Experimental corn breeding has passed through several distinct phases in the last 50 years. At the beginning of this period mass selection within a variety or in the progeny of varietal hybrids was the generally accepted procedure. This method of selection was effective in modifying ear type as evidenced by the diverse types produced; small-eared prolifics, Missouri Cob Pipe, Reid and Hickory King. Selection as a factor in modifying yielding ability of adapted varieties was much less successful.

The ear-to-row method of corn breeding was tried extensively by experiment stations and farmers after its introduction by the Illinois Experiment Station about 1896. Many investigators reported substantial increases in yield following this practice, but the method was finally abandoned when it became apparent that cumulative improvement was not realized and that the pure-line method appeared to offer much greater possibilities.

Under the system of corn breeding commonly used at present, self-fertilization is practiced for a period of 3 to 5 years. During this period selection is practiced both among and within progenies for such characters as general vigor, resistance to lodging, freedom from disease, etc. At the end of this period of inbreeding the lines remaining are top-crossed by some standard variety or hybrid, the top crosses are compared for yield and other characters, and their performance is used to evaluate the general combining ability of the parent line. After this test obviously inferior lines are discarded, but a considerable number are tested for two or more years. Following this period of testing the best lines are combined into single crosses. When systematically made, the results of tests of such crosses can be used to predict the better double crosses. These in turn must be tested to determine those best suited to commercial production. This entire procedure requires a minimum of 10 to 12 years from the first inbreeding to the completion of the experimental testing and the release for commercial production of the best hybrids. Any procedure which will hasten the evaluation and production of superior inbred lines will be of value to the producer and user of hybrid seed.

Early testing has been suggested by Jenkins (3) and Sprague (8). It differs in two main respects from the usual procedures for testing inbred lines. First, 50 plants are outcrossed to a tester at the time of the first selfing and the combining ability and general performance of the top cross progeny is determined. Second, heavy discarding of


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3Figures in parenthesis refer to "Literature Cited", p. 117.