aleurone sectors showing Dt activity; sectors of Dt^{in-ac} reactivation were found only on kernels with dotted scutella. The 3 : 5 ratios for kernels with dotted: dotless scutella on the four remaining ears of Table 3 (Nos. 2-5) were attributed to the segregation of a scutellar color factor in both parents. Nevertheless, sectors of Dt^{in-ac} reactivations were found mainly on kernels with dotted scutella. The dotless scutella of the four exceptional kernels (last column, Nos. 2 and 5) were not unexpected since a scutellar factor was presumably segregating in addition to Dt^{in-ac}. It was concluded that inactivations of Dt^{in-ac} followed by occasional reactivations were tissue-dependent, occurring in the aleurone but not in the scutellum. Thus, kernels with colorless scutella (with the proper scutellar factor constitution) were assumed to be of dt dt dt constitution.

Preliminary crosses show independent inheritance of yg_2 and Dt^{in-ac} suggesting that Dt^{in-ac} was derived from Dt_1^{TB} rather than Dt_1. No tests of Dt_1^{TB} and Dt^{in-ac} allelism have been made, however.

Reversals of phases of activity were found for the regulatory element Spm (McClintock, B. 1961. Am. Nat. 95: 265-277). Alternations of phase occurred during any period of the life cycle and were interpreted to be autonomously controlled by Spm. The active and inactive phases of $En^{(crown)}$ or $En^{(flow)}$, however, were associated with specific areas of the aleurone (Peterson, P., 1966. Genetics 54: 249-266). Dt^{in-ac} has characteristics in common with both $En^{(crown)}$ or $En^{(flow)}$ and Spm. Random reversals of phase occurred in a single tissue (the endosperm), but such fluctuations were a property of the endosperm and not of the scutellum where Dt^{in-ac} was fully active.

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1. Survival of Maize Borer (Chilo partellus Swinhoe) Larvae and Varietal Resistance in Maize.

Maize borer is the most devastating insect pest of maize in West Pakistan. It is very active from March to July after which it starts to hibernate. Sporadic attack, however, continues till the end of November but damage done from August onwards is not very severe. It is due to the ravages of this pest that the growing period of maize in West Pakistan has been relegated to the fag end of the long summer season and the farmers are forced to plant short duration varieties because the crop planted earlier in the season is completely destroyed by this pest. A late sown crop often does not mature in time for planting wheat that is supposed to follow maize in the same field. Consequently, early maturing varieties are planted that in general give low yields. Recently high yielding composites containing Central and South American germ-plasm have been introduced in some parts of West Pakistan. These varieties are late maturing, therefore have to be planted early in the season with the result that very intensive plant protection measures are required to save them from borer attack. Obviously in a developing country like Pakistan,

it is not feasible to provide adequate plant protection facilities to all the farmers in the villages; therefore use of late maturing varieties will remain restricted. It was therefore considered necessary that efforts for the development of high yielding varieties that are resistant to maize borer attack should be intensified.

Controlled experiments were conducted on feeding of larvae (Chilo partellus Swinhoe) on the leaves of the following varieties both in the spring as well as in the normal crop season. These varieties were selected on the basis of differential survival of plants under natural infestation in the field. Percentage survival of plants recorded in the field during the previous season for each of the selected varieties as compared to double cross hybrid 59 is given.

Varieties.	Percentage survival of plants under natural infestation in the field.
Antigua Gr I	60.9
OH45	60.2
Antigua Gr II	47.2
Caribbean (Composite)	46.3
Renala (West Pakistan)	44.0
J-1 (Composite)	40.3
Double Cross Hybrid No. 59	24.2

Larvae of the same brood were collected from the field immediately on hatching and released on the leaves of different varieties kept in specimen tubes. Seventy such tubes were kept in each case. Fresh succulent portions of the leaves were put in the tubes after every twenty-four hours. The open end of the tube was covered by muslin cloth held in position by a rubber band. Only one larva was reared in each tube. The number of larvae that survived and pupated was recorded. The size of larvae was also measured and recorded on every alternate day with a view to ascertaining the differential growth rate of the larvae feeding on the leaves of different varieties. This experiment was conducted during the month of July on the normal season crop. Results obtained from these preliminary experiments are given below:

Survival and mortality of Chilo larvae fed on the leaves of different varieties

Variety.	Percentage of larvae survived and pupated.
Spring crop.	
Double Cross Hybrid No. 59	100.0
J-1 (Composite)	80.5
Caribbean (Composite)	79.3
Renala (West Pakistan)	70.4
Antigua Gr. II	69.5
OH45	49.5
Antigua Gr. I	49.5
Normal season.	
Double Cross Hybrid No. 59	100.0
J-1 (Composite)	79.5
Caribbean (Composite)	80.7
Renala (West Pakistan)	69.6
Antigua Gr. II	70.5
OH45	49.5
Antigua Gr. I	51.5

The results given in the above table show that observations made in the normal season corroborate those recorded in the spring. Double cross hybrid 59 was the most susceptible variety while OH45 and Antigua Gr I were the most resistant types of the varieties under study. Caribbean and J-1 composites also appear to contain some resistance against the pest. These results also confirm the original observations in the field.

Differential survival of larvae when fed on the leaves of various varieties appears to indicate some sort of genetic resistance in maize against Chilo partellus Swinhoe. One hundred per cent survival of larvae when fed on the leaves of double cross hybrid No. 59 shows that the conditions in the laboratory for the growth and development of the

larvae were quite congenial. The 50% mortality of larvae fed on Antigua Gr I and OH45, against 100% survival in the case of variety No. 59 under the same laboratory conditions, justifies the conclusion that there is definite genetic resistance in maize against Chilo partellus Swinhoe. It is difficult to say anything about the exact nature of the resistance at this stage.

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1. Heritability of repressed R expression noted in R^6R^6R aleurone cells.

In Vol. 41 (under Washington University) we reported a high level of repression for R when introduced into aleurone tissue of an R^6R^6 (paramutated for six generations with R^{st}). The lightest kernels (R^6R^6R) were selected for planting in 1967 to test the heritability of the observed repression of R. Table 1 shows that the selected lightest phenotypes observed the previous year scored the same as unselected kernels in the testcrosses in 1967 (for testcross methods see our previous reports). Following the mating R^6R^6 x RR, it can be concluded that the degree of repression of R in the presence of two R^6 chromosomes in the aleurone cannot be used to select for lighter phenotypic expression in the sporophyte. Several points may be noted:

(1) Under the conditions of this experiment, specific levels of pigment expression in the endosperm phenotype will not identify a specific level of pigmentation for the testcross of the sporophyte included in the seed.

(2) The repression effect of R^6, when the lightest mottle kernels are selected, is a "preview" of the general level of secondary paramutation from R^6 to be observed when the R^6R "heterozygotes" are planted out and testcrossed the following year.

(3) The degree of "immediate" paramutation (repression) in the R^6R^6R was greater than that in the $R^{st}R^{st}R$ (Vol. 41) though in the following generation the effect of the standard R^{st} on R was greater than that of R^6 on

(4) The degree of paramutation on R from R^6 is of the order of that encountered with a weakly paramutagenic R^{st} allele.