It is apparent from the data that $\underline{R}^{sc}$ mutations are frequent when $\underline{R}^{st}\underline{R}^{st}$ is employed as staminate parent. Since the $\underline{R}^{sc}$ aleurone-$\underline{R}^{st}$ embryo combination and the reciprocal class, $\underline{R}^{st}$ aleurone-$\underline{R}^{sc}$ embryo, occur with frequencies of similar order, the hypothesis concerning the gametophytic origin of the types is upheld. An additional point of interest is that it is possible in this material to determine directly the mutation rate for a particular mitotic division. The frequency with which the second nuclear division of the male gametophyte gives rise to two daughter nuclei only one of which is mutant, is obtained by pooling the two classes which represent discordance between the two tissues, embryo and endosperm. In this case the rate is $\frac{15 + 13}{(2831 + 3640)/2} = 86.5 \times 10^{-4}$.

J. Kermicle

5. Differential induction of paramutation at R locus.

The earlier work in this laboratory showed that certain $\underline{R}^{r}$ and $\underline{R}^{g}$ alleles undergo weak and variable paramutation when they are made heterozygous with $\underline{R}^{st}$, which is known to be a strong and uniform paramutagenic allele. On the other hand, some $\underline{R}^{sc}$ (self colored) mutants from stippled and $\underline{R}^{mb}$ alleles are weakly and variably paramutagenic. One explanation for such variability is that the plants in question are actually chimeras, in which paramutation of $\underline{R}^{r}$ or $\underline{R}^{g}$ has proceeded to various levels in different parts of the individual. An attempt is being made to see if this hypothesis is valid, by separating and testing paramutated $\underline{R}^{r}$ and $\underline{R}^{g}$ alleles, as well as $\underline{R}^{sc}$ alleles, from within the same plant.

The material in the present study includes (1) $\underline{R}^{r}\underline{R}^{st}$ combinations in which the $\underline{R}^{r}$ alleles used showed, in previous studies, different grades of paramutation, (2) $\underline{R}^{r}\underline{R}^{sc}$ combinations in which $\underline{R}^{sc}$ showed different grades of paramutagenicity and (3) $\underline{R}^{g}\underline{R}^{st}$ and $\underline{R}^{r}\underline{R}^{mb}$ combinations in which $\underline{R}^{g}$ showed variable changes in pigment-producing action and $\underline{R}^{mb}$ showed variable paramutagenic action. The method consists in collecting pollen lots from side branches of the tassel of the plants to be tested and then pollinating plants of $\underline{r}^{g}\underline{r}^{g}$ constitution (Inbred W22). From the resulting ears, 100 $\underline{R}^{r'}\underline{r}^{g}\underline{r}^{g}$ or $\underline{R}^{g'}\underline{r}^{g}\underline{r}^{g}$ kernels ($\underline{R}^{r'}$ and $\underline{R}^{g'}$ designate paramutants of $\underline{R}^{r}$ and $\underline{R}^{g}$ alleles, respectively) were scored for intensity of pigment by matching them with a standard set of kernels defining 11 classes.

The following table is a sample of data from plants in which differences in paramutation of $\underline{R}^{r}$ in different tassel branches could be detected. The scores from two ears pollinated by the pollen from the same tassel branch did not differ widely, and so the observed differences cannot be attributed to the $\underline{r}^{g}\underline{r}^{g}$ ♀♀ parents. One

Differential induction of paramutation at $\underline{R}^r$ locus

Family	Genotype of ♂ parent	Position of the branch on tassel	Mean score of $R^{r'}r^g r^g$ kernels
(52-10)-6	$\underline{R}^r\underline{R}^{st}$	Basal	4.54
		Central	7.87
		Top	3.97
(52-11)-1	$\underline{R}^r\underline{R}^{st}$	Basal	6.54
		Central	3.04
		Top	5.96
(52-12)-8	$\underline{R}^r\underline{R}^{st}$	Basal	7.81
		Central	5.09
		Top	2.14
(52-18)-5	$\underline{R}^r\underline{R}^{sc}$	Basal	6.65
		Central	10.91
		Top	4.94
M^c772-1	$\underline{R}^r\underline{R}^{sc}$	Basal	6.11
		Central	3.23
		Top	5.63

interesting case ((52-18)-5) was where in the central branch no paramutation of $\underline{R}^r$ has occurred, while in both basal and top branches it occurred to some degree. The present data do not indicate any simple relationship between differential paramutation of $\underline{R}^r$ and symmetry of the tassel. In some cases the $\underline{R}^{r'}$ alleles from weakly affected branches showed a considerable range of variability. Matings are being planned to test whether the observed differences are heritable and to study the concurrent changes in both alleles of heterozygotes, particularly in $\underline{R}^r\underline{R}^{sc}$ combinations.

These results are in agreement with those previously obtained by H. B. Cooper, Jr. referred to briefly by Brink (Quart. Rev. Biol. 35:120-137).

G. R. K. Sastry

6. A non-paramutable, non-paramutagenic R^r allele.

Among a collection of R alleles from various geographic sources presently being introduced into the W22 inbred line, are several which give self-color in Rrr aleurone. This behavior is in contrast to that of the majority of the R alleles which are darkly mottled in Rrr