The largest population continued to show a substantial increase in yield but the populations associated with three plants per hill yielded lower than expected from those populations involving two plants per hill. The moisture percentage at harvest was quite variable.

R. H. Peterson

2. The inheritance and linkage relationships of factors controlling a long mesocotyl type.

A study is under way to determine the mode of inheritance and linkage relationships of factors controlling the long mesocotyl type common to Indian corns from the Southwest. A stock averaging 24 mm (from germ face to first node) was crossed to nine inbreds (direct extractions from a number of open-pollinated varieties) and a set of chromosomal interchanges. The agronomic possibilities of this trait are being considered.

A. Forrest Troyer

3. Location of fertility restorer genes A and B in inbreds A293 and K55 using translocation stocks with $Wf9^t$ as a tester.

This study was initiated to determine the number of and locations of the fertility restorer genes in inbreds A293 and K55. Fertile segregates of $Wf9^t$ x ($B164^t$ x A293) $A286_2$ - 2 and $Wf9^t$ x ($Tx61^t$ x K55) $A286_2$ - 4 were crossed with 28 different translocations involving all arms of the chromosomes. The fertile plants with translocations from these crosses were crossed onto $Wf9^t$. A linkage study will be made in 1957.

Based on work of other investigators, it was hypothesized that the fertility restoration in these inbreds was the function of 2 complementary genes. The expected phenotypic ratios for the hypothesis are as follows:

[($Wf9^t$ x A293) $A286_2$-2] AaBb x aaBB (TRANSLOCATION STOCKS)

↓

	AaBb + AaBB (Fertile-use)	+	aaBB + aaBb (sterile-discard)
($Wf9^t$) aabb x AaBb ⟶	1 AaBb (Fertile)	+	1 Aabb + 1 aaBb + 1 aabb* (Sterile)
($Wf9^t$) aabb x AaBB ⟶	2 AaBb (Fertile)	+	2 aaBb (Sterile)

* Data to be used for recombination test for B.

Fertile and sterile classes should consist of equal number of normal and semi-sterile plants where no linkage exists between the restorer genes and the translocation breakpoints.

Frank M. Remley

4. Linkage studies between a fertility restorer gene and genetic markers both in the presence and absence of translocations.

A recombination figure of 28% was obtained for the A293 fertility restorer gene and translocation 1-3 (5982-2) which has breaks in the short arm of chromosome one and about .66 of the distance out in the long arm of chromosome three. A recombination value of 5.4% was obtained between the A293 fertility restorer gene and translocation 1-3 (5883-1) which has breaks in the short arm of chromosome one and about .65 of the distance out on the short arm of chromosome three. These data indicated that the A293 fertility restorer gene is in the short arm of chromosome one. However allelic tests with other sources of fertility restoration which have been located in chromosome three have led to further studies.

The A293 source of fertility restoration has been crossed with several genes in chromosomes one and three which include in various combinations: sr, zb_4, br, d_1, Rg, ts_4, na and lg_2. The recombination results will be obtained in the summer of 1957.

A test is being made to determine if one or both of the translocations reduce crossing over in regions adjacent to the break positions. Crosses were made between plants which were heterozygous for both the fertility restorer gene and the translocation and various combinations of the genes previously mentioned. Crosses were also made with plants which did not have the translocation. Testcrosses were made by selecting plants which had both the translocation and the fertility restorer gene and backcrossing them to the appropriate recessive genetic stock. Whenever possible these crosses were made reciprocally. Testcrosses were also made with plants in the same row which did not contain the translocation so a comparison can be made of the effect of the presence of the translocation on the recombination between the fertility restorer gene and the various genetic markers. As the frequency of plants with both the fertility restorer gene and the 1-3 (5883-1) translocation was very low some crosses were also made onto sterile plants so the recombination percentages between the translocation and the genetic markers may be measured. These results will be obtained in the summer of 1957.

Duane B. Linden