	86.7	14.2	12.88
.6	.972	8.7	17.6	4.49	.257	23.3	84.3	14.9	11.96
.3	1.022	9.2	17.0	4.73	.279	22.7	88.3	15.6	14.63
2.0	1.033	18.0	17.4	4.62	.267	21.3	86.6	14.9	13.52
.5	.974	14.4	15.9	4.52	.285	20.6	86.0	14.3	12.03
1.2	1.000	6.4	16.4	4.72	.288	24.2	87.1	16.2	12.69
2.5	1.013	36.4	17.2	4.53	.266	25.2	86.5	14.6	12.12
1.7	1.015	27.1	17.8	4.39	.248	24.1	85.3	13.6	12.09
4.2	1.016	16.5	19.5	4.48	.231	29.9	83.9	13.4	13.40
1.6	1.008	16.1	17.2	4.55	.267	23.5	86.1	14.6	12.66
2.7	0.928	27.9	15.9	4.24	.270	24.2	83.8	14.1	9.10
3.9	1.036	14.8	16.6	4.36	.264	24.0	85.8	14.4	11.50

Table 1 continued

Crossing block row number	Pedigree number	Parent variety
24	280-3-6-1	C. I. 204
25	420-2-7-6	Osterland's strain of Reid Yel. Dent
26	426-5-2-4	" " " " " "
27	432-3-2-4	Clark Yellow Dent
28	439-2-2-3	" " "
29	472-1-1-1	Argentine Flint
30	487-5-1-5	" "
31	140-3-3-2	C. I. 133
32	150-3-3-3	C. I. 133
33	276-5-4-2	C. I. 204
34	282-2-4-6	" " "
35	422-5-3-1	Osterland's strain of Reid Yel. Dent
36	428-5-1-3	" " " " " "
37	436-1-3-1	Clark Yellow Dent
38	443-4-2-6	" " "
39	483-5-4-1	Argentine Flint
40	493-3-1-5	" "
Means for all of the crosses in this group		
41(2)	Holbert's A-1-1-R-4-J33-2	Funk Bros. 176A
42(2)	Holbert's B-1-1-2-4-J2-6-15	" " "
43	304-1-3-3	Lancaster Surecrop
45	325-4-2-1	" "
46	178-2-2-4	Iodent
47	221-3-2-1	"
48	211-4-4-2	"
49	244-5-3-1	"
50	173-3-3-3	"
51	218-4-4-8	"
52	154-4-4-3	"

	Number of crosses averaged	Date 1/4 tasseled (3)	Date 1/4 silked (3)	Plant height	Number of nodes per plant	Number of nodes to upper ear	Per cent of nodes below ear	Per cent of plants smutted	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants with two or more
		Mean values of the different characters in the crossb									
	10	20.3	24.6	7.2	13.1	7.8	59.2	1.8	7.2	63.9	1.
1. Dent	10	20.8	23.5	7.2	13.4	8.0	59.2	1.7	6.4	88.0	2.
"	10	21.8	24.4	7.2	13.8	8.0	58.4	4.6	17.5	58.2	3.
	10	17.2	20.8	6.9	12.8	7.6	59.4	2.6	5.2	82.2	3.
	10	22.6	22.5	7.1	14.6	8.2	56.7	2.1	8.4	67.5	10.
	10	21.6	23.0	7.2	13.9	7.8	56.0	2.9	27.3	57.1	6.
	10	19.4	21.3	7.6	13.9	8.4	60.2	2.5	8.5	69.9	9.
	9	18.0	20.7	7.2	14.1	8.5	60.3	4.1	8.2	66.4	2.
	9	18.2	22.1	6.9	12.9	7.5	58.0	2.7	3.8	65.9	2.
	9	20.0	22.5	6.8	12.8	7.5	58.6	2.0	4.5	59.0	.
	9	22.8	25.1	7.2	14.0	8.1	58.0	5.2	6.0	69.6	2.
1. Dent	9	19.4	21.7	7.3	13.1	7.8	59.4	4.4	15.7	27.0	2.
"	9	21.6	24.0	7.6	13.5	7.8	57.4	16.3	7.5	84.3	2.
	9	18.5	20.9	7.3	14.0	8.3	59.7	4.9	7.7	77.0	3.
	9	19.1	20.8	7.6	14.6	7.8	53.6	4.7	6.5	61.3	1.
	9	21.9	22.4	7.4	14.4	8.5	59.2	8.6	28.0	57.8	18.
	9	19.4	22.7	7.2	13.1	8.1	62.0	3.9	15.1	51.7	11.
	--	19.9	22.3	7.2	13.6	8.0	58.6	5.7	10.3	66.5	4.
		Later Yellow Corn									
	29	25.3	26.2	6.86	14.2	8.0	56.2	2.9	9.8	84.1	.
	29	22.6	25.1	8.17	13.9	7.5	54.0	3.7	12.2	68.3	.
	29	26.1	27.9	8.02	14.7	8.4	56.8	1.3	13.3	58.1	1.
	9	23.7	24.7	8.08	14.0	8.0	57.3	1.2	7.4	57.2	.
	10	24.2	25.2	8.45	13.8	7.6	54.7	2.0	14.3	87.6	3.
	9	23.5	25.6	8.19	14.6	8.4	57.8	2.2	5.7	43.5	.
	10	24.0	24.6	7.55	14.7	8.4	57.1	3.1	27.6	72.6	9.
	10	24.2	24.6	8.15	14.8	8.4	56.9	2.6	7.4	88.6	.
	28	25.6	26.8	8.01	15.0	8.3	55.2	1.3	12.2	78.8	.
	10	24.6	26.3	8.48	15.3	8.6	56.2	3.0	12.3	69.6	1.
	10	25.3	27.0	8.25	15.2	8.8	58.2	1.2	7.6	55.6	3.

ossbr progeny from each inbred line

Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length in cm.	Ear diameter in cm.	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear	Yield in pounds per row
1.6	1.052	10.7	17.0	4.16	0.279	27.4	84.9	16.8	12.41
2.3	1.053	8.6	18.6	4.61	.250	27.3	85.3	15.6	14.05
3.0	1.081	5.3	18.2	4.55	.251	23.8	85.0	15.5	13.82
3.1	1.051	12.1	15.0	4.27	.288	24.0	84.0	14.9	9.65
10.5	1.084	7.6	17.4	4.46	.258	23.3	86.6	15.0	12.40
6.1	1.143	6.0	17.1	4.30	.254	29.3	84.4	14.3	12.61
9.9	1.130	7.4	16.5	4.38	.267	24.5	85.3	13.9	12.88
2.2	1.005	15.1	16.3	4.53	.278	23.6	85.3	14.2	12.30
2.3	1.012	9.9	15.0	4.46	.302	23.7	83.7	15.5	9.89
.7	1.010	12.2	16.0	5.01	.315	28.1	85.3	17.7	12.92
2.2	1.025	16.3	16.9	4.57	.273	25.5	84.8	15.3	12.25
2.3	1.032	6.2	19.2	4.33	.226	25.0	86.0	14.1	12.77
2.6	1.032	17.9	17.8	4.32	.243	24.0	85.7	15.0	12.40
3.0	1.044	6.8	16.9	4.54	.269	22.9	85.5	15.7	12.49
1.9	1.022	11.0	16.1	4.50	.281	24.1	86.5	16.2	12.75
18.9	1.308	7.8	18.0	3.99	.223	28.2	83.2	13.2	12.10
11.7	1.126	8.3	17.4	4.11	.235	28.1	84.0	12.5	10.65
4.8	1.062	11.2	16.9	4.37	.265	25.3	85.0	13.4	12.05
.9	1.044	9.0	19.6	4.71	.242	23.9	86.2	16.9	14.26
.4	1.055	9.6	19.1	4.76	.250	22.6	86.0	16.3	15.58
1.2	1.044	18.1	21.0	4.74	.227	23.4	86.4	16.7	16.81
.7	1.036	13.4	22.8	4.71	.209	23.1	87.1	14.0	16.92
3.2	1.069	9.0	20.7	4.74	.231	22.9	85.2	16.0	14.12
.1	1.018	9.0	20.0	4.69	.236	24.0	84.9	15.9	14.71
9.0	1.229	16.7	20.6	4.57	.224	24.5	86.3	14.9	15.98
.8	1.031	9.1	20.3	4.74	.235	23.0	86.2	15.2	16.94
.7	1.051	8.2	20.2	4.74	.235	22.4	84.6	16.2	15.26
1.1	1.046	10.5	19.8	4.90	.248	22.5	84.0	14.9	15.05
3.3	1.060	12.0	19.7	4.62	.236	25.0	85.0	16.4	14.87

Table 1 continued

Crossing block row number	Pedigree number	Parent variety	Number of crosses averaged
53	159-1-4-4	Iodent	24
54	170-2-4-1	"	10
55	194-5-5-5	"	10
56	202-1-2-2	"	7
57	205-5-4-2	"	9
58	227-2-2-1	"	10
59	230-3-1-5	"	8
60	238-3-2-6	"	10
61	245-4-4-2	"	10
62	258-4-1-2	"	10
63	265-4-2-2	"	28
64	292-3-1-2	Lancaster Surecrop	28
65	309-1-2-2	" "	29
66	345-4-1-6	Black's strain of Reid Yel. Dent	10
67	347-3-3-1	" " " " " "	10
68	356-5-3-3	" " " " " "	10
69	363-4-2-5	Proudfit's strain of Reid Yel. Dent	10
70	364-5-4-3	" " " " " "	10
71	377-3-1-4	" " " " " "	29
72	385-5-6-2	Krizer Bros. Yellow Dent	10
73	390-3-1-2	" " " "	9
74	393-2-6-2	" " " "	10
75	401-1-2-5	McCulloch's strain of Rhid Yel. Dent	28
76	405-3-2-1	" " " " " "	10
77	412-5-4-4	" " " " " "	10
78	456-3-2-1	Walden Yellow Dent	10
79(2)	461-2-1-1	" " "	10
80	467-1-4-1	" " "	10

Means for all of the crosses in this group --

ety	Number of crosses averaged	Date 1/4 tasseled (3)	Date 1/4 silked (3)	Plant height	Number of nodes per plant	Number of nodes to upper ear	Per cent of nodes below ear	Per cent of plants smutted	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants
	Mean values of the different characters in the cr										
	24	24.5	26.3	8.07	14.7	8.5	57.7	5.1	33.4	81.4	
	10	23.5	24.8	7.62	13.9	8.2	59.2	5.2	26.7	48.4	
	10	23.3	25.0	7.65	14.0	7.8	56.1	1.8	8.1	54.2	
	7	23.6	24.6	7.50	13.6	8.0	58.5	2.7	11.2	62.2	
	9	24.6	24.9	7.64	14.2	8.5	59.5	.9	7.4	92.3	
	10	24.6	26.3	8.18	14.9	8.7	58.5	.4	5.6	48.6	
	8	24.2	26.1	7.91	14.5	8.0	55.3	1.0	2.7	77.3	
	10	26.2	28.4	8.00	15.0	8.2	54.5	1.3	8.6	45.6	
	10	26.6	28.0	7.90	15.6	8.5	54.5	1.7	13.2	48.2	
	10	23.2	24.9	7.62	14.4	8.2	56.9	2.8	4.2	93.2	
	28	23.5	25.0	7.46	13.6	7.8	57.8	4.4	19.8	74.6	
	28	24.0	26.5	8.37	14.2	8.1	56.8	1.6	8.7	59.8	
	29	25.3	27.8	8.65	15.4	8.9	57.7	.6	4.9	48.0	
Yel. Dent	10	25.5	27.4	8.12	16.0	9.4	58.6	1.8	26.6	67.9	
" "	10	25.6	28.2	8.00	14.0	7.8	55.8	3.6	43.3	82.7	
" "	10	23.2	26.8	7.75	13.9	8.0	57.4	5.2	9.7	87.4	
eid Yel. Dent	10	27.0	28.4	8.00	14.9	8.6	57.4	4.5	27.0	57.5	
" " "	10	23.1	25.2	7.80	14.6	8.4	57.6	7.3	31.7	80.8	
" " "	29	26.1	28.3	8.64	15.5	9.0	58.4	8.7	11.4	67.7	
nt	10	23.8	28.4	8.20	13.5	8.4	57.0	4.0	11.6	75.0	
	9	27.6	30.3	8.44	14.3	8.2	56.7	8.4	9.7	86.4	
	10	27.7	30.8	8.15	14.5	8.8	60.2	8.2	12.0	68.4	
Reid Yel. Dent	28	25.3	27.8	8.11	15.0	9.0	60.6	2.2	20.2	81.2	
" " "	10	25.7	28.8	7.92	14.6	8.6	59.0	.7	5.6	50.1	
" " "	10	27.6	28.9	8.65	14.8	8.4	57.1	3.2	17.5	80.3	
	10	25.0	26.0	8.10	15.2	8.8	57.6	1.4	6.2	87.8	
	10	26.2	30.0	8.68	14.7	8.0	54.2	8.8	27.7	76.4	
	10	23.0	25.5	7.90	14.8	8.3	56.2	.9	8.8	74.0	
	--	24.8	26.8	8.03	14.6	8.3	57.1	3.1	14.0	69.7	

crossbr	progeny from each inbred line								
Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length in cm.	Ear diameter in cm.	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear	Yield in pounds per row
1.7	1.157	6.3	18.8	4.74	0.253	24.4	85.5	15.9	16.36
.3	1.094	11.2	19.7	4.63	.237	23.9	87.6	15.1	15.43
.4	1.035	17.4	18.8	4.90	.263	25.0	87.3	16.9	15.22
.2	1.042	8.6	19.5	4.75	.247	21.0	86.2	16.5	14.37
1.2	1.063	9.3	19.1	4.93	.260	24.3	86.0	16.8	16.61
1.3	1.035	7.1	19.3	4.74	.248	22.1	86.6	17.2	16.29
.3	1.009	7.0	20.6	4.77	.234	25.1	85.5	17.4	17.50
2.2	1.049	9.2	18.9	4.68	.249	24.9	85.8	17.4	16.38
2.2	1.064	8.1	21.4	4.55	.215	22.6	84.6	15.4	14.85
.3	1.006	7.1	17.9	4.86	.274	24.0	85.8	17.2	14.73
.7	1.059	14.3	17.6	4.81	.275	22.4	86.5	18.0	13.77
2.9	1.083	9.2	22.1	4.61	.210	26.4	84.6	14.4	16.51
1.1	1.012	11.3	22.6	4.66	.208	24.6	85.6	15.9	16.96
2.6	1.142	15.6	19.0	4.72	.251	24.2	87.1	16.1	17.81
1.6	1.189	13.2	21.4	4.45	.210	25.7	85.6	15.6	14.12
.4	1.049	7.6	21.0	4.61	.222	25.9	85.4	15.6	15.41
.5	1.086	16.6	19.5	4.98	.256	23.3	87.0	16.5	16.41
.4	1.064	17.6	19.4	4.80	.251	25.5	88.2	18.8	15.53
2.8	1.066	8.3	18.6	4.89	.264	29.4	87.1	17.2	15.70
.2	1.026	11.5	18.8	5.02	.270	27.2	85.8	17.8	15.55
.6	1.009	7.6	18.7	4.94	.267	23.0	85.1	18.4	14.92
.9	1.079	13.8	20.2	4.68	.234	25.6	84.8	16.5	15.41
2.1	1.084	18.2	19.0	4.82	.254	22.5	88.1	16.4	16.19
.1	1.016	11.0	18.7	4.77	.258	23.8	86.5	18.1	15.88
.8	1.056	17.7	20.0	5.04	.254	22.8	86.8	17.5	17.41
.9	1.023	8.7	20.9	4.56	.220	25.0	85.6	15.2	15.71
4.7	1.161	9.2	20.4	4.71	.233	25.5	86.7	17.3	15.98
1.1	1.032	11.4	19.6	4.66	.238	25.2	87.0	15.6	16.08
1.4	1.063	11.3	19.9	4.75	.242	24.2	86.1	16.4	15.73

Table 1 continued

Crossing block row number	Pedigree number		Parent variety	Number of crosses averaged
101	3-3-3-3-	Comp.	Four County White	10
102	11-4-1-3-	"	" " "	10
103	16-4-3-3-	"	" " "	10
104	29-3-5-4-	"	" " "	9
105	46-5-4-2-	"	" " "	9
106	56-3-3-4-	"	" " "	10
107	63-4-1-6-	"	" " "	10
108(1)	67-4-2-1-	"	" " "	--
109	80-1-3-6-	"	" " "	10
110	101-4-5-5-	"	" " "	10
111	128-1-3-2-	"	Silver King	9
112(2)	Lindstrom 7117-	"	White Flint	9
113(1)	50-5-3-6-	"	Four County White	--
Means for all of the crosses in this group				--
114	134-3-2-4-	"	C. I. 133	9
115(1)	135-4-5-6-	"	" " "	--
116	153-5-2-2-	"	" " "	9
117	155-2-2-2-	"	Iodent	9
118	157-3-1-3-	"	"	9
119	161-1-3-3-	"	"	9
120	169-4-4-1-	"	"	9
121	170-2-3-2-	"	"	42
122(1)	183-4-5-2-	"	"	--
123	188-1-4-1-	"	"	9
124	197-1-2-6-	"	"	9
125	207-2-5-2-	"	"	8
126	215-2-5-1-	"	"	9
127(1)	219-3-1-5-	"	"	--
128	224-2-2-1-	"	"	9

Number of crosses averaged	Mean values of the different characters in the crossbre										pro
	Date 1/4 tasseled (3)	Date 1/4 silked (3)	Plant height	Number of nodes per plant	Number of nodes to upper ear	Per cent of nodes below ear	Per cent of plants smutted	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants with two or more ears	Number of ears per plant
1926 CROSSING BLOCK											
White Corn											
10	25.1	28.4	6.8	--	--	--	--	--	95.0	--	--
10	25.1	30.2	7.6	--	--	--	--	--	93.8	--	--
10	22.9	27.0	6.8	--	--	--	--	--	91.7	--	--
9	24.0	26.4	6.6	--	--	--	--	--	91.9	--	--
9	25.8	30.0	6.9	--	--	--	--	--	97.2	--	--
10	26.0	29.0	7.1	--	--	--	--	--	89.6	--	--
10	24.6	28.1	7.3	--	--	--	--	--	93.3	--	--
--	--	--	--	--	--	--	--	--	--	--	--
10	26.1	29.6	6.9	--	--	--	--	--	94.8	--	--
10	25.5	28.6	7.3	--	--	--	--	--	94.2	--	--
9	24.8	27.5	7.3	--	--	--	--	--	86.1	--	--
9	25.7	29.5	7.4	--	--	--	--	--	86.7	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	25.0	28.6	7.1	--	--	--	--	--	92.3	--	--
Yellow Corn											
9	27.1	32.4	7.6	--	--	--	--	--	73.4	--	--
--	--	--	--	--	--	--	--	--	--	--	--
9	26.4	30.4	7.0	--	--	--	--	--	89.0	--	--
9	34.4	39.0	7.8	--	--	--	--	--	68.6	--	--
9	34.5	38.4	7.8	--	--	--	--	--	74.0	--	--
9	34.5	39.0	8.4	--	--	--	--	--	79.2	--	--
9	34.4	39.4	8.0	--	--	--	--	--	49.7	--	--
42	33.2	37.8	7.9	--	--	--	--	--	80.2	--	--
--	--	--	--	--	--	--	--	--	--	--	--
9	32.2	38.0	7.9	--	--	--	--	--	82.1	--	--
9	32.6	35.7	8.1	--	--	--	--	--	85.0	--	--
8	32.8	37.0	7.9	--	--	--	--	--	75.7	--	--
9	33.4	38.1	8.4	--	--	--	--	--	80.1	--	--
--	--	--	--	--	--	--	--	--	--	--	--
9	34.6	38.4	8.2	--	--	--	--	--	86.6	--	--

rossbre progeny from each inbred line

Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length in cm.	Ear diameter in cm.	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear	Yield in pounds per row
--	--	4.8	--	--	--	11.1	86.4	--	11.08
--	--	2.7	--	--	--	12.2	85.3	--	11.86
--	--	4.3	--	--	--	11.7	86.4	--	11.20
--	--	4.1	--	--	--	10.3	85.4	--	10.08
--	--	2.5	--	--	--	11.9	84.1	--	11.23
--	--	1.4	--	--	--	13.6	84.3	--	11.51
--	--	.7	--	--	--	12.4	85.5	--	12.29
--	--	--	--	--	--	--	--	--	--
--	--	3.4	--	--	--	14.3	84.6	--	11.32
--	--	3.0	--	--	--	12.7	84.4	--	12.09
--	--	6.2	--	--	--	11.9	84.7	--	11.42
--	--	1.6	--	--	--	13.7	85.6	--	12.35
--	--	--	--	--	--	--	--	--	--
--	--	3.1	--	--	--	12.4	85.1	--	11.60
--	--	4.8	--	--	--	14.6	83.2	--	10.06
--	--	--	--	--	--	--	--	--	--
--	--	2.5	--	--	--	13.8	85.2	--	9.84
--	--	4.6	--	--	--	17.1	83.0	--	10.41
--	--	2.1	--	--	--	17.7	82.5	--	10.31
--	--	2.6	--	--	--	19.7	80.8	--	10.68
--	--	3.8	--	--	--	13.8	83.0	--	11.08
--	--	2.8	--	--	--	15.5	83.8	--	10.38
--	--	--	--	--	--	--	--	--	--
--	--	5.2	--	--	--	16.4	84.6	--	10.35
--	--	2.5	--	--	--	17.3	83.5	--	12.30
--	--	2.9	--	--	--	18.6	83.6	--	10.90
--	--	1.3	--	--	--	15.9	84.2	--	11.85
--	--	--	--	--	--	--	--	--	--
--	--	1.8	--	--	--	15.2	84.0	--	11.61

Table 1 continued

Crossing block row number	Pedigree number	Parent variety
129	234-2-3-1- Comp.	Iodent
130	254-3-6-1- "	"
131 (1)	262-3-3-2- "	"
132	267-3-5-2- "	"
133	275-3-5-1- "	C. I. 204
134 (1)	278-3-4-1- "	" " "
135	289-4-3-5- "	Lancaster Surecrop
136	291-1-6-1- "	" "
137 (1)	307-2-4-4- "	" "
139	315-2-4-3- "	" "
140	317-3-1-2- "	" "
141	324-2-2-1- "	" "
142	331-3-1-7- "	" "
143	345-2-1-5- "	Black's strain of Reid Yel. Dent
144	348-3-1-5- "	" " " " " "
145 (1)	349-5-1-6- "	" " " " " "
146	351-4-5-5- "	" " " " " "
147	353-5-1-1- "	" " " " " "
148 (1)	358-2-6-2- "	Proudfit's strain of Reid Yel. Dent
149	365-4-3-1- "	" " " " " "
150	370-1-1-1- "	" " " " " "
151	389-5-2-1- "	Krizer Bros. Yel. Dent
152 (1)	391-5-5-1- "	" " " "
153	394-4-2-1- "	" " " "
154	397-1-2-1- "	" " " "
155	398-1-2-2- "	McCulloch's strain of Reid Yel. Dent
156	399-1-1-6- "	" " " " " "
157	411-3-3-3- "	" " " " " "
158	415-5-4-4- "	" " " " " "
159	418-2-6-1- "	Osterland's strain of Reid Yel. Dent
160	419-2-2-4- "	" " " " " "
161	420-2-7-5- "	" " " " " "
162	433-2-3-1- "	Clark Yellow Dent
163 (1)	440-1-3-7- "	" " "
164	447-5-1-8- "	" " "
165	451-1-5-1- "	Walden Dent
166	460-4-1-5- "	" "

le ty	Number of crosses averaged	Date 1/4 tasseled (3)	Date 1/4 silked (3)	Plant height	Number of nodes per plant	Number of nodes to upper ear	Per cent of nodes below ear	Per cent of plants smutted	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants
					Mean values of the different characters in the cros						
	9	34.2	38.1	8.2	--	--	--	--	--	75.0	-
	9	36.5	40.7	8.3	--	--	--	--	--	66.3	-
	--	--	--	--	--	--	--	--	--	--	-
	9	34.6	39.2	8.0	--	--	--	--	--	77.6	-
	9	34.9	39.4	7.8	--	--	--	--	--	72.1	-
	--	--	--	--	--	--	--	--	--	--	-
	9	32.0	37.1	7.8	--	--	--	--	--	63.3	-
	9	33.6	38.4	8.0	--	--	--	--	--	45.3	-
	--	--	--	--	--	--	--	--	--	--	-
	9	32.4	37.6	8.0	--	--	--	--	--	50.2	-
	41	34.2	39.4	8.4	--	--	--	--	--	62.4	-
	9	32.4	37.7	7.8	--	--	--	--	--	61.5	-
	9	31.0	35.8	7.9	--	--	--	--	--	49.0	-
Yel. Dent	43	33.8	38.4	8.4	--	--	--	--	--	75.1	-
" "	9	33.8	38.7	7.9	--	--	--	--	--	61.4	-
" "	--	--	--	--	--	--	--	--	--	--	-
" "	9	33.7	38.1	8.2	--	--	--	--	--	71.4	-
" "	9	34.6	39.3	8.0	--	--	--	--	--	82.1	-
id Yel. Dent	--	--	--	--	--	--	--	--	--	--	-
" " "	9	32.8	38.6	8.4	--	--	--	--	--	76.0	-
" " "	43	33.6	38.9	7.6	--	--	--	--	--	68.6	-
	7	34.8	38.2	7.8	--	--	--	--	--	41.4	-
	--	--	--	--	--	--	--	--	--	--	-
	43	32.0	36.1	7.6	--	--	--	--	--	82.7	-
	9	32.7	37.1	7.6	--	--	--	--	--	64.8	-
eid Yel. Dent	9	33.4	37.7	8.2	--	--	--	--	--	78.5	-
" " "	9	31.6	36.1	8.0	--	--	--	--	--	78.6	-
" " "	43	33.0	38.8	8.1	--	--	--	--	--	59.0	-
" " "	9	34.3	38.6	8.0	--	--	--	--	--	71.1	-
eid Yel. Dent	9	30.7	37.8	7.2	--	--	--	--	--	87.5	-
" " "	43	32.0	36.0	8.1	--	--	--	--	--	75.7	-
" " "	9	30.6	36.2	7.7	--	--	--	--	--	87.6	-
	9	35.0	39.7	8.2	--	--	--	--	--	43.5	-
	--	--	--	--	--	--	--	--	--	--	-
	9	27.5	32.9	7.3	--	--	--	--	--	86.1	-
	9	33.4	38.6	7.8	--	--	--	--	--	75.4	-
	9	33.8	38.6	8.2	--	--	--	--	--	69.2	-

the different characters in the crossbre progeny from each inbred line

plant	Number of nodes to upper ear	Per cent of nodes below ear	Per cent of plants smutted	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length in cm.	Ear diameter in cm.	Ear shape index (diameter ÷ length)
--	--	--	--	--	75.0	--	--	3.1	--	--	--
--	--	--	--	--	66.3	--	--	6.3	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	77.6	--	--	1.9	--	--	--
--	--	--	--	--	72.1	--	--	3.9	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	63.3	--	--	4.7	--	--	--
--	--	--	--	--	45.3	--	--	1.3	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	50.2	--	--	2.7	--	--	--
--	--	--	--	--	62.4	--	--	4.2	--	--	--
--	--	--	--	--	61.5	--	--	9.5	--	--	--
--	--	--	--	--	49.0	--	--	3.5	--	--	--
--	--	--	--	--	75.1	--	--	5.5	--	--	--
--	--	--	--	--	61.4	--	--	1.4	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	71.4	--	--	3.7	--	--	--
--	--	--	--	--	82.1	--	--	3.2	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	76.0	--	--	1.9	--	--	--
--	--	--	--	--	68.6	--	--	3.1	--	--	--
--	--	--	--	--	41.4	--	--	1.8	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	82.7	--	--	2.5	--	--	--
--	--	--	--	--	64.8	--	--	3.0	--	--	--
--	--	--	--	--	78.5	--	--	6.9	--	--	--
--	--	--	--	--	78.6	--	--	3.3	--	--	--
--	--	--	--	--	59.0	--	--	4.2	--	--	--
--	--	--	--	--	71.1	--	--	5.0	--	--	--
--	--	--	--	--	87.5	--	--	9.8	--	--	--
--	--	--	--	--	75.7	--	--	5.5	--	--	--
--	--	--	--	--	87.6	--	--	6.0	--	--	--
--	--	--	--	--	43.5	--	--	3.9	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	86.1	--	--	4.3	--	--	--
--	--	--	--	--	75.4	--	--	5.2	--	--	--
--	--	--	--	--	69.2	--	--	3.2	--	--	--

ssbre	progeny from each inbred line								
Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length in cm.	Ear diameter in cm.	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear	Yield in pounds per row
--	--	3.1	--	--	--	16.2	83.7	--	11.16
--	--	6.3	--	--	--	20.1	83.8	--	10.91
--	--	--	--	--	--	--	--	--	--
--	--	1.9	--	--	--	15.8	83.4	--	11.13
--	--	3.9	--	--	--	17.6	84.1	--	9.85
--	--	--	--	--	--	--	--	--	--
--	--	4.7	--	--	--	16.1	84.6	--	12.43
--	--	1.3	--	--	--	17.3	83.2	--	11.65
--	--	--	--	--	--	--	--	--	--
--	--	2.7	--	--	--	18.7	82.3	--	11.39
--	--	4.2	--	--	--	19.8	81.6	--	11.46
--	--	9.5	--	--	--	19.6	82.5	--	11.17
--	--	3.5	--	--	--	19.5	80.8	--	11.76
--	--	5.5	--	--	--	15.2	82.7	--	10.56
--	--	1.4	--	--	--	16.2	82.0	--	10.98
--	--	--	--	--	--	--	--	--	--
--	--	3.7	--	--	--	17.1	84.8	--	12.27
--	--	3.2	--	--	--	19.3	85.4	--	9.79
--	--	--	--	--	--	--	--	--	--
--	--	1.9	--	--	--	19.0	84.4	--	10.39
--	--	3.1	--	--	--	18.4	84.8	--	10.57
--	--	1.8	--	--	--	19.7	85.1	--	10.16
--	--	--	--	--	--	--	--	--	--
--	--	2.5	--	--	--	17.6	84.1	--	10.79
--	--	3.0	--	--	--	19.7	82.5	--	11.39
--	--	6.9	--	--	--	17.6	83.4	--	11.19
--	--	3.3	--	--	--	14.5	84.6	--	10.49
--	--	4.2	--	--	--	19.6	83.5	--	10.43
--	--	5.0	--	--	--	19.3	83.5	--	10.39
--	--	9.8	--	--	--	14.8	82.0	--	8.65
--	--	5.5	--	--	--	16.5	83.4	--	10.92
--	--	6.0	--	--	--	21.2	83.5	--	11.09
--	--	3.9	--	--	--	17.6	81.6	--	9.63
--	--	--	--	--	--	--	--	--	--
--	--	4.3	--	--	--	12.3	81.8	--	10.30
--	--	5.2	--	--	--	20.2	84.7	--	9.75
--	--	3.2	--	--	--	19.0	82.9	--	10.30

Table 1 continued

Crossing block row number	Pedigree number	Parent Variety	Number of crosses averaged	
167	461-2-1-4- Comp.	Walden Dent	9	
168	465-3-1-4- "	" "	43	
169	467-1-4-4- "	" "	9	
170	477-4-2-2- "	Argentine Flint	9	
171	483-5-4-4- "	" "	43	
172	487-5-1-2- "	" "	9	
173	493-3-1-1- "	" "	9	
174(2)	Holbert's A-1-1-2-R-1-2-3-7-1	Funk Bros. 176A	9	
175(2)	Holbert's B-1-1-3-R-10-1-12-14	" " "	8	
176(2)	Holbert's G-8-8-1-B-2-2	Griffin's strain of Reid Yel. Dent	9	
Mean for all of the crosses in this group			--	

(1) Used in the correlation studies within inbred lines but not in the

(2) Used in the crossing experiments but not in the correlation studie

(3) The dates for 1/4 tasseled and 1/4 silked are recorded as dates in

	Number of crosses averaged	Mean values of the different characters in the crossbre									
		Date 1/4 tasseled (3)	Date 1/4 silked (3)	Plant height	Number of nodes per plant	Number of nodes to upper ear	Per cent of nodes below ear	Per cent of plants smutted	Number of suckers per 100 plants	Per cent of plants standing erect at harvest	Per cent of plants with two or more ears
	9	38.4	43.0	9.0	--	--	--	--	--	58.3	--
	43	32.8	37.1	7.8	--	--	--	--	--	77.0	--
	9	31.5	36.9	8.0	--	--	--	--	--	71.5	--
	9	32.8	39.6	7.8	--	--	--	--	--	84.7	--
	43	33.2	38.8	7.8	--	--	--	--	--	51.1	--
	9	31.8	36.4	7.8	--	--	--	--	--	64.4	--
	9	35.0	42.2	7.6	--	--	--	--	--	55.7	--
	9	33.6	38.1	7.8	--	--	--	--	--	68.6	--
	8	37.0	41.6	8.3	--	--	--	--	--	65.4	--
1. Dent	9	32.8	36.8	8.4	--	--	--	--	--	66.9	--
	--	33.1	37.9	8.0	--	--	--	--	--	70.2	--

but not in the crossing experiments.
relation studies.
ded as dates in July, August 1,2,3, etc. being recorded as July
32, 33, 34, etc.

harvest	Per cent of plants with two or more ears	Number of ears per plant	Per cent of ears moldy	Ear length in cm.	Ear diameter in cm.	Ear shape index (diameter ÷ length)	Shrinkage per cent of the harvested ears	Shelling per cent	Mean number of kernel rows per ear	Yield in pounds per row
crossbre	progeny from each inbred line									
3	--	--	2.0	--	--	--	20.3	84.2	--	10.28
0	--	--	1.8	--	--	--	13.6	83.4	--	10.41
5	--	--	3.5	--	--	--	20.7	83.6	--	10.92
7	--	--	3.4	--	--	--	16.5	85.5	--	9.01
1	--	--	3.0	--	--	--	23.1	83.5	--	10.40
4	--	--	1.9	--	--	--	17.8	84.9	--	10.27
7	--	--	1.1	--	--	--	22.5	81.9	--	9.07
6	--	--	2.3	--	--	--	18.4	82.7	--	10.81
4	--	--	5.2	--	--	--	19.6	83.8	--	9.89
9	--	--	2.3	--	--	--	17.2	83.3	--	9.88
2	--	--	3.6	--	--	--	17.7	83.4	--	10.65