1. Disease resistance in maize.

The program is devoted largely to the practice of artificially producing disease epiphytotics under corn nursery conditions, so that disease resistant plants may be finally selected. Resistance to seedling blights and some forms of smut may be recognized at silking time but most resistant plants are positively identified September 10-20, for leaf blights, and at harvest time for stalk rots, ear rots, and other types of smut.

Disease treatment begins with planting and ends with stalk rot inoculations in August. Lines are seldom carried beyond F_4 in the disease nursery at which time they are turned over for yield testing. Lines surviving the yield test are reused in making new crosses for disease resistance. In this way the build up of resistant material is cumulative.

Gene frequency for resistance to Northern leaf blight caused by Helminthosporium turcicum is rather low. Inheritance is quantitative. We now limit selection to plants rating 1.0 and 2.0. Plants of the higher rating segregate and must be reselected. As a matter of practical observation, a great many lines wlll continue to segregate through F_4 for most diseases but susceptibles appear less frequently as inbreeding progresses. Plants highly resistant for a great number of diseases are rare.

Chief limitations of the disease program are our relatively short season which limits the expression of stalk rot and makes difficult an adequate build up of Southern leafblight caused by Helminthosporium maydis.

We believe the detection and subsequent doubling of haploids to have distinct advantages in studying inheritance of disease resistance. A project is planned whereby work of this type may be carried out.

C. C. Wernham