T4-9 5657-2 (4L.33-9S.25) and in homozygous T6-9e (6L.17-9L.22). In the second case the break is in 9L so a centromere effect is ruled out. No explanation can be advanced at present for the change in recombination frequencies in the homozygous T6-9b.

Ellen Dempsey

4. Test for pseudoallelism at the A_2 locus.

A total of nine possible mutants (A_2) were obtained among 179,500 seeds from crosses of Gl_{17} $a_2^{Bl\ Mex}$ Bt V_2 / gl_{17} a_2^{St} bt V_2 yy ♀ X gl_{17} a_2^{St} bt Pr v_2 y ♂ (see MNL 34, page 65). The phenotypes of these nine individuals and the results from selfing are shown below:

Plant phenotype							⊗ Ear
1	Gl	A	Bt	Pr	Y		seg bt and sh, no v; red cob
2	Gl	A	Bt	Pr	y	(on same ear)	not seg bt or v
1	Gl	A	Bt	Pr	y		seg bt, no v; red cob
*1	Gl	A	Bt	Pr	y		seg bt, seg v; white cob
1	?	A	Bt	Pr	y		(no germination)
1	gl	A	bt	Pr	y		(hoed out)
*1	gl	A	bt	Pr	y		seg v
1	?	A	bt	Pr	y		(no germination)

The two cases which appear not to be contaminants are non-recombinants for the adjacent markers, one being Gl Bt, the other gl bt. They probably represent mutations of a→A. The reverse mutation rate of the two a alleles used in the experiment has not been tested. This experiment failed to demonstrate intra-cistron recombination.

Ellen Dempsey

5. Evidence for the chiasma theory of metaphase pairing.

On the chiasma theory of metaphase pairing post-diplotene association is due to the presence of chiasmata which arise from prior crossover events. This theory is believed to be generally valid although in some forms, notably *Drosophila*, other mechanisms are responsible for association of the two homologues until anaphase separation. There is, however, considerable evidence in maize which indicates the essential correctness of this theory. Data of two kinds are available.

The first is purely cytological and comes from the study of plants trisomic for chromosome 6 with and without abnormal 10.

% trivalents		% of trisomic progeny as ♀ parent	
N10 N10	Abn10 N10	N10 N10	Abn10 N10
74%	87%	36%	45%

The argument is clear. Abnormal 10 increases crossing over; this is reflected in an increased number of chiasmata. More chiasmata mean an increase in number of trivalents which in turn leads to a greater number of n+1 megaspores since disjunction of a trivalent usually gives equal numbers of n and n+1 spores.

Data of a different sort comes from studies of plants heterozygous for T6-9b with and without abnormal 10. Plants with abnormal 10 have more genetic crossing over than do N10 N10 sibs; they have more chiasmata as shown by the higher percentage of rings of 4 and by the drastic reduction in trivalent frequency. The cytological observations and genetic data, shown in the following table, are consistent with the theory that chiasmata are essential for metaphase association.

	% rings	% chains	% trivalents	Sh-Wx recomb. in ♂ B. C.
N10 N10	19.4	48.4	32.2	11.5
Abn10 N10	68.8	30.4	0.8	24.0

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6. Genic interaction with the mutant plastids induced by the iojap gene.

In 1943 I reported that the iojap gene induced plastid mutations which were irreversible. However, Mazoti (1950) found that strains of maize carrying the R allele gave only green progeny when used as the pollen parent onto iojap silks, while strains with the r^r allele gave green and colorless seedlings. Mazoti's results suggested that the expression of the mutant plastids was subject to genic control and that restorer genes existed. This would parallel the finding of restorer genes for male sterile cytoplasm. We have confirmed Mazoti's conclusion that some strains of maize yield only green seedlings while others give varying proportions of whites when crossed onto iojap ears, although it is questionable that the R locus is involved. This past summer ten different lines were used as the pollen parent in crosses with iojap. Five of the ten strains gave only green seedlings while the remaining five gave progenies with both green and white seedlings. The presence of restorer genes in the lines failing to yield white seedlings will be tested this summer in the following manner. If some of the egg cells of the iojap plants possessed