Crosses between w-3 and pastel-8686, both of which had been shown to be on chromosome two by linkage test, have established that these two mutants are allelic. The two mutants are quite distinct; w-3 has white seeds and pure white albino seedlings while pastel-8686 has white seeds and pale yellow-green seedlings. The $F_1$ between them is closer to w-3 than pastel-8686 in phenotype but this will need to be tested further since the seedling tests were performed during cloudy weather. It may be that high temperature and sunlight are necessary for the greening of pastel seedling. The fact that pastel-8686 seedlings were much paler than those observed in previous years grown under more favorable conditions would suggest that this is so.

Dr. Smith at Stanford has shown that w-3 seedlings when grown in the dark produce protochlorophyll that is converted to chlorophyll a when they are transferred to the light. Chlorophyll a on exposure to the light is destroyed so that the albino seedlings result. A study of chlorophyll synthesis in the pastel-8686 allele might prove very enlightening in view of what is already known about chlorophyll synthesis in w-3.

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1. West Indian maize.

There is support for Harland's hypothesis that West Indian maize strains are inbred lines that have also been selected for vigour. Comparison of the growth between sibs and once selfed lines has been made, although the number of lines tested has been limited owing to difficulties of seed setting. In Early Caribbean and Cuban Flint strains, the sibbed lines were no more vigorous than the selfed lines. Thus the drastic occurrence of inbreeding depression normally expected in outbreeding maize populations has not been demonstrated.

Most of the families produce seedlings differing from normal. These include small and narrow leaved ones, and various yellow leaved ones probably associated with the character "virescent". True albinos also occur and rapidly die. Comparison was made between the growth, flowering and ear formation of adult plants raised from normal and abnormal seedlings. The data were unable to establish that abnormal seedlings were severely handicapped, either in their early mortality or in their final heights and flowering times. A relationship was established between intensity of anthocyanin coloration of the seedling bases, and the frequency of small seedlings. There were no small seedlings with very dark red bases, 12% among those with very pale red bases, while all green seedlings were 65% small.

Meiosis was examined in normal plants of Cylindrical Dent, Cuban Flint, and Early Caribbean. Meiosis was normal in that 10 bivalents were formed; there was no indication of lagging chromosomes which might have accounted for aberrant seedlings. In one plant of Coastal Tropical Flint the anthers were very small and shrivelled but P.M.C.s were present, although divisions could not be seen. Mitoses have also been examined in abnormal seedlings of four families. The diploid count of 2n = 20 was obtained for seedlings that included albino, yellow-leafed, "virescent" and weakly seedlings, as well as normal controls.

Some plants produced viviparous growth in their tassels, the florets developing directly into young plants. It has been possible to vegetatively propagate these, and they form good roots. These propagules appear to make only limited growth and mortality has been heavy. This is believed to be the first record of this condition in cultivated maize, although it is known that Singleton's "corn-grass" mutant will vegetatively propagate. This character supports the view that West Indian maize has evolved along a differing path from North American corn.

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1. Test of Ga specificity.

Further genetic tests for specificity of the interaction between gametophyte factors in the style and those in the pollen were made. Five plants that were homozygous ga in 4 but heterozygous for a Ga factor in group 5 and for bt were self pollinated and also crossed as ♂ on two Bt Bt Su Su stocks: #1 which carries the Ga in 4 and the ga in 5 and #2 which carries the Ga in 5 and ga in 4. These crosses were grown in an open pollination plot with borders and scattered rows of bt bt and Bt bt plants as supplemental pollinators. When mature the number of ears segregating and not segregating bt were counted. The selfs of the five parents had 12% or less of bt seeds.

| ♂ parents | ♀ = Ga in 5, ga in 4 Stock #2 | | | ♀ = ga in 5, Ga in 4 Stock #1 | | |
|---|---|---|---|---|---|---|
| | Bt Bt | Bt bt | % het. | Bt Bt | Bt bt | % het. |
| 19875 - 2 | 65 | 2 | 3.0 | 46 | 18 | 28.1 |
| 19875 - 3 | 63 | 4 | 6.0 | 47 | 27 | 36.5 |
| 19875 - 7 | 20 | 1 | 4.8 | 61 | 15 | 19.7 |
| 19873 - 3 | 56 | 14 | 20.0 | 37 | 21 | 36.2 |
| 19873 - 5 | 42 | 31 | 42.5 | 43 | 21 | 32.8 |