There appears to be no consistent change in variance as F increases beyond 0.125. Teko and Anveld show some decline while Sahara and Robyn show a slight increase with increasing F.

Both estimates of variability are subject to certain biases when used for the material concerned. The upward trend shown in Table 2 could be explained in part by the downward trend of the means in Table 1 since the mean is inversely proportional to the coefficient of variability. Van Schaik (Proc. I Cong. S. A. Genet. Soc. 1:66) obtained an overall correlation coefficient of -.69 between coefficient of variability and mean yield for a number of nonsegregating inbred and F_1 strains chosen in such a way that the whole yield range was represented as well as possible. Re-examination of this data gave a highly significant overall positive correlation of .51 between variance and yield. If the factors responsible for this relationship were operative also in the material presented in this paper, which seems likely, a downward trend would be expected in Table 3 unless other factors interfere.

In conclusion it would seem that the truth must be found somewhere between the trends shown in Tables 2 and 3. This would mean that the data indicate an increase in variability between strains with inbreeding. No exact quantitative estimate of this increase can be given, however.

It is interesting to note the contrasting behaviour of the varieties Teko and Sahara. While the former showed hardly any inbreeding effect until F = .25, the Sahara strains on the average had lost about a third of the yield capacity of the open pollinated variety at this stage of inbreeding. In Table 2 Teko shows little if any increase in variability between strains with inbreeding beyond F = 0.125 while Sahara shows a steep incline in variability. In Table 3 Teko again behaves exceptionally in that it indicates a slight decrease in between strains variance as F increases from 0.125. Sahara shows a gradual but fairly regular upward trend. It would appear, therefore, that Teko in contrast to Sahara and the other varieties does not show some of the typical effects of inbreeding. This characteristic could be explained by assuming that Teko is more homozygous than the other varieties. As reported in last year's newsletter there was little difference between the number of visible seedling abnormalities segregating from nonselected self-pollinated ears of the two varieties, so this would seem not to be the case. Indeed with continued inbreeding, Teko does lose its vigour to almost the same extent as the other varieties. It also shows more variability from F = 0 to F = 0.125 than the other varieties.

Another prominent feature of the data is the distinct and consistent peaks at F = 0.125 and 0.375 in the variability data. No satisfactory explanation can be offered for this phenomenon. Graphs showing the effect of inbreeding on yield were straightened out by the method of least squares and new coefficients of variability were determined but the characteristic peaks remained approximately the same indicating that they have no relation with the irregularities in inbreeding depression.

The surprisingly gradual yield decline at early stages of inbreeding of some varieties is of practical importance. Many inbred strains (up to F= 0.375) yielded considerably more than the parental open pollinated variety within the same block. These observations have renewed interest in the possibility of selecting for yield during mild inbreeding.

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6. Maize uniformity trials.

A series of uniformity trials was carried out on the experimental farm of the University of Pretoria to determine the minimum plot size and shape for lattice experiments for the testing of lines in the hybrid maize breeding program. It was found that a plot of about 14 square yards gave a coefficient of variation of about 10%. An increase in the size gave no reduction in the coefficient of variation while smaller plots showed a considerably increased C.V. The shape of the plots had no material effect on the coefficient of variation. Thus, under these circumstances where the plants were spaced 3 ft. x 2 ft., one plant per hill, and where the commercial maize variety "Improved Potchefstroom Pearl" was used, a plot of about 14 sq. yds. was found the most efficient size and nothing was gained by using larger plots.

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1. Linkage studies on chromosome 5 with special reference to ae.

a. v_3 - ae - pr linkage

Five ears of the genotype $\frac{+\ ae\ +}{v_3\ +\ pr}$ were self-pollinated with the following results:

+ + +	+ ae +	v_3 + +	v_3 ae +	+ + pr	+ ae pr	v_3 + pr	v_3 ae pr
544	290	155	12	175	5	124	0

colorless

+ +	v_3 +	ae +	ae v_3
290	112	102	5

Recombination %

v_3-ae 22 ± 0.02 (colored or colorless)

ae-pr 14 ± 0.03

v_3-pr 34 ± 0.02

The gene order is v_3 - ae - pr. The data indicate the map positions to be

10	32	46
v_3	ae	pr

b. bv - ae - pr linkage.

Six ears of the genotype $\frac{+\ ae\ +}{bv\ +\ pr}$ were self-pollinated with the following results:

+ + +	+ ae +	bv + +	bv ae +	+ + pr	+ ae pr	bv + pr	bv ae pr
269	123	41	7	39	4	121	2

colorless

+ +	+ ae	bv +	bv ae
394	165	170	11

Recombination %

bv - ae 25 (colored + colorless)

ae - pr 20

bv - pr 16