in testcrosses. The triploid offspring coming from these crosses were scored for the three marked loci.

el el $\frac{ws\ lg\ gl}{+\ +\ +}$ ♀ X ws lg gl ♂

Triploid Progeny

+ + +	371	10.9% ws_3	ws_3-centromere 39.1% recombination
ws lg gl	28		
ws + +	10	13.3% lg_1	lg_1-centromere 36.7% "
ws lg +	12		
ws + gl	2	17.5% gl_2	gl_2-centromere 32.5% "
+ lg +	0		
+ + gl	30		
+ lg gl	23		
	475		

The recombination values are in the anticipated order and indicate that the method, although laborious, has some merit. It should be pointed out that although the homozygosis percentages were obtained from triploid plants, not all of them had 30 chromosomes. A few of the plants with 29 chromosomes could have arisen from 19 chromosome eggs having only one chromosome 2.

M. M. Rhoades

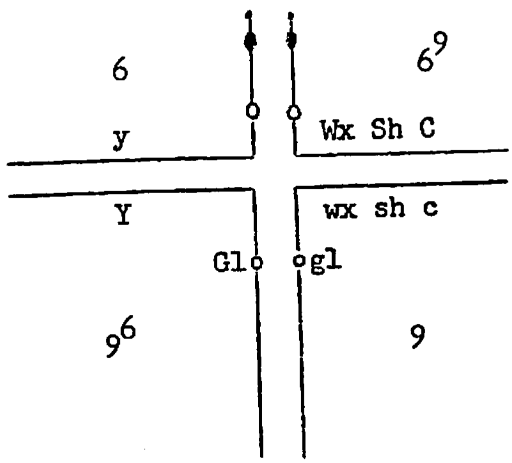
3. Further studies with T6-9b.

Genetic studies with T6-9b (breaks 6L.10-9S.37) reported in previous News Letters have shown that the frequency of recovery of T chromosomes from backcrossed T/N plants is 50% when the heterozygote is used as male parent, but only 31.5% when used as female parent. This observation was confirmed by crossing the translocation stock to five unrelated stocks and testing transmission rates in different backgrounds(Table 1).

Table 1. Transmission frequencies and recombination in T/N pistillate parents carrying N chromosomes from five different sources.

Female parent in B.C.	% T marker	% C-Wx recombination
T/ chr 3 tester	31.3	5.1
T/ chr 9 tester	31.5	2.8
Bl Mex/ T	33.9	5.2
chr 10 tester/ T	34.3	3.8
chr 6 tester/ T	40.2	12.4

Cytological studies of T/N plants have shown a high frequency of chains of four and trivalents due to absence of chiasmata in the 6^9 chromosome (see diagram). In spite of the low recovery of T-bearing spores, there is no increase in ear abortion; the expected 50% frequency of aborted ovules was observed.



In order to explain the differences in ♂ and ♀ transmission of gametes with translocated chromosomes, the following sequence of events is proposed:

Diakinesis configuration	MI orientation	Constitution of microspores	Constitution of megaspores
Rings or chains	1/2 alternate	1/4 T	1/4 T
		1/4 N	1/4 N
	1/2 adjacent	1/2 aborted	1/2 aborted
Trivalent and univalent 6^9	all alternate	1/4T	1/2N
		1/4 N	
		1/2 aborted	1/2 aborted

The difference in the array of ♂ and ♀ gametes on this scheme is attributed to the behavior of cells with trivalents and univalents. It is assumed that the univalent 6^9 chromosome undergoes a delayed equational division at AI and the resulting chromatids are oriented toward the inner poles of the two AII spindles in megasporogenesis. The basal megaspore would then receive either 9 + 6 or 9^6; the former is viable but the latter would abort. In microsporogenesis, four potentially functional spores are produced of constitution 6 + 9, $6^9 + 9^6$, 9^6, and $6 + 9 + 6^9$. The latter two will abort in most cases although occasional transmission of $6 + 9 + 6^9$ occurs in the male gametes. The former two spores, one carrying normal chromosomes and one carrying translocated chromosomes would be produced in equal frequencies unlike the corresponding megaspores. Two cytological observations support this scheme. First the orientation of trivalents at MI in microsporogenesis is almost entirely of the alternate type. Secondly, in sections of developing ears, only the basal megaspore gives rise to the embryo sac. Thus, spore substitution is ruled out. The behavior of the univalent 6^9 chromosome in meiosis has not been carefully followed cytologically. It probably is not lost from the nucleus since pollen from tertiary trisomes carrying 6^9 Wx/ 9 wx/ 9 wx shows about 43% Wx grains.

A trivalent frequency of 40% (32% was observed at microsporogenesis) would lead to 50% ovule abortion and a 30:70 ratio of translocated to normal chromosomes. Since the amount of crossing over in 9S will influence the trivalent frequency, there should be a low C-Wx recombination in plants with the distorted backcross ratio. This is seen to be true in Table 1. In the past few years, some ears have been noted which have 1:1 ratios for the translocated and normal chromosomes. These occur regularly in plants carrying abnormal chromosome 10 (see MNL 33: 55) but also arise occasionally in plants with N 10. One would expect to find a low frequency of trivalents and higher recombination values in such plants.

Last summer backcrosses of T/N X N/N were planted and classified for T. Plants carrying the T were backcrossed again and ears were scored for aberrant segregations and 1:1 ratios. The plants bearing ears with normal ratios more often than not had been derived from a crossover in one of the arms of the T in the previous generation. The distribution of crossover and non crossover parent plants in the two classes of ears is as follows:

132 ears with aberrant ratios	125 non crossovers 4 T-Gl crossovers 3 Sh-Wx crossovers
19 ears with normal ratios	7 non crossovers 2 T-Gl crossovers 7 Sh-Wx crossovers 3 C-Sh crossovers

Eleven of the 19 ears had markers allowing a test of crossing over in 9S. Table 2 shows the % Wx (Wx marks the T) and the Sh-Wx recombination in these eleven plants as well as in two plants with 1:1 ratios from the 1961 season. With 3 exceptions there is a good correspondence of the normal segregation with a high Sh-Wx recombination. The two plants from the 1961 crop were tested again in 1962 and the 1:1 ratios and high crossing over were maintained.

Table 2. Transmission frequencies and recombination in T/N pistillate parents having approximately normal backcross ratios.

	Σ	% Wx (T marker)	% Sh-Wx Recombination	Phenotype of plant
25212	183	47.0	15.8	C Sh Wx gl Y
	125	56.0	25.6	C Sh Wx Gl Y
	130	48.5	3.1	C Sh Wx Gl Y
25225	158	50.6	21.5	C Sh Wx Gl Y
	158	45.6	13.9	C Sh Wx Gl Y
	165	49.1	22.4	C Sh Wx gl Y
25228	209	55.5	25.8	c Sh Wx Gl Y
	184	50.0	22.3	c Sh Wx Gl Y
25232	127	53.5	18.9	C Sh Wx Gl Y
	156	53.8	3.2	C Sh Wx Gl Y
25235	108	41.7	26.0	c Sh Wx Gl Y
24435	190	52.6	22.1	C Sh Wx Gl Y
24450	164	44.5	20.1	C Sh Wx gl Y

A random sample of 12 noncrossover plants from the aberrant ratio class gave a total of 1832 seeds, a Wx frequency of 33.6% and Sh-Wx recombination of 3.8%.

The occurrence of plants with normal backcross ratios in the female is often associated with a crossover in one arm of the T. This may lead to a closer homology of the arms in question, although no striking difference in homology has been observed between the T and N chromosomes. The result, at any rate, is a higher crossing over in 9S, leading to a lower trivalent frequency (not yet confirmed cytologically) and to normal recovery of T and N chromosomes.

Ellen Dempsey

4. Du-Oy linkage.

Some preliminary data from a selfed ear of Du oy/du Oy constitution gave the following classes:

Du Oy	Du oy	du Oy	du oy	Σ
176	75	62	2	315