Progress continues on the Inman plan which uses crosses between lines which have an increasing number of interchanges in common.

C. R. Burnham and Paul Yagyu

7. Segregation for quantitative characters in crosses with multiple interchange stocks.

Tests for possible association between quantitative characters and a θ6 and a θ8 were repeated in 1961. The general plan was to test F_1's made up as (Inbred A x θ6 Inbred B) and also as (Inbred B x θ6 Inbred A). Parents, F_1's, F_2's and backcrosses to each parent were grown in a trial with 4 replications. Growth conditions were much more favorable than in 1960 (Newsletter #35 p. 87).

A preliminary examination of the data shows a difference for one of the F_1's but not for the other for height to base of tassel. This showed a significant difference in the 1960 trials.

Paul Yagyu and C. R. Burnham

Assisting in the above work also were Ken Kasha, Jerome Arnold, and Gerald M. Welch. The work with multiple interchanges and related studies was supported by a Rockefeller Foundation Grant.

8. Dominance of genes controlling grain yield in corn.

Comstock and Robinson (1952) outlined an experimental approach for investigating level of dominance in the action of genes controlling quantitative traits which utilizes populations derived from crossing two homozygous lines. They pointed out that linkage equilibrium of genotypic frequencies cannot be anticipated in early generations of such a population. They further demonstrated that estimates of genetic variances would be affected by linkage disequilibrium so that the proposed measure of dominance would be biased upward until equilibrium was established. In order to investigate the effect of linkage disequilibrium upon estimates of dominance they recommended that data be obtained for the same single cross population in the F_2 generation and again in later generations when linkage equilibrium will have been approached.

This approach has been effectively employed at North Carolina (H. F. Robinson and co-workers) and at Nebraska (C. O. Gardner and J. H. Lonnquist) in studies on grain yield. Overdominance would have been inferred on the basis of F_2 generation data in these studies if the possible effect of linkage had not been considered. However, results from their advanced generation evaluations conclusively indicate that linkage disequilibrium existed and had the anticipated effect. Level of dominance estimates in the most advanced generations studied were fully compatible with the hypothesis of only partial dominance at all loci. However, these results do not preclude the possible existence of a range of dominance effects, i.e., partial dominance at many loci, but with overdominance at a sufficient number of loci to be of consequence with respect to population dynamics. The purpose of this study is to obtain more decisive information to distinguish between these two possible situations.