number of husk leaves, ear exsertion, ear length, ear diameter, number of ears, ear weight, number of kernel rows, number of kernels per row, kernel size, kernel weight, tassel length and number of tassel branches. Furthermore, some attributes were remarkably sensitive to the climatic difference in the 3 experimental stations, Iwate, Hiratsuka and Ehime. They were maturity, stalk height, stalk diameter, tillering, prop-rooting, number of green leaves, number of ears, cob diameter, cob weight and kernel weight.

(3). The genetical uniformity of the characters of a race was dependent on the degree of topographic isolation, the diversity of corn cultivation by the farmer, the climatic difference in the growing area and the care of farmers in their seed selection. In accordance with such differences, 65 corn-growing localities could be grouped into 25 areas, Kokonoe, Tsue, Kujû, Asaji, Ogi, Namino, Oguni, Asodani, Shiramizu, Kusakabe, Mamihara, Noziri, Gokasho, Kuwanouchi, Takachiho, Nobeoka, Saigô, Morozuka, Shiiba, Mera, Yuyama, Itsuki, Kirishima, Shibushi and Shimabara. In 8 areas Kokonoe, Tsue, Noziri, Kawanouchi, Morozuka, Shiiba, Nobeoka and Shimabara, there were distinct races with uniform characters, any one of which was rather small in its variability. In 6 other areas, Asaji, Kujû, Ogi, Itsuki, Kirishima and Shibushi, races were more heterogeneous in character. Lastly, the remaining 11 areas were intermediate between the above two cases in their intra-race variability.

(4). The knob analysis of the pachytene chromosomes has been carried out. Data obtained from 67 samples are given in Table 2. The B chromosome was not met with, as seen in the native races in Shikoku. In every race, 5 arms with knobs were always observed: 3L, 5L, 6L, 7L and 8L. Accordingly, it seems that those knob positions should be considered as a fundamental characteristic of the Caribbean flint growing in Japan. In addition, the old races distributed in Kiushiu were characterized by having three marked peculiarities in knob position. As compared with old races native to the other two centers, the races in Kiushiu tended to have a very high occurrence of the knobs on 10L and 2L, giving an average of 0.7 and 0.8 respectively. Another peculiarity was the occasional loss of the second knobs on 6L and 8L, resulting in an average of 1.5 and 1.9 respectively, because the first knobs on 6L and 8L existed in every race. Lastly, the occurrence of knobs on 1L, 4L, 7S and 9S was very low, the frequency varying from 7 to 14 percent. However, their presence or absence was very important in the identification and relationship of the race, in accordance with which the number of knobs varies. The variability of knobs was, however, not as great as that seen in the other two centers. Average number of knobs was computed to be 8.8, ranging from 7 to 12. On the whole, it may be said that a decrease in knob number in a given race should be associated with earliness; the more knobs a race has, the later it becomes. On the other hand, it may also be said that an increase of knob number should be considered as an index of contamination by Japanese old pop corn, because the pop races native to Japan had more knobs than the pure races of Caribbean flint distributed in the same area.

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1. Genetic and genotype x environmental interaction variances in an open-pollinated variety of corn.

This experiment was designed to estimate the magnitude of components of genotype x environmental interaction variance relative to genetic variance. Sixty half-sib families of the Jarvis variety

Table 2. Number and position of the chromosome knobs in 67 races native to the island Kiushiu.

Chromosome		Oodetchi 9	Kanazuchi 7	Nakadama 17	Shinboso 8	Okuzuru 9	Hayadama 11	4Ohi-wase 3	Shimabara 1	Benkei 1	Pop-like 1	Total (67)
		Type of races										
1	S	-	-	-	-	-	-	-	1.0	-	-	-
	L	0.2	0.2	0.2	-	0.1	0.1	-	-	-	-	0.1
2	S	-	-	-	-	-	-	-	-	-	-	-
	L	0.7	0.9	0.8	0.4	1.0	0.8	1.0	1.0	1.0	1.0	0.8
3	S	0.2	0.2	0.1	0.1	-	0.1	-	1.0	-	-	-
	L	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	S	-	-	-	-	-	-	-	-	-	-	-
	L	1.0	0.7	0.5	0.8	-	0.1	-	-	-	1.0	0.4
5	S	-	-	-	-	-	-	-	-	-	-	-
	L	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	S	-	-	-	-	-	-	-	-	-	-	-
	L	1.6	1.6	1.6	1.6	1.2	1.1	1.0	1.0	2.0	1.0	1.5
7	S	0.1	-	0.1	-	-	0.2	-	-	-	1.0	0.1
	L	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	S	-	-	-	-	-	-	-	-	-	-	-
	L	2.0	2.0	1.6	2.0	1.9	1.8	2.0	2.0	2.0	2.0	1.9
9	S	0.1	0.2	0.4	-	-	0.2	0.3	-	-	-	0.1
	L	-	-	-	-	-	-	-	-	-	-	-
10	S	-	-	-	-	-	-	-	-	-	-	-
	L	1.0	0.7	0.7	1.0	0.3	0.4	-	1.0	-	1.0	0.7
M	S	0.4	0.4	0.6	0.1	-	0.5	0.3	2.0	-	1.0	0.3
	L	9.4	9.1	8.6	8.9	7.6	7.3	7.0	8.0	8.0	9.0	8.5
Total		9.9	9.5	9.2	9.0	7.6	7.8	7.3	10.0	8.0	10.0	8.8

were grown in replicated tests at 5 locations for 5 years. The components of variance estimated from a combined analysis of variance are given in Table 1. The variation attributed to interactions

Table 1. Estimates of Components of Variance in the Jarvis Variety

Variance among half-sib families	.0007
Variance due to interaction of families and locations	-.0001
Variance due to interaction of families and years	-.0001
Variance due to interaction of families and years x locations . .	.0005

between families and locations, and between families and years is very small, whereas the second order interaction involving locations, years and families is of importance. This implies that the important interaction variance is simply due to family x environmental interaction without regard to years and locations. The variance due to families is estimated to be larger than the variance due to interaction of families and environments.

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-- H. F. Robinson

2. Heterosis in crosses of varieties from different geographical regions.

The objective of this study is to determine the relative amounts of heterosis obtained when locally adapted corn varieties were crossed with each other and with varieties from different regions. Geographical separation and isolation leads to genetic diversity through genetic drift and adaptation to different environments. The degree of genetic diversity should be reflected in greater amounts of heterosis in "between region" crosses than for "within region" crosses.

This experiment included two North Carolina varieties, Jarvis and Indian Chief; two midwestern varieties, Krugs and Reids Yellow Dent; and two Puerto Rican varieties, Diente de Cabolla and Mayorbela. These were crossed in all possible combinations. However, one of the crosses, Diente de Cabolla x Krugs, did not produce sufficient seed and was not included in the test. This study was planted in five replicates at two locations for three years.

The average yields for each variety and variety cross are given in Table 1. The highest yielding entry was the cross, Indian Chief x Diente de Cabolla, and the second highest was Indian Chief x Mayorbela. Both of these represent a cross between a locally adapted and an unadapted variety. Table 2 gives the yield of the crosses expressed as per cent of the average of the two parental varieties. The greatest amount of heterosis (as measured from the midparent) occurred in the cross Rieds Yellow Dent x Mayorbela. The cross between the two Puerto Rican varieties was less than the midparent. The average heterosis of the "within region" crosses is 3%, and for the "between region" crosses is 25%. The greatest amount of heterosis, on the average, occurred in crosses between midwestern varieties and Puerto Rican varieties. Considering the "between region" crosses, crosses between the North Carolina varieties and the midwestern varieties showed the smallest amount of heterosis, averaging 14% above the mean of the parental varieties.