mean of .453, the shape of the distribution closely approximated that of the theoretical distribution.

In tests of the association of homologous chromosomes 6 in cells from both treatments, we found, as did Miles, that the mean distance between homologues did not differ significantly from the expected .453. The distribution distance mean (.417, .412) for chromosome 10 also did not deviate significantly from the theoretical curve. However, it appears that other homologous chromosome pairs are associated at metaphase in Seneca-60 and that the degree of this association is affected by the treatment used to arrest spindle development for the accumulation of metaphase spreads.

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1. Organization of the pigmenting and paramutagenic determinants of the R-stippled gene in maize.

The R-stippled (R^{st}) gene in maize is unstable in aleurone pigmentation and mutates in the germ line to a fully colored form, self-colored (R^{sc}). In mutation to R^{sc} the potential of R^{st} to reduce heritably the pigmenting action of sensitive alleles in heterozygotes (paramutation) may be fully retained, quantitatively reduced, or lost. The basis for the coincident alteration in paramutagenicity with R^{st} to R^{sc} mutation and the topographical arrangement of the components of R-stippled were the main objects of investigation.

Major reductions in paramutagenicity among R^{sc} mutants from $R^{st}R^{st}$, $R^{st}R^{nj}$, and $R^{st}R^{nj:st}$ combinations were found in the class of mutants that arose in conjunction with recombination. Reductions among the noncrossover mutants were small. When exchange in the R region was suppressed by a closely linked heterochromatic knob, or precluded in the case of R^{st} hemizygotes, the reductions were minor and infrequent. The association between recombinant origin of the R^{sc} mutants and major

reduction in paramutagenicity is accounted for by intralocus crossovers which simultaneously separate the seed pigmenting component ($\underline{Sc}$) from an instability factor ($\underline{I}^R$) and fractionate the paramutagenic component.

Three types of crossover derivatives were obtained from $\underline{R}^{st}\underline{R}^r$ plants: (1) unstable plant color (green to red mutations), near-color-less aleurone, (2) $\underline{r}^r$, near-colorless aleurone and (3) $\underline{r}^r$, colorless aleurone. The medium to strongly paramutagenic $\underline{R}^{sc}\underline{R}^r$ combinations yielded the second and third types of derivatives at combined rates equivalent to the total of the three types of derivatives from $\underline{R}^{st}\underline{R}^r$. The strongly paramutagenic $\underline{R}^{sc}\underline{R}^r$ heterozygotes gave more $\underline{r}^r$ near-colorless than colorless derivatives. As the paramutagenicity of the $\underline{R}^{sc}$ allele heterozygous with $\underline{R}^r$ decreased, however, the frequency of the near-colorless derivatives decreased and that of the colorless increased. Only $\underline{r}^r$, colorless crossover derivatives were obtained from the very weakly paramutagenic and nonparamutagenic $\underline{R}^{sc}\underline{R}^r$ combinations, and at rates of approximately one-half the total rate of crossover derivatives from $\underline{R}^{st}\underline{R}^r$. All crossover $\underline{r}^r$, colorless aleurone derivatives from $\underline{R}^{st}\underline{R}^r$ and $\underline{R}^{sc}\underline{R}^r$ heterozygotes were nonparamutagenic. Most of the near-colorless derivatives were paramutagenic at various levels, all weaker than the respective parent $\underline{R}^{st}$ or $\underline{R}^{sc}$ allele. One $\underline{r}^r$ near-colorless derivative from $\underline{R}^{st}\underline{R}^r$ and one to three similar derivatives from each of five $\underline{R}^{sc}\underline{R}^r$ heterozygotes were nonparamutagenic. The average level of paramutagenic action of the near-colorless derivatives was stronger when derived from strongly paramutagenic $\underline{R}^{sc}\underline{R}^r$ than from weakly paramutagenic $\underline{R}^{sc}\underline{R}^r$ combinations.

The present paramutation and recombination data support the conclusions that $\underline{R}$-stippled carries two aleurone pigment determiners ($\underline{Sc}$) and a near-colorless component ($\underline{Nc}$), with the paramutagenic potential distributed along the length of the chromosome segment between ($\underline{Sc}$) and ($\underline{Nc}$). The instability factor maps approximately in the middle of the paramutagenic component and was shown to be transposable. The paramutagenic segments in the ($\underline{Sc}$)--($\underline{I}^R$) and ($\underline{I}^R$)--($\underline{Nc}$) intervals seem to consist of many repeats of a basic unit or a small segment.
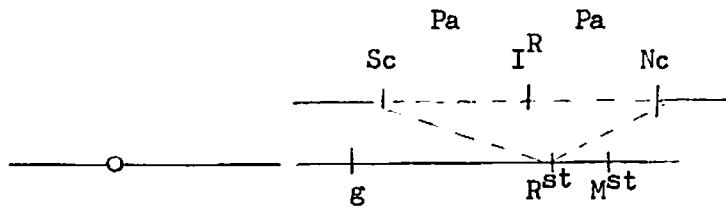
Pa = paramutagenic determiners

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2. **Correction of a published statement concerning a supposed new class of paramutable R alleles of Andean origin.**

It was reported in an article entitled "Geographic distribution of paramutable and paramutagenic $\underline{R}$ alleles in maize" recently published (Genetics 61:677-695) by W. J. Van Der Walt and the writer that certain $\underline{R}$ alleles of Andean origin undergo a reduction in pigmenting potential on passage through heterozygotes with standard $\underline{R}^r$. It was concluded at the time that these Andean alleles represented a previously unrecognized class of paramutable $\underline{R}$ factors.

Later tests have not confirmed this claim. The mistake is probably attributable to two circumstances: (1) the Andean $\underline{R}$ alleles in question appear to be subject to significant variation in expression from season to season, in contrast to standard $\underline{R}^r$ and (2) the testcrosses of the controls (homozygous Andean $\underline{R}$ $\underline{R}$ and Andean $\underline{R}/\underline{r}$ ♂♂) and of the heterozygotes of Andean $\underline{R}$ with standard $\underline{R}^r$ on which the published report was based were made in different years.

Adequately controlled testcrosses with three of the Andean $\underline{R}$ alleles in question were made in 1969. The results clearly showed no effect of heterozygosity for standard $\underline{R}^r$ for either one or two generations on level of Andean $\underline{R}$ action.

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