or bz wx sectors. Between 3,000 and 6,500 gametes were sampled per treatment. The sum of apparent gametic mutations plus sectors for most compounds ranged from .03% to .09%. One compound, 2-amino-6-thiopurine, did not produce any mutations nor sectors in 3074 kernels. Two compounds, proflavine and 2-thioadenine, were apparently more effective than the other substances since the sum of mutants plus sectors was .29% for 2-thioadenine (2779 kernels) and .20% for proflavine (4645 kernels). For 5-bromouracil, only 1 pollination was obtained owing to breakage of the injected plant. One apparent mutation to wx was found in 474 kernels. All the mutant kernels are being grown to ascertain whether the embryos are homozygous or heterozygous for bz or wx as the case may be.

Pollen of untreated M14 plants was irradiated for 4 and 6 minutes under an ultraviolet lamp. The sum for the 4-minute treatment was .9%, and for the 6-minute treatment it was 1.1%.

E. Attempts to affect inter- and intragenic recombination differentially.

It is still a question as to whether intergenic and intragenic recombination have the same physical basis. If a stimulus could affect markedly one type but not the other, it would suggest a different basis for the two types. Roman has shown in yeast that ultra-violet radiation can greatly increase intragenic recombination without apparently affecting intergenic recombination. We have attempted to do the converse in maize (i.e., use agents which have been reported to increase intergenic recombination and then look for an effect on intragenic recombination). The material used here was the $F_1 \frac{+\ +\ wx^{90}\ +}{sh\ bz\ wx^{Coe}\ v_1}$ which has already been reported on in other connections. Two plants were injected as described for the base analogues with .001 M Versene (Na_2) every two days from a premeiotic stage until pollen shed. The usual pollen collections were made, and pollinations were made onto the sh bz wx^{Coe} v_1 stock. The frequency of $+^{wx}$ pollen grains in the treated plants was not different from the frequency in control plants. Nor could any increase in the frequency of recombination between sh and bz over the controls be detected in the pollinations made from the treated plants. The same negative results were garnered from 4 plants which were sprayed with .2 M $MnSO_4$ every five days from the time that they were 10 inches high until the emergence of tassels from the boot.

With the apparent inability of these agents to affect either type of recombination under the conditions of our test, it was not possible to obtain the information originally desired.

-- Oliver E. Nelson

2. The fourth chromosome gametophyte factor in some Central and South American races.

As has been pointed out previously, knowledge of the allelic constitution of a variety for the fourth chromosome gametophyte factor, ga/Ga/Ga^s, can be an aid in tracing the evolutionary history of that variety. This is so because male gametophytes carrying Ga and Ga^s exclude or nearly exclude male gametophytes carrying ga when both types are competing to effect fertilization in plants which are ga/Ga, ga/Ga^s, Ga/Ga^s, Ga/Ga, or Ga^s/Ga^s. The competitive advantage of Ga^s or Ga alleles over ga in such situations is close to 1. On the other hand, there is no advantage of ga gametophytes over Ga or Ga^s gametophytes on ga/ga plants. When either Ga or Ga^s is introduced into a stock by introgressive hybridization or mutation and becomes established, its frequency must increase rapidly until it is equal to 1. It is not possible to derive a variety which is ga/ga from a cross between two other varieties one of which is Ga or Ga^s. All United States varieties which we have tested here have been ga/ga (except for Papago Indian Corn which is Ga/Ga). This includes southern whites, northern flints, and middle western dents.

Through the kindness of Dr. E. J. Wellhausen and Dr. Robert Osler of the Rockefeller Foundation in Mexico and Dr. David Timothy of the Rockefeller Foundation in Colombia, we were able to assemble a number of Central and South American races of maize for tests of their constitution with reference to the 4th chromosome gametophyte factor. The details of the test are as follows: all possible plants of the variety under test were pollinated by a ga/ga stock while pollen from each of 4 plants of the variety was used to pollinate 2 plants of a Ga^s/Ga^s stock. Three types of results were found: plants of a particular variety did not set seed with ga pollen but were capable of inducing seed set on Ga^s plants (variety is Ga^s); plants of the variety set seed with ga pollen and could induce seed set on Ga^s plants (variety is Ga); plants of the variety set seed with ga pollen but did not induce seed set on Ga^s plants (variety is ga). If, as is often the case with introduced varieties, it was not possible to obtain ears on the variety and the variety could be scored only for ability to induce seed set in the Ga^s/Ga^s stock, it could not be determined whether a variety is Ga or Ga^s if it was able to fertilize Ga^s/Ga^s plants.

Table 2. Tests of Central and South American Varieties for 4th Chromosome Gametophyte Factors

Variety	x ga	on Ga^s	Probable Allele
Arrocillo Amarillo	N.P.	Intermediate (.25-.9 of normal seed set)	?
Nal-Tel	N.P.	+	Ga^s or Ga
Palmero Toluqueño	+	0	ga
Harinoso de Ocho	+	0	ga
Cacahuacintle	+	+	Ga
Reventador	0	+	Ga^s
Maiz Dulce	0	+	Ga^s
Chapalote	N.P.	+	Ga^s or Ga
Olotillo	N.P.	+	Ga^s or Ga
Zapalote Grande	+	+	Ga
Zapalote Chico	+	+	Ga
Guat. 211H (Nal-Tel, 3300')	0	+	Ga^s
Guat. 229H (Nal-Tel, 6700')	+	+	Ga
Guat. 230H (Nal-Tel, 6700')	+	0	ga
Guat. 232H (Nal-Tel, 6,600')	+	0	ga
Guat. 41H (Chimbo, 8,000')	N.P.	0	ga
Guat. 75H (Quicheño, 9400')	N.P.	0	ga
Guat. 76H (9400')	N.P.	+	Ga^s or Ga
Guat. 78H (8800')	N.P.	+, 0	Both ga & Ga^s
Guat. 122H	+	+	Ga
Guat. 139H (3,200')	0	+	Ga^s
Guat. 159H (Nal-Tel, Tropical)	N.P.	+	Ga^s or Ga
Guat. 188H (Koc-Jal)	N.P.	+	Ga^s or Ga
Costa Rica 227	0	+	Ga^s
Costa Rica 379	0	+	Ga^s
Costeño Amarillo	N.P.	+	Ga^s or Ga
Costeño Blanco	N.P.	+	Ga^s or Ga
Nariño 330-*-xa-*	N.P.	+, +, 0, 0	ga & Ga
Peru 330-L-*-*	N.P.	0	ga
Eto-*-*	+	+, +, 0, 0	Both Ga & ga
Nariño-330-*-*b-L-*-*	N.P.	+, +, +	Ga^s or Ga
Venezuela 305-*-*-*	N.P.	+, +, +, 0	Ga^s or Ga
Bolita	N.P.	+ (1 plant)	Ga^s or Ga

Variety	x ga	on Ga^s	Probable Allele
Maiz pisankalla	0	+	Ga^s
Pollo amarillo	N.P.	0	ga
Pollo blanco	N.P.	0	ga
Pira blanco	N.P.	0 (but late and poll on tillers)	ga

N.P. = No Pollinations
0 = No Seed Set
+ = Full Seed Set

The results of our tests are summarized in Table 2. For most varieties tested, the results were homogeneous. This is not so, however, for the Guatemalan variety 78H, nor for the South American varieties Nariño 330, Eto, and Venezuela 305. In all these varieties there were both plants identified as Ga^s (or Ga) and plants identified as ga. Such a situation could result from recent introgression of a Ga^s variety into a ga variety or the recent establishment of a synthetic variety from varieties one or more of which are Ga^s (or Ga) and the others ga. In this connection, it should be noted that heterozygotes Ga^s/ga or Ga/ga can fertilize Ga^s/Ga^s plants and hence are scored as Ga^s or Ga plants. Some of the varieties tested here in 1959 previously have been tested as accessions from other sources. Chapalote and Zapalote Chico from Anderson and Brown's Standard Exotic Collection in tests in 1953 were found to be Ga^s and Ga respectively. Maiz pisankalla was also previously identified as Ga^s. Reference to Table 2 show that those races again were similarly identified.

The results of the tests are particularly interesting in several ways. In the first place, the collections of Palmero Toluqueño and Harinoso de Ocho which we tested are clearly ga/ga. Palmero Toluqueño, a popcorn, is classified by Wellhausen et al as an Ancient Indigenous race and Harinoso de Ocho as a Pre-Columbian Exotic race. The considerations already presented as to the great selective advantage of the Ga and Ga^s alleles plus the knowledge that United States varieties tested are ga/ga demand the existence of primitive races which are ga/ga. It is reassuring to find that they do exist together with the Ancient Indigenous races (Chapalote and Nal-Tel) which are Ga^s. Secondly, all the other more complex Mexican races tested are either Ga or Ga^s.

With regard to the Guatemalan collections, several identified as Nal-Tel give divergent results in tests for the Ga factors. All that can be inferred here is that if these actually represent one line of descent the ga races are the original types and the Ga^s races the result of introgression into them of another race which is Ga^s. There is a suggestion in the data for these Guatemalan races that the majority of high altitude races may be ga in contrast to the tropical races, but the sample is too small to place much reliance on it.

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1. Adaptation and problems of growing sweet corn in Scotland.

For the first time trials have been conducted with four varieties of sweet corn that I had shown to be the best in English conditions. The main differences in growing sweet corn in Scotland rather than