Seed yield is perhaps the most important quality of the cereal crops. Variety tests are conducted at almost every experiment station for the purpose of determining the highest yielding varieties. New strains developed by the plant breeder are carried through a long series of nursery and field plat yield tests, and their value for distribution hinges on their ranking in yield with the best of the standard local sorts. There are, of course, other characters that are always considered in the rating of a variety, such as disease resistance, erectness, winter hardiness; but they affect yield indirectly and are called ancillary characters by Engledow and Ramiah (2).3

The present situation with regard to breeding for yield in the cereal crops cannot be considered satisfactory. Too little information is available relative to the internal yield factors of our common strains. When, in plat tests, variety A exceeds variety B, we do not know why. Is it because of a difference in number of plants per unit area, which in turn is the result of a difference in size of seed in the two varieties? Or is it because of the ability of variety A to stool better under the same conditions than variety B and thus produce a larger number of heads per unit area? Such questions as these suggest the kind of information that we need about strains, but that we do not have at present.

Seed yield is a very complex character. It is the end result and sum total of the activities of the plant. Two main forces determine the amount of seed produced. These are environment and heredity. Soil type, soil fertility, moisture, and temperature are examples of environmental influences. Inherent influences or factors are important also, because we know that certain varieties yield better than others—though tested under the same environmental conditions. This paper deals with the inherent factors affecting seed yield in a few self-fertilized crops, such as wheat, oats, barley, and soybeans.

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2Chief in Plant Breeding.

3Reference by number is to "Literature Cited," p. 395.