point mutant as opposed to the more common chromosomal mutations induced by chemical mutagens in maize.

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3. Genetic properties of an atypical chromosome 10.

In previous notes (MNL 45: 115-119 and 46: 120-122) the nonrandom transmission of a chromosome 10 was described. From the crosses made with the trisomic condition, it appeared as though the lower frequency of transmission of that chromosome was the result of an abnormal pairing at meiosis and of male gametophyte competition. It was suggested that an unfavorable chromosomal condition, linked to $\underline{R}^{st}$, the marker used to follow this chromosome, was the cause of the low recovery of two classes ($\underline{R}^{st}$ and $\underline{R}^{nj}\underline{R}^{st}$) in reciprocal crosses involving putative trisomic parents ($\underline{R}^{nj}\underline{R}^{st}\underline{r}$) and a tester ($\underline{rr}$).

The linkage mentioned was confirmed since such crosses produced 41 progenies in 40 of which the situation remained unchanged, while in one, two doses of this abnormal chromosome were apparently present, respectively marked by $\underline{R}^{st}$ and by $\underline{R}^{nj}$. The individual found with two such chromosomes is believed to be the result of recombination between the marker and the chromosomal condition, involving an abnormal and a normal chromosome, followed by the recovery of two abnormal chromosomes in the same spore. The low recombination frequency is probably the result of both physical linkage and nonrandom pairing, similar to that observed by Dr. Rhoades in K10, k10, k10 individuals (Preferential Segregation in Maize, in "Heterosis," 1954). Out of the 41 putative trisomics tested, four gave no transmission of the marker $\underline{R}^{st}$, while two gave no transmission of the marker $\underline{R}^{nj}$. In the first four cases $\underline{R}^{nj}$ was transmitted in typical disomic ratios, while in the other two cases $\underline{R}^{st}$ was transmitted at a much lower

frequency than the allele r. These six cases were regarded as the result of nondisjunction of one of these chromosomes in the second microspore division, which could explain the noncorrespondence between the endosperm and the embryo, although other mechanisms may be the cause of loss of one of the markers, such as somatic nondisjunction, chromosome breakage eliminating only the marker, etc.

The abnormal chromosome, marked by $\underline{R}^{st}$, was removed from the trisomic condition and its transmission was observed in the disomic condition, i.e., in plants where this chromosome was present together with a normal chromosome marked by r.* A few individuals regarded as disomic $\underline{R}^{st}$ r were reciprocally testcrossed to an rr tester, and the results are given in Table 1 and in Table 2. From the data reported here and in the earlier notes, it appears that the chromosome marked by $\underline{R}^{st}$ is constantly transmitted at a lower frequency regardless of the chromosomal condition, whether trisomic or disomic.

Table 1

Progeny of the cross $\underline{R}^{st}$ r x rr

$\underline{R}^{st}$	r	Total	% $\underline{R}^{st}$	s.e.
58	175	233	25.0	2.84
48	151	199	24.1	3.03
94	277	371	25.3	2.26
164	130	294	55.8	2.89
115	334	449	25.6	2.06
80	214	294	27.2	2.59
72	168	240	30.0	2.96
174	155	329	52.9	2.75
220	120	340	64.7	2.59
70	218	288	24.2	2.52
37	101	138	26.8	3.77
1,132	2,043	3,175	35.6	0.85

*Since the disomic condition was not ascertained cytologically in all plants, the possibility exists that some of these $\underline{R}^{st}$ individuals have the genotype $\underline{R}^{st}$ r r (trisomic).

Table 2

Progeny of the cross $\underline{rr} \times \underline{R^{st}r}$

$\underline{R}^{st}$	$\underline{r}$	Total	% $\underline{R}^{st}$	s.e.
44	260	304	14.5	2.02
31	374	405	7.6	1.32
47	373	420	11.9	1.58
94	236	330	28.5	2.48
56	347	403	13.9	1.72
3	24	27	11.1	6.04
34	455	489	6.0	1.07
76	332	408	18.6	1.93
227	285	512	44.3	2.19
36	481	517	7.0	1.12
44	316	360	12.2	1.72
692	3,483	4,175	16.6	0.57

Cytological observations were made on root tip metaphases. The abnormal chromosome appears sharply different from a normal chromosome 10, in that 1) it shows a long arm exceeding by more than 30% the length of the long arm of the normal chromosome and 2) the long arm is club-shaped with a constriction at .35-.40. This chromosome looks quite similar to the well known K10. The similarity with K10 is supported by the frequent exclusion from pairing and by the lower recombination frequency in the region distal to R. However, a remarkable difference between the two is apparent in the genetic behavior of this chromosome, namely its low transmission and the male gametophyte effect. Sporocytes have not been studied yet.

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4. Nondisjunction and preferential fertilization in balanced and hyperploid structural heterozygotes for the translocation TB-9b.

Nondisjunction of the B^9 chromosome in the presence of the 9^B chromosome occurs at highly variable rates in the second pollen mitosis, while preferential fertilization of the egg by hyperploid sperm occurs at more constant rates. The data of various investigators were briefly reviewed by