6. Resemblance of maize-teosinte mutants to those occurring in long-inbred strains.

It now appears probable that many, if not the majority, of mutations occurring in long-inbred strains of maize are the result of some phenomenon involving blocks of teosinte genes. There is little doubt that the majority of maize varieties of Central America, Mexico, and the United States have at some time in their history undergone teosinte introgression or that the majority of inbred strains derived from these contain some teosinte genes. Strains such as Oh28, for example, have cobs as highly lignified as some of our maize-teosinte derivatives in which teosinte chromosomes have been introduced.

The mutants reported by Singleton are particularly interesting in this connection. When the mutant dwarf which he found in an inbred line of sweet corn was crossed with another inbred new variations such as germless seeds, brittle seeds, and virescent seedlings were observed. This situation is similar to that reported above where one mutation was followed by a series of others. Also all of these mutations reported by Singleton have occurred in our maize-teosinte derivatives, as have also the narrow leaf, male-sterile dwarfs, and small seeds reported by Schuler.

The transposition of a block of genes from one chromosome to another could produce heterozygosity in long-inbred, apparently homozygous strains and this process could account for the residual heterozygosity which Schuler found in several inbred mutants.

If the majority of mutants in long-inbred strains are the product of transposition of blocks of genes, they are of doubtful value in experiments designed to measure the heterosis resulting from heterozygosity at a single locus.

7. Possible relationship of maize-teosinte mutants to previously described mutation systems.

We have long suspected that the mutation systems described by McClintock and by Brink owe their origin to teosinte genes introduced into maize chromosomes. It has not yet been possible to prove this but it is significant that the controlled introgression of teosinte into maize produces mutability; that some of the mutants are unstable and involve a number of "states"; that defective seeds are common; that disturbance of Mendelian ratios often occurs; and that there appears to be "transposition" in both kinds of systems.

The maize-teosinte derivatives do not, as such, appear to carry the Ac factor of the McClintock system but they may in some manner give rise to it. In 1954 five different maize-teosinte derivatives produced 1.4, 1.2, 1.2, 0.7, and 2.0 percent of mosaic seeds involving the c locus when crossed with the Ac tester. Another derivative, one which