The third inversion is paracentric and it is on the long arm of chromosome 5. The length of this inversion is equivalent to about one half of the length of the long arm. At both anaphase 1 and anaphase 2, dicentric bridges and acentric fragments were found in the microsporocyte divisions of these F_1 hybrids. At diakinesis, among 514 cells examined, 11.8 percent of them had two univalents, 0.4 percent of them, four univalents.

Table 4. Length of inversion in chromosome 9 of Nobogame teosinte.

Cell No.	Length in Microns		Percent of Short Arm
	Short Arm	Inversion	
1	19.6	14.2	72.0
2	19.6	11.6	59.0
3	19.0	11.1	58.0
4	22.7	11.0	48.0
Average	20.2	11.9	59.0

The chromosomes of Nobogame teosinte have only a few knobs. Chromosome 7 has a large terminal knob on the short arm. Internal knobs of medium size occur on the long arms of chromosomes 2 and 4. A small internal knob is present on the short arm of chromosome 1 and a small terminal knob on the short arm of chromosome 6.

9. Spontaneous reciprocal translocations.

In a maize strain used as cytogenetic marker in a cross with a progeny of Durango teosinte-maize derivatives which was homozygous for In 8 a case of spontaneous reciprocal translocation was observed. This translocation is designated as T2-8. At diakinesis of the T2-8 heterozygotes 1.0 percent of the sporocytes showed regular behavior for both bivalents 2 and 8, 54.5 percent of them demonstrated a ring of four chromosomes, 12.5 percent of them demonstrated a chain of four chromosomes, and 31.8 percent of them showed other types of irregular behavior. The points of exchange between the long arms of chromosomes 2 and 8 are shown in Table 5.

Table 5. Chromosomes and the points of exchange of the arms involved in two translocation heterozygotes.

Progeny No.	Chromosomes	Chromosomal Designation	
56-68	6 - 7	6L . 17	7L . 23
56-528, 529	2 - 8	2L . 87	8L . 42

Among fourteen plants of selfed progenies of T2-8 heterozygotes six plants were normal in fertility, eight plants were semi-sterile.

A second case of spontaneous reciprocal translocation was found in a progeny of maize-Florida teosinte derivatives. In this translocation, the long arms of chromosomes 6 and 7 were involved. It is designated as T6-7. The points of exchange between the arms are shown in Table 5. Among the eight plants of the selfed progenies of T6-7 heterozygotes, four plants were normal in fertility, four plants were semi-sterile.

A study of the other aspects of the above two reciprocal translocations is in progress.

10. The origin of abnormal chromosome 10 in maize.

During the year 1956 a cytological study was made of a number of F_1 crosses of maize varieties collected from Latin America with inbred strains from the United States. In these F_1 crosses Mangelsdorf had previously found high percentages of aborted pollen and chromosome irregularities were therefore suspected.

At pachytene, B-chromosomes varying from one to six in number were observed in 25 plants from nine crosses. No B-chromosomes were found in eighteen plants from six crosses. In one additional cross not included in the above categories, involving a Peruvian variety as one parent, a B-chromosome was found in two plants, while a third plant in the same progeny lacked the B-chromosome, but was heterozygous for an abnormal chromosome 10.

It was further found that the entire extra piece of heterochromatin attached to the chromosome 10 resembled closely the terminal one third of the B-chromosome found in the two sister plants. This extra piece involved the pycnotic or knob-like region and its adjacent regions on both sides including the terminal spindle fiber attachment region which was often not apparent.

At metaphase 1 of the microsporocyte divisions in the plant heterozygous for this abnormal chromosome 10, secondary centric regions on more than one bivalent were observed in many sporocytes. The number of these secondary centric regions varied from one to four on a single bivalent. At anaphase 1 the continuation of the secondary centric regions was found. Dyads carrying one or more secondary centric regions tended to lead the way poleward in the chromosome movement. The other dyads which did not carry the secondary centric regions showed no aberrant configurations.

At metaphase 2, the secondary centric regions on certain dyads showed precocious poleward movement, and sometimes the arms of these dyads were extensively attenuated. At anaphase 2, the secondary centric regions often imparted a V-shaped configuration to the monads, with the primary centric regions lying toward the equatorial plane.