We have crossed the inhibitor with Tu stocks. If it has a similar effect upon these, as it almost certainly will, then the genotype Tu Tu should become more or less similar to $tu^h tu^h$ in ordinary stocks and should not be monstrous.

That a major inhibitor of the expression of genes at the Tu locus, as well as minus modifying complexes, should be found in pop corn varieties, which are primitive in other respects, is highly significant and is probably more than mere coincidence.

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8. Genotypes involving the Tu-tu locus compared in isogenic stocks.

In an earlier News Letter (1953) we compared a number of genotypes involving the Tu-tu locus in characters of the ears and tassels. However, the stocks then available were not completely isogenic and not all genotypes were included. We now have data involving a comparison of six genotypes in isogenic stocks resulting from repeated backcrossing to the inbred A158. These are shown in the table on the following page.

A study of the data show that four profound changes of obvious evolutionary significance are involved in the transition through the genotypes from Tu Tu to tu tu.

A. The terminal inflorescences, the tassels, decline and the lateral inflorescences, the ears, gain in prominence. The fact that the gain in weight of the ears (line 11) greatly exceeds the loss of weight of the tassels (line 1) suggests that the shortened lateral branch is more efficient in laying down dry matter than the terminal inflorescence. Indeed, it may be this fact which renders maize more productive, on the average, than any other cereal.

B. The ratio of pistillate and staminate spikelets in the tassel is drastically changed (line 10).

C. The central spike of the tassel becomes relatively more prominent at the expense of the branches (line 4). Since the ears are the counterpart of the central spike, this change accounts for the fact, previously noted in other studies, that branched ears are more common among tunicate stocks than among non-tunicate.

D. The rachises of both inflorescences become more prominent at the expense of the glumes (lines 6, 8 and 15-16). This is especially significant in the ear, since a large rachis offers a greater grain-bearing surface and at the same time is capable of containing a larger system of supply. These facts are reflected in the increased number and weight of the kernels and the higher shelling percentage (lines 17-19).

A comparison of six genotypes involving the Tu-tu locus in isogenic stocks.

	Characters	Genotypes					
		Tu Tu	Tu tu^h	Tu tu	$tu^h tu^h$	tu^htu	tu tu
1.	Weight tassels, gms	28.9	18.3	12.7	9.2	6.7	4.9
2.	Weight peduncles, cgms	264	220	130	111	109	106
3.	Weight central spikes, gms	6.6	4.8	3.5	2.9	2.1	1.5
4.	Percent: central spikes/ tassel weight	22.8	26.2	27.6	31.5	31.3	30.6
5.	Weight rachises, gms	4.6	2.9	2.1	1.4	1.3	1.1
6.	Percent: rachis weight/ total weight	15.9	15.8	16.5	15.2	19.4	22.5
7.	Weight spikelets, gms	24.3	15.4	10.6	7.8	5.4	3.8
8.	Percent: spikelets/ total weight	84.1	84.2	83.5	84.8	80.6	77.5
9.	Average length glumes, cms	2.7	1.9	1.7	1.4	1.2	1.0
10.	Percent pistillate spikelets	79.9	0.9	0.0	0.0	0.0	0.0
11.	Weight ears, gms		21.6*	59.5	89.7	126.6	125.2
12.	Weight cobs, gms		6.4*	20.6	24.5	24.0	22.7
13.	Weight glumes		5.3*	16.5	17.7	14.2*	8.7*
14.	Weight rachises gms		1.1*	4.1	6.8	10.5*	10.9*
15.	Percent: glumes/cob		82.8*	80.1	72.2	57.5*	44.4*
16.	Percent: rachis/cob		17.2*	19.9	27.8	42.5*	55.6*
17.	Weight kernels, gms		15.2*	39.0	65.2	102.6	102.5
18.	Percent: kernels/ear		70.3*	65.6	72.7	81.0	81.8
19.	Number of kernels		76 *	282	371	532	477
20.	Average weight of kernels, gms		20 *	13	17	19	21

* Data based on a single ear.

There is little doubt that changes of the four types described above have occurred in the maize plant during its evolution under domestication. It cannot yet be proved that such changes were wrought by genetic changes at the Tu-tu locus, but it would be strange indeed if this were not the case. At least no other locus has yet been discovered in maize which is capable of so drastically changing the maize plant in the direction of greater usefulness to man.

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9. Mutation rates in teosinte derivatives.

In previous News Letters we have recorded the occurrence of a wide variety of mutations in modified strains of the inbred A158 in which one or more teosinte chromosomes have been substituted for maize chromosomes. No mutation was ever observed in the original inbred A158.

During the past year we have conducted a controlled experiment in which the mutation rates for seed and seedling characters of the teosinte-modified strains were compared directly to the original strain. In 100 ears of A158 there was one mutation to defective seeds. In 435 ears of teosinte derivatives there were 32 mutations involving 12 defective seeds, one brittle endosperm and 19 seedling defects of various types.

The mutations which have now occurred in the teosinte derivatives include most of the categories of inherited defects found in open-pollinated maize: gametophyte factors, defective seeds, chlorophyll deficiencies (albinos, virescents, stripes), brittle and sugary endosperm and dwarfs.

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10. Papyrescent maize.

The dominant gene which produces this glume character has been designated previously as "pseudopod" (Pp) (Galinat and Mangelsdorf, MNL, 1955) but it now seems more appropriate to use the name "papyrescent" and the symbol Pn in order to call attention to its papery character and its similarity to the "papyrescens" character of Sorghum (Rangaswami) as well as to avoid confusion with the symbols for heterozygous pericarp color (Pp).

When we first obtained the Pn character from a Peruvian variety, it was closely linked to another mutant form resembling branched silkless (bd) reported as near the long arm of chromosome 7. The associated