Family 660 was also segregating for Ts5. The segregation for this character among the three classes for kernel shape was as follows: pointed, 63:59; intermediate, 129:104; round, 57:45. There is no indication in these data of linkage between Ts5 and kernel shape. Therefore if kernel shape is indeed linked with the Su-su and Ga-ga loci as the other data indicate the sequence of genes must be Pt Ga Su Ts5. Additional tests involving backcrosses are being made to determine whether this conclusion is correct.

There is some indication of linkage between kernel shape and development of a staminate tip on the ear. Segregation for presence and absence of a staminate tip among the three classes for kernel shape was in one population as follows: pointed, 8:13; intermediate, 26:20; round, 13:2. If this indication is confirmed by further tests one more primitive character will be added to the list of those, Tu, Ga, Pt, and possibly Ts5, which have their loci on chromosome 4.

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5. Low penetrance of mutant dwarfs arising in teosinte derivatives.

We have repeated the experiments reported earlier (MNL 35) in which mutant dwarfs occurring in teosinte derivatives failed to segregate normally in F_2 populations of crosses with various inbred strains. The data on segregation of dwarfs obtained in 1962 are similar to those previously reported but are now explicable. The ears in F_2 populations in which the parental mutant dwarfs failed to reappear could be classified with respect to their ears into normal, intermediate, and tripsacoid. In 14 F_2 populations in which the dwarfs failed to appear or occurred in low frequencies, the ears were classified as follows: normal, 152; intermediate, 330; tripsacoid, 165.

These data show that the segregation for the tripsacoid condition is approximately normal. In some populations the tripsacoid condition of the ear is accompanied by conspicuous dwarfing of the plants, in other populations it is not.

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6. The tripsacoid nature of variable mutants.

Because the mutants arising in maize-teosinte derivatives are often variable and difficult to classify, it occurred to us that some of the variable mutants arising spontaneously in maize or appearing after inbreeding might have arisen in the same manner and may be tripsacoid

in their characteristics. Accordingly we selected from the characters described in Emerson, Beadle, and Fraser a number of those described as "variable" or "difficult to classify." These were grown in 1962 and the ears were scored with respect to tripsacoid effects, especially the induration of the rachis and lower glumes of the cobs. The following characters proved to be associated with tripsacoid cobs: albescent, brevis, narrow leaf-1, pale green seedling-2, rootless, silky-1, zebra-1, zebra-2, zebra-3, and zebra-4. In several segregating populations the mutants were tripsacoid and normal plants not. Only one character of those studied in 1962, adherent-1, was not associated with tripsacoid effects.

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7. Segregation of genetically marked chromosomes in maize-Tripsacum hybrids.

We have for some years been attempting to produce a hybrid of Tripsacum dactyloides with our WMT stock which has recessive marker genes on seven chromosomes (1, 2, 3, 4, 7, 8, 9). The principal purposes of making this cross were (1) to determine whether Tripsacum carries dominant alleles of the maize recessives; (2) to determine whether Tripsacum, having almost twice as many chromosomes as maize, carries the dominant alleles in duplicate in some cases; (3) to identify cytologically the Tripsacum chromosomes which carry the dominant alleles.

A hybrid plant obtained by employing embryo culture exhibited none of the recessive characters introduced from maize but proved to be completely sterile, probably because of the greater amount of chromosome pairing than had previously been reported in maize-Tripsacum hybrids. The chromosome number of this hybrid was doubled through colchicine treatment (MNL 35). Backcrosses to the multiple recessive maize stock produced 32 triploid hybrids having 20 maize and usually 18 Tripsacum chromosomes. These, like the F_1 hybrids, showed no maize recessive characters with three exceptions: one plant each was bm_2, a and j indicating that one or more Tripsacum chromosomes had in each case been lost. The cytological studies of the triploid which exhibited j showed that three Tripsacum chromosomes were absent.

The triploid hybrid proved to be highly sterile (1.7% fertile) when backcrossed by the multiple recessive stock. Ninety-two plants of the segregating backcross population were obtained. The frequencies of dominants in this population were as follows:

	Maize Chromosome						
	1	2	3	4	7	8	9
Dominant from Tripsacum	Bm_2	Lg_1	A_1	Su_1	Gl_1	J_1	Wx
Frequency of Dominants	34.5	23.9	31.6	28.2	38.0	60.5	37.0