is much greater than that between $\underline{Y}_1$ and the break point in chromosome 6, it is reasonable to assume that most of the observed crossing over takes place in the chromosome 9 segment and that $\underline{Y}_1$ is located cytologically very close to the break point in 6 (L .18).

These data establish that the centromere on 6 is definitely to the left of the $\underline{Y}_1$ locus.

The attachment of a segment of chromosome 6 to chromosome 9 has resulted in a marked decrease in crossing over in the wx-break point region. Linkage data reported at the annual Maize Genetics Conference indicate that the distance between wx and $\underline{gl}_{15}$ (located cytologically at L .1) is 15 units. Since the T6-9e break point (L .24) is distal to $\underline{gl}_{15}$, a minimum of 15% crossing over would be expected between wx and $\underline{Y}_1$ in a homozygous translocation. The observed value of 2.8% represents a considerable reduction in crossing over.

Rhoades (1960, Maize Genet. Coop. News Letter 34:67 and 1966, Maize Genet. Coop. News Letter 40:60-62) reported that the insertion of a duplication for chromosome 3 between bz and wx reduced crossing over between these two loci rather than increasing it as apriori considerations might suggest, since the length of chromosomal material was being increased. However, he did find increased crossing over in the $\underline{C}$-$\underline{sh}_1$ and $\underline{yg}_2$-$\underline{C}$ regions. This latter effect would rule out the possibility that the presence of the homozygous break points somehow acts to reduce crossing over or that the presence of homozygous foreign chromatin of necessity reduces crossing over in adjacent regions.

Contrary to Rhoades' observations, the attachment of a segment of chromosome 6 to the long arm of chromosome 9 creates a marked reduction in crossing over in the region adjacent to the break point in the homozygous translocation. It would be of interest to determine how the presence of this homozygous segment of chromosome 6 affects crossing over between other genes located in the wx-break point region and if this effect extends beyond the wx locus, and also, if a similar reduction in crossing over is observed in chromosome 6. Anderson, Kramer, and Longley (1955, Genetics 40:531-538) found that heterozygous translocation involving the long arm of chromosome 6 often exhibited a marked suppression of recombination in the region between Y and Pl. The work reported here suggests that this suppression may be due to more than just the poor pairing expected in a heterozygous translocation but might involve an effect due to transferring the long arm of 6 and to a foreign environment.

Donald S. Robertson

2. A new opaque gene located on chromosome 7.

This mutant was given me by Dr. Brawn of MacDonald College of McGill University. In his stocks the seeds had pale yellow endosperm which produced yellow-green seedlings when germinated.

The apparent pale color is evidently not the result of less pigment but rather is due to a difference in endosperm texture that, in a flint or dent background, produced an opaque phenotype. The appearance of this

mutant's endosperm is variable. The most common phenotype is that of a typical opaque; but frequently the seeds will be decidedly shrunken, approaching *sh*$_1$ in phenotype. In most stocks (dent or flint) the seed classification has been satisfactory.

The seeds, when planted at about seventy degrees Fahrenheit, produce yellow-green seedlings which are easily distinguishable from normal siblings. Seedlings grown at higher temperatures (e.g. about ninety-five degrees Fahrenheit) will approach normal pigmentation. Under field conditions these seedlings are viable, and stands comparable to normal are common. The mature plants are a foot or two shorter than their normal siblings and mature about a week later. The symbol *o*$_5$ has been given this mutant.

Testcrosses heterozygous for *o*$_5$ and a series of chromosome 9 translocations gave indications of linkage only with T7-9a (7L.63, 9S.07) (Table 1). Although the data are meager, they are sufficient to indicate that the gene is located on chromosome 7. No indication of linkage was found with waxy.

Table 1

Testcross progeny of *wx* *T7-9a* + / + + *o*$_5$ x ++ ++ *o*$_5$*o*$_5$

T +	+ *o*$_5$	T *o*$_5$	+ +	Total	% recombination
29	32	3	6	70	12.86

Allele tests with *o*$_2$, which is also on chromosome 7, were negative. This is an excellent new marker that can be used either as an endosperm or seedling trait.

Donald S. Robertson

3. Electron microscopy study of plastid development in dim light grown seedlings of *w*$_3$, *pas*$_{8686}$, *lw*$_1$, and *cl*$_1$.

As part of a larger project involving genetic, biochemical, and cytological studies of mutant seedlings of maize, we have been using electron microscopy to study plastid structural differentiation. The white-albino, *w*$_3$; its pastel allele, *pas*$_{8686}$; and their heterozygote (*pas*$_{8686}$/*w*$_3$) were grown, along with a normal control, in the dark for eleven to fourteen days at 26.6 degrees C. The seedlings were illuminated with 2,000 foot candles of light and samples taken in the dark and at intervals up to twenty-four hours after illumination. (Results of these experiments were discussed in last year's News Letter and presently a more detailed report is in preparation for publication.) Tissue was fixed with 3% glutaraldelhyde, post-fixed with 1% osmium tetroxide in phosphate buffer, dehydrated in an alcohol series, embedded in Epon 812 and sectioned on a LKB microtome with a diamond knife. Sections were