The methods in use in breeding wheat, oats, and barley, all self-fertilized plants, will be discussed briefly, while rye will be omitted chiefly because almost nothing has been published in this country on the breeding of this crop and the writer has not done any rye breeding. The improvement of these grains by selection and by hybridization will be considered separately.

**BREEDING BY SELECTION**

By some geneticists selection may not be called breeding, but it is generally agreed that it has been a most effective method of securing improved new varieties. The method is based on the assumption that in any variety of these grains that has been grown for any considerable number of years there are variations or biotypes which may be either better or worse than the average of the strains which together constitute the variety. This was the basis upon which Le Couteur and Shirreff made selections a hundred years ago. The cereal breeder of today with his better facilities can carry on the work on a larger scale than they and can test more accurately.

**PLANTS OR HEADS SELECTED**

Plants or heads may be selected. Occasionally grains of the commercial variety are spaced so that the plants have more nearly equal chances of development so that the most promising can be selected. More often the selections are made in ordinary fields where plants cannot be easily separated and here heads are taken.

**IDEALS IN SELECTION**

There may be a question as to whether the selections should be all more or less typical of the variety or whether off-type heads should be chosen. The latter are quite likely to be other varieties that have gotten in by mechanical mixing. The reasonable method, it seems, would be to take desirable plants or heads regardless of variety characteristics. It is of interest to note that some of the outstanding new varieties have been off-type selections, among them Fultz, until lately the leading awnless wheat in Pennsylvania which was selected from an awned variety, and Forward, an awnless...