the total number of the kernels on the ears and the ratio of wx. That, together with the appearance of the two regular wx ears in a population of 55 ears, seems compatible with an hypothesis that some ga pollen grains are functioning and that some crossing-over occurs between wx and ga. In backcrosses of heterozygous Ga Wx/ga wx as the male on homozygous waxy plants 32 wx kernels were obtained out of 672 (4.76%). All the reported data indicate that the Ga factor detected in the maize-teosinte derivative is identical or allelic to Gag, described by Schwartz (Maize News Letter 25:30).

Another aberrant ratio perhaps caused by a ga factor on chromosome 9 has been found which, however, gives minor deviations of the wx classes. The family in which it was detected showed 21% wx; its progeny gave 3 Wx Wx ears, 3 low wx ears (20.2%), 2 normal wx ears (24.7%) and 1 high wx (30.8%). These data suggest that, if actually a ga factor is involved, it should be a very weak allele of gag or, as seems more likely, a ga factor loosely linked to wx.

A ga factor should be postulated in the family 56-488, too, where the su class ranges from 28.5 to 35.1% and in the family 56-392 in which the su percent is 21.3 (17.5 to 24.3). In both these cases progeny tests are not yet available.

A ga factor that has been lost may have been present on chromosome 7 in a cross in which the percentage of gl_1 was as low as 7.2% instead of the expected 25%.

4. Incomplete synapsis in a multiple tester.

Incomplete synapsis has been found in the multiple tester stock bred by Dr. P. C. Mangelsdorf. In almost every pollen mother cell one or more of the pachytene chromosomes show usually one or two non-paired regions. These asynaptic segments cover one fourth to one half of the arm length. The centromere region is almost always regularly paired. The stock is wholly fertile. Specific linkage data are not yet available, but indirect evidence suggests that possibly the irregularity does not effect appreciably the crossing-over.

5. Mitotic disjunction and non-disjunction in the case of interchanges involving the B-type chromosomes.

One of the two gametes of the mature pollen grain unites with the polar nuclei in the embryo sac to form the triploid endosperm; the other fertilizes the egg. The two gametes of a single pollen grain are usually identical, with the exception of plants carrying B-chromosomes or interchanges between a B-type chromosome and a member of the A complement. The B-type centromere with the translocated A-segment undergoes non-disjunction in the second microspore mitosis. Thus one

of the gametes has two of these chromosomes; its partner none. If fertilization were at random one would expect the hyperploid and the deficient gametes to fertilize the egg with equal frequency. Actually the egg receives the hyperploid gamete more frequently than the deficient one, and a low rate of regular disjunction occurs in the second microspore division. As a consequence, three types of kernels are expected: (1) normal chromosome complement both in embryo and in endosperm because of normal disjunction, (2) hypoploid endosperm with hyperploid embryo or, (3) vice versa, hyperploid endosperm with hypoploid embryo because of non-disjunction. The relative frequency of the three kernel types can easily be determined by crossing TB-A translocation stocks on testers possessing two recessive markers in the segment homologous to the translocated A-segment. One marker should affect an endosperm character; the second one a seedling trait.

The multiple tester for the short arm of chromosome 9 yg C sh_1 bz wx has been pollinated by a TB-9b stock. Because the break in chromosome 9 occurs somewhere between bz and wx loci, the resulting endosperms should be classified according to their phenotypes in the classes sh_1 bz and Sh_1 Bz. The figures found were 237 and 231 respectively. As expected, the first class turned out to be all regularly green, Yg with ten exceptions due possibly to hetero-fertilization or to some other unusual event. The second class gave 116 yg and 100 Yg. The high proportion of the Yg seedlings in the Sh Bz class may be accounted for by regular disjunction of the B9 chromosome in the division of the generative nucleus. These results, as compared with those reported by Roman (Proc. Nat. Acad. Sci. 34. 2: 36-42) who, using C-c segregation, found very low B9 regular disjunction, indicate that disjunction occurred in an appreciable rate and suggest that the residual inheritance may affect the behavior of the chromosomes at the second division of the microspore. A fairly high disjunction has to be postulated, too, in later results by Roman and Ullstrup (Agron. Jour. 43: 450-454) in the case of TB-1a, and may be inferred in Randolph's findings (Genetics 26: 608: 631).

6. Balanced lethals for determining linkages.

The methods of locating inherited factors on the chromosomes in maize are based (1) on multiple testers with at least a marker for each of the 10 chromosome pairs, (2) on the use of a series of reciprocal translocations, (3) on the exploitation of the characteristics of A-B chromosome translocation stocks used as pollinator.

An additional method may rely on a series of balanced lethal systems, one for each chromosome pair. The defective endosperm factors may be useful for this purpose. Such balanced lethal stocks can be crossed with the unplaced mutants. In the non-lethal class of the following selfed progenies an excess of the mutants is expected, as