for pastel seedlings and albescent seedlings with occasional pastel mutable and albescent mutable seedlings. An occasional plant was found that, besides the pastel and albescent seedlings, segregates for some white seedlings and one plant had a white mutable seedling.

At the same time the selfs described in the above paragraph were made, the selfed plants were crossed as male parents to $\underline{w_3}$ plants. These outcrosses to an albino allele resulted in the segregation of the same classes of seedlings described above. However, white and white mutable seedlings were more frequent and they were found in some outcrosses in which the self pollinated male parent did not segregate for white seedlings. In two instances selfed plants which did not segregate for any white seedlings gave outcross plants that were homozygous for white seedlings.

The data suggest that the $\underline{w}_{\text{Kermicle \#1}}$ allele is a mutable allele of the $\underline{w_3}$ locus that can mutate to various levels of expression (e.g. pastel, albescent or albino). The instability of this gene in transmission from one generation to the next and the occurrence of mutable phenotypes support this conclusion. The nature of the mutable system can not be determined from the present data.

The fact that $\underline{w}_{\text{Kermicle \#1}}$ and $\underline{w}_{\text{Kermicle \#2}}$ are descended from the same self pollinated ear would certainly suggest that they might have had their origin in the same mutational event.

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2. A pseudoallele test at the Y_1 locus.

Since several alleles are known at the $\underline{Y_1}$ locus, a pseudoallele test was undertaken involving two of them. One of the alleles was the standard $\underline{y_1}$ (white-endosperm-green plant) found in genetic stocks. The second allele was $\underline{w}^{mut}$, (white mutable). This is a mutable allele of $\underline{Y_1}$ that originated as a spontaneous mutant in one of Dr. E. G. Anderson's stocks. The original mutant had white endosperm with small areas of yellow tissue and seedlings which when grown at high temperatures were pale green with streaks of green tissue. Stable lines have been derived from this original mutant in which there is no mutability in the endosperm or seedling. These lines have white endosperm and pale green seedlings

(at high temperatures). The stable $\underline{w}^{mut}$ gene was used in the test described here.

For outside markers in this test, the translocation 6-9e and $\underline{ms}_1$ were used. The break point of T6-9e is known to be proximal and very close to the $\underline{y}_1$ locus (see MGCNL 41:93-94, 1967). In a two point test, about 3% recombination was measured between $\underline{y}_1$ and $\underline{ms}_1$. Although the direction of $\underline{ms}_1$ with respect to $\underline{y}_1$ is not known it was used as one of the markers, since it is close to the $\underline{y}_1$ locus and since $\underline{w}^{mut}$ and $\underline{ms}_1$ had been obtained in coupling as the result of an earlier linkage test.

The F_1 had the genotype $\frac{T\ y_1\ +}{+\ w^{mut}\ ms_1}$ and was homozygous for $\underline{wx}$ (used as a contamination marker). The F_1 plants and homozygous $\underline{y}_1\ \underline{wx}$ pollen parents were planted in an isolation plot. All F_1 plants were detasseled. The ears of F_1 and male plants (controls) were harvested and checked for the presence of waxy yellow seeds that would be expected as the result of a crossover within the $\underline{y}_1$ locus or back mutation to dominant $\underline{Y}_1$. The ears were shelled and the resulting seeds weighed. A 1000 gram sample of seeds was counted and from this the number of seeds harvested was calculated based on the total weight of seeds obtained. The F_1 yielded 901,494 seeds which represent the number of F_1 gametes tested. The male parents yielded 347,165 seeds, but since each is the result of two $\underline{y}_1$ gametes, this represents a total of 694,330 gametes tested from the male plants. No yellow waxy seeds were observed on either the F_1 ears or those of the male parents. Thus no evidence was obtained that $\underline{y}_1$ and $\underline{w}^{mut}$ are pseudoalleles.

There are several possible explanations for these negative results. If the mutation sites for $\underline{y}_1$ and $\underline{w}^{mut}$ were very close together in the $\underline{y}_1$ cistron, then crossing over necessary to demonstrate pseudoalleles might be extremely rare. If one or the other or both of the alleles were the result of large deficiencies within the locus, the crossover necessary for the production of a normal allele may be impossible. Another possibility for failure may involve the $\underline{w}^{mut}$ allele which was derived from a mutable system. There may be some attribute of this mutable system that interferes with crossing over. The use of translocation 6-9e as an outside marker may have reduced the probability of crossing over. Since this translocation is very close to $\underline{y}_1$, there may have been considerable

distortion of pairing in this region resulting in little or no crossing over. Anderson, Kramer and Longley (1955, Genetics 40:531-538) found that heterozygous translocations involving the long arm of chromosome 6 frequently produced a marked suppression of crossing over in the $\underline{Y_1}$-$\underline{Pl}$ region.

The actual reason for the negative results may have been a combination of two or more of the above explanations. However, there is evidence that the second alternative might have been one of the factors involved. In this experiment a total of 2,051,571 $\underline{y_1}$ bearing gametes was tested (694,330 from the male rows, 901,494 male gametes that fertilized the F_1 plants and 455,747 $\underline{y_1}$ female gametes produced by the F_1 plants) and no back mutations to $\underline{Y_1}$ were observed. If the mutation causing $\underline{y_1}$ was due to a simple base substitution back mutations might be expected, yet none was observed in a reasonably large sample. However, no back mutations would be expected if the mutation was the result of a deletion.

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1. Unstable derivatives of the B^9 chromosome.

The B^9 chromosome of the translocation, B-9b, can be separated from the reciprocal 9^B chromosome and maintained as a supernumerary in a stock with two chromosomes 9. When crosses of the type $\underline{c}$ $\underline{sh}$ $\underline{wx}$ X $9^{c\ sh\ wx}$ $9^{c\ sh\ wx}$ $B^{9C\ Sh}$ are made, about 10% of the progeny are phenotypically $\underline{C}$ $\underline{Sh}$ and result from functioning of $9^{c\ sh\ wx}$ $B^{9C\ Sh}$ pollen. (Crossover $9^{C\ Sh\ wx}$ chromosomes also give rise to $\underline{C}$ $\underline{Sh}$ kernels, but can be distinguished in the next generation by testcross data--Robertson, 1967). A relatively large percentage of the $\underline{C}$ $\underline{Sh}$ progeny of 9 9 B^9 plants exhibit $\underline{C}$-$\underline{c}$ mosaicism (1-2%) and such kernels have been investigated. One might expect the great majority of mosaics to have arisen from a single break in the B^9, followed by a breakage-fusion-bridge cycle. However, a number of the mosaic kernels investigated showed a heritable mosaicism, and, in this respect, resembled ring chromosomes. Given below are the results of