Table 1
Translocation stocks used in crosses designed to determine the location of the $\underline{E}_4$ gene in the maize genome

Translocation	Breakage Points	$\underline{E}_4$ Esterase Genotype
$T_{1\text{-}9c}$	(1S.48; 9L.22)	$\underline{E}_4^D/\underline{E}_4^D$
$T_{2\text{-}9b}$	(2S.18; 9L.22)	$\underline{E}_4^E/\underline{E}_4^E$
$T_{3\text{-}9c}$	(3L.09; 9L.12)	$\underline{E}_4^D/\underline{E}_4^D$
$T_{4\text{-}9g}$	(4S.27; 9L.27)	$\underline{E}_4^E/\underline{E}_4^E$
$T_{5\text{-}9a}$	(5L.69; 9S.17)	$\underline{E}_4^D/\underline{E}_4^D$
$T_{6\text{-}9b}$	(6L.10; 9S.37)	$\underline{E}_4^D/\underline{E}_4^D$
$T_{7\text{-}9a}$	(7L.63; 9S.07)	$\underline{E}_4^D/\underline{E}_4^D$
$T_{8\text{-}9d}$	(8L.09; 9S.16)	$\underline{E}_4^D/\underline{E}_4^D$
$T_{9\text{-}10b}$	(9S.13; 10S.40)	$\underline{E}_4^F/\underline{E}_4^F$

John W. Harris

6. Association of crossing over and production of unstable $\underline{a}^p$ alleles.

The $\underline{a}^p$-D35 allele arose in two steps from an $\underline{a}_1$ exposed to Dt: $\underline{a}_1$ $\xrightarrow{Dt}$ A:D2 $\xrightarrow{Dt}$ $\underline{a}^p$-D35 (Neuffer). In the absence of Dt, the $\underline{a}^p$-D35 allele gives a uniformly faint aleurone color; if Dt is present, dots of deep color are formed, as well as sectors of intermediate color, on a pale background. A stock of $\underline{a}^p$-D35 without Dt was obtained from Neuffer and crossed with a $T2\text{-}3\text{-}\underline{a}_1\text{-}\underline{sh}_2$ stock also without Dt, obtained from Laughnan. F_1 plants of $\frac{N\ a^p\text{-}D35\ Sh}{T\ a\ \ \ sh}$ dt dt constitution were testcrossed by N-a-sh dt male parents and the 34 resulting ears were scanned for colored shrunken crossovers. One ear produced two sh kernels that were pale colored. With the exception of one A sh kernel, a possible contaminant, these were the only colored shrunken crossovers detected on the 34 testcrossed ears. Some of the pale sh kernels are probably overlooked because of similarity to colorless sh. The two pale sh kernels mentioned above had fairly deep aleurone color. Both individuals proved to be heterozygous for the translocation; i.e. they arose by a double crossover in the F_1. Self pollinations of the two plants gave ears segregating pale and colorless seeds, all of which were shrunken. Many of the pale seeds had one or two very small dots of color; these are apparent on sh seeds only after careful scrutiny, usually with a dissecting microscope. The original two kernels were not closely examined for dots, but the pale Sh kernels on the

same ear have been inspected and no dots are present. Furthermore, a second backcross of plants arising from these pale Sh kernels has produced no dotted kernels and no obvious pale sh crossovers on 6 ears.

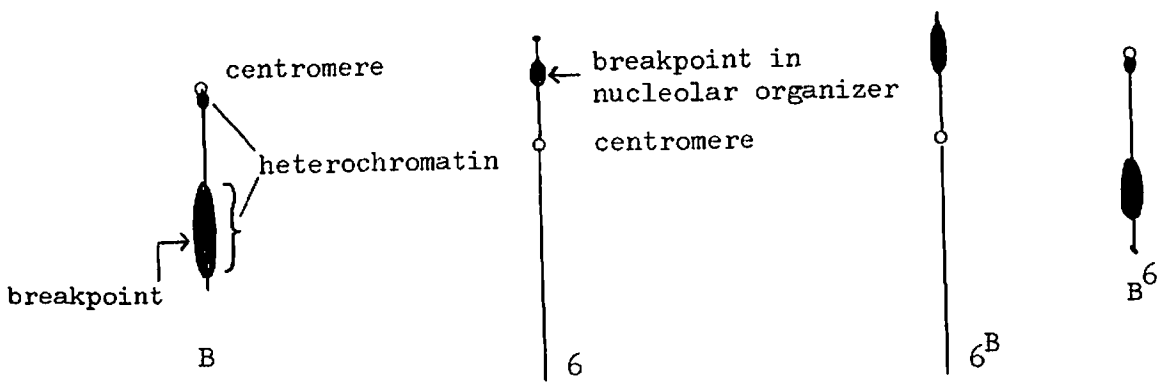
One of the two exceptional alleles (designated a^{p*}) has been studied further. The $\frac{T\ a^{p*}\ sh}{N\ a\ \ sh}$ plant arising from one of the two pale sh kernels was self pollinated and used as male parent in a cross with $\frac{T\ a^{s}\ \ Sh}{N\ a\ \ sh}$ female parents. Both crosses gave pale kernels with infrequent small dots as well as some pale kernels without dots. Backcrosses of resulting $\frac{a^{p*}}{a}$ and $\frac{a^{p*}}{a^{s}}$ individuals revealed that the dotting was a property of the a^{p} allele and not due to an independent mutator gene. The pale kernels without dots contain the same a^{p*} allele and appear to be "escapes"; the progeny of plants from such kernels includes dotted pale kernels. There is no evidence of a new Dt factor at the a^{p} locus since the a allele on the homologous chromosomes in the endosperm is unaffected. Kernels of $a/a/a^{p*}$ and $a^{s}/a^{s}/a^{p*}$ constitution contain the same low number of dots (1-3).

Tests are underway to determine whether unstable a^{p} alleles will arise in F_1's of a^{p}-D35/a^{s} constitution as well as in a^{p}-D35/a plants. If the associated double crossover is a prerequisite for instability, some mutable component of the a allele (or the allele itself) may be included in the mutable a^{p} allele. If this is the case, no unstable pales should arise from F_1's involving the a^{s} allele. Another cross will test whether the stable a^{p} can be recovered from the unstable a^{p} following various crossovers.

Ellen Dempsey

7. Cytological location of rgd on chromosome 6.

One of Roman's A-B translocations, TB-6a, was used in an attempt to determine the cytological location of ragged (rgd) on chromosome 6. The breakpoint in chromosome 6 is in the nucleolar organizer region (Roman and Ullstrup, Agron. J., 1951).



Hypoploid plants of the constitution 6^{By} 6 ^{By} B^{6} (as determined by root tip examination) were transplanted to the field in May of 1967. They were crossed as male parents with plants that were phenotypically Y Rgd. The genotype of the female parent was determined by self-pollinating the