bifunctional locus. The latter model was proposed by Coe (1964) because he did not obtain the crossovers expected on the basis of the compound locus model. While this may be the case, the dominance behavior of (the mutation) I appears to be somewhat similar to the so-called super-repressed mutations of the regulator gene (R^S type) in E. coli which when heterozygous (R^S/R^+) are unable to synthesize the enzyme (B-galactosidase). This is a very striking result from the genetic point of view since an R^S mutation corresponds to a dominant loss of function (Jacob & Monod in Cytodifferentiation and Macromolecular Synthesis, Academic Press, 1963).

The data to be presented here were collected with a view to study similarities and differences between I and C in regard to their direction of mutation, mutation rates, and any other information which would have a bearing on the above models. Our observations are summarized in Table 2. The following points are noteworthy:

(1) There is a very high proportion of non-concordant changes of I. In contrast no such class was observed from C, Sh and Wx mutations.

(2) The direction of mutation of I is only to i (phenotypically indistinguishable from c) never to C. These findings are similar to those of Coe (1962) for the direction of spontaneous mutation of I.

(3) The mutation rates of I and C are apparently dissimilar but the data are insufficient on this point.

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3. A new gametophyte factor on chromosome 9.

Drastically reduced pollen transmission for the factors located on the short arm of chromosome 9 was observed following, apparently, a spontaneous mutation of a Ga factor to ga. I was transmitted to the extent of about 1%, Sh about 3%, Bz about 4%, and Wx about 10%. No reduction in transmission of these factors was noted in the reciprocal cross (Table 3). Assuming 100% non-transmission for the pollen carrying ga and assuming the transmitted gametes as due to crossovers, the locus of ga is placed very close to I and distal to it. Crossing-over between I and Wx is about half the usual value. Its relationship with ga, if any, is not clear at the moment.

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4. High rate of induced change for anther color in maize.

During the course of a study designed to reveal the type of sectorial mutations induced by ionizing radiations and chemical mutagens, homozygous ACR^r (original stock kindly supplied by Prof. R. A. Brink) seeds were irradiated with Co^{60} gamma-rays and ethylmethane sulfonate (EMS). A large number of plants arising from the treated seeds were observed to have green anthers (Table 4). EMS was found to be particularly effective in inducing this change with as many as 103 out of 280 plants showing some

Table 4

Effect of treatment with ethyl methane sulfonate or gamma-rays on anther color of plants grown from A C R^r and A B Pl C R^r homozygous seeds

Treatment	Genotype Homozygous for	No. plants scored	No. plants showing green anthers	Extent of green anther sector (No. of Plants)									
				3 branches affected		2 branches affected		1 branch affected		Spikelets affected			1 anther affected
				Entirely	Partly	Entirely	Partly	Entirely	Partly	4 or more	2	1	
Control	A B Pl R^r	185	1	-	-	-	-	-	-	-	-	-	1
	A C R^r	226	1	-	-	-	-	-	-	-	-	-	1
Seeds soaked 24 hrs. & irradiated 2000r, gamma rays	A B Pl R^r	178	12	-	-	-	1	-	-	-	-	6	5
	A C R^r	401	15	-	1	1	2	-	4	1	-	2	4
Treated with 0.01M EMS 24 hrs.	A B Pl R^r	123	26	-	-	-	-	-	-	-	-	20	6
	A C R^r	280	103	1	4	2	5	4	41	2	13	11	20

change. Forty-four of the changed plants were examined for pollen fertility. In general the pollen fertility was higher in red anthers than in the green ones. Similar changes were observed with the A B Pl R^r homozygous stock but the incidence was much lower and the sectors very much smaller.

These observations are not readily explained in conventional terms. Since the colored anther color phenotype is dominant over the green anther phenotype, a simultaneous mutation or deletion of the P component of R^r locus would have to occur in both chromosomes to manifest this change in the first generation. This is highly improbable from what we know of the mutation rates of certain gene loci. The determination of the basis of this change must await further work.

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1. Male-sterility as affected by seed storage.

Seed of Llera III, a derivative of the Tuxpeno race of maize from Mexico, was produced by sib pollination during the 1963 winter at Hyderabad. During summer 1965 a yield trial was planted at Indian Agricultural Research Institute, New Delhi, in which Llera III was one of the entries. While taking notes on various characters it was observed that Llera III had 2.9 per cent male-sterile plants. The anthers of the male-sterile plants were shriveled and there was no pollen formation in any of the anthers. When a random sample from the same seed lot of Llera III, which was increased at Hyderabad during the 1963 winter, was grown at the Birla Institute of Scientific Research, Rupar, during the 1967 summer, 12.5 per cent male-sterile plants were observed--an increase of 9.6 per cent over what was observed in 1965 summer.

Two possibilities seem to have given rise to an increased percentage of male-sterile plants during the 1967 summer, when the source of seed for both the years of study happened to be the same. Either there has been inadequate sampling during the 1965 study or else the seed storage for another two years has resulted in an increase of male-sterile plants in the population. Such a storage effect has been noted in mutation studies.

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1. Analysis of variation of an autodiploid strain of maize by means of diallel cross analysis.

In genetic studies, especially for quantitative characters, it is sometimes very important to have available strains with an homogeneous genotype;