COMMERCIAL and experiment station plant breeders are of the opinion that there will continue to be a rapid increase in the use of hybrid corn until the greater part of the field corn acreage in the United States is planted to hybrid varieties. The reasons for the rapid expansion of hybrid corn are rather well known. The primary cause is the greater efficiency of adapted hybrids in yield per acre, ability to withstand lodging, uniformity of maturity, disease resistance, and other important characters.

The explanation of hybrid vigor was placed on a Mendelian basis by Jones (7) and the results of experiments by Richey and others (8, 9) have given some evidence that lends added support to this explanation. If the Mendelian explanation proves the correct one, it furnishes a genetical basis for the belief that improved inbred lines can be developed by the same plant breeding methods that have been so successfully applied to self-pollinated crop plants.

Most of the inbreds already used in commercial hybrids have been obtained by self pollination and selection from commercial varieties. All inbred lines of field corn now available are much less vigorous than the normal varieties from which they were selected. An inbred line may be far superior, however, to the commercial variety from which it was selected in some one character, such as ability to withstand lodging or disease resistance. The major difference in the breeding of improved selfed lines of corn from crosses between available inbreds and subsequent selection in self-pollinated lines and the breeding of improved varieties of self-pollinated plants is the necessity of controlling pollination in corn.

After a wide collection of selfed lines has been selected from normally pollinated adapted varieties and from other breeders, three rather specific methods of breeding are available in the development of improved inbreds. These are the pedigree method, backcrossing, and convergent improvement. Backcrossing and convergent improvement are being used extensively by many corn breeders. Convergent improvement is a method of double backcrossing and, as originally developed by Richey (8), was suggested as a method for testing the Mendelian explanation of hybrid vigor. In its application to plant breeding it was proposed as a means of improving each of two inbred lines without materially changing their combining ability in an F₁ cross.

Backcrossing appears a logical method when one desires to add one or two characters which a variety or inbred line lacks and to retain the many desirable characters of the variety or inbred line used as the recurrent parent. This can be accomplished most easily when the character to be added is simply inherited. Most inbred lines are great-