NOTES
THE USE OF PUNCHED CARD EQUIPMENT IN PREDICTING
THE PERFORMANCE OF CORN DOUBLE CROSSES

In 1934, Jenkins presented data comparing four methods of predicting the performance of double-crossed corn hybrids. Since that time his method B, which utilizes information on the four non-parental single-crosses, has been verified by several investigators and found quite satisfactory. This method is now used widely, but the labor involved in assembling and averaging the results from extensive single-cross tests without the aid of punched card equipment has proved a considerable task.

The corn breeding project at Ames, Iowa, has made extensive use of punched card equipment in the tabulation of yields, sums of squares, etc., for the past several years. Using the punched card equipment available in the Statistical Laboratory of the Iowa State College, the following method of predicting double-cross performance has been found quite satisfactory and much more rapid than hand tabulation.

The single-crosses involved in any particular test were written down in systematic order, as follows: First the six singles which can be produced from four inbreds, then the four additional singles which can be made when the fifth inbred line is added, etc. After this process was completed the single-crosses were numbered consecutively. The numbers are the single-cross code numbers used in sorting and tabulating.

The next step was a similar systematic listing of all possible double-crosses; first the three double-crosses which can be made among four inbred lines, then the 12 additional double-crosses possible when a fifth line is added, etc. Using letters of the alphabet to designate inbred lines rather than actual pedigrees, pedigrees have been prepared for all possible combinations among 16 inbred lines. The listing of single-cross and double-cross combinations in the systematic order indicated permits the use of the same coded pedigrees for any set of single crosses involving all possible combinations of 16 or fewer lines. All possible single-cross combinations among 13 or 16 lines can be handled readily in 9X9 or 11X11 lattice square designs, respectively, which we have found to be quite satisfactory for corn yield comparisons.

After the key list of double-cross pedigrees was prepared the single-cross code numbers of the four non-parental single crosses were obtained from the systematically listed single crosses and recorded on the same sheet with the double-cross pedigrees, as illustrated below:

1Journal Paper No. J-785 of the Iowa Agricultural Experiment Station, Ames, Iowa. Project No. 163. Contribution from the corn improvement program at Ames, Iowa, conducted by the Division of Cereal Crops and Diseases, U. S. Dept. of Agriculture, in cooperation with the Farm Crops Subsection, Iowa Agricultural Experiment Station.