5. The extraction of "teosinte" chromosomes from present-day maize varieties.

In a survey made several years ago of varieties of maize of this hemisphere for the presence of weak alleles of a tunicate, a number of plants were found whose ears had prominent lignified glumes. When this characteristic was introduced into the inbred strain, A158, through repeated backcrossing followed by selfing the final product in several cases was a modified strain of A158 similar in its characteristics to some of the modified strains which are produced by substituting a chromosome of teosinte for a chromosome of maize.

Chromosomes which have the same general effect as teosinte chromosomes have now been extracted from varieties from Mexico, Honduras, Nicaragua, Venezuela, Brazil, Paraguay, Argentina, Bolivia, and Cuba.

Not only do these extracted chromosomes produce phenotypic effects similar to those of teosinte chromosomes but like the latter, they also increase mutability. Furthermore at least some of the mutations are genetically identical to those produced by teosinte chromosomes. An unstable defective seed mutant which is genetically identical or "allelic" to *de*^{t5} described above has been produced by chromosomes extracted from varieties from Mexico, Honduras and Paraguay.

Since teosinte is not known in South America, two explanations for the occurrence of "teosinte" chromosomes in South American maize suggest themselves: (1) that the admixture of maize and teosinte which has occurred and is still occurring in Central America and Mexico has become widely distributed throughout this hemisphere; (2) that these extracted chromosomes in South American varieties are derived originally, not from teosinte but, from Tripsacum.

Since some of the South American races from which these chromosomes were extracted have no counterparts in Central America and Mexico and no obvious relationship to races of that region, and since we now know that Tripsacum is much more common and more diverse in South America than had previously been supposed, the second explanation seems at the moment to be the more plausible.

Whether these chromosomes come from teosinte or from Tripsacum, serious consideration must be given to the fact that the modern maize plant is a complex hybrid involving not only numberous once-distinct races but also the introduction of genes and blocks of genes from teosinte or Tripsacum or both. These general conclusions, which are supported by both archaeological remains and genetic evidence, are important not only for corn improvement but also for theoretical genetics. It may well be that many of the genetic phenomena observed in maize have significance only for this species.