Two clear cases of knob and centromere adhesion were found. These involved the knob on 5 with the centromeres of 4^{6} and 7 and the satellite on the 5^{6} chromosome with the 6^{5} centromere. Although hypotheses to account for the non-randomness of knob associations could be presented, none have been adequately tested.

José do Amaral Gurgel

SYRACUSE UNIVERSITY
Syracuse, New York

1. Orange variegated pericarp.

Orange variegated pericarp is one of the relatively rare mutants arising in variegated pericarp stocks. The mutant P allele responsible for this phenotype affects both pericarp and cob color. Orange variegated pericarp shows (1) self colored stripes similar to those of variegated pericarp and (2) a homogeneous orange-red ground color between these stripes, rather than colorless as in ordinary variegated. The cob exhibits only a slight flush of color, with occasional larger flecks of red. The allele associated with this mutant phenotype is designated P^{ovov}. The present studies indicate that P^{ovov} is composed of the gene, P^{rr}, and a transposable element similar to the Modulator (Mp) of the P^{vv} allele. The transposable element is designated Mp'. The orange variegated allele has been isolated from eight different Wisconsin P^{vv} stocks. In all cases tested, the mutant allele "activates" Dissociation (Ds).

The mutational pattern and the mutational spectrum of P^{ovov} are similar to those of P^{vv}. The phenotype of the ears produced by plants grown from kernels on orange variegated ears is, for the most part, the same as that of the parent ear both in the frequency of the self colored striping and in the shade of ground color. A low percentage of ears (2 to 3% in stocks graded to inbred W22R) exhibit a markedly lower frequency of striping and a lighter shade of ground color. This class is referred to as "orange light variegated" and is due to the presence of a transposed Mp' in the genome in addition to the P^{ovov} allele. Self red ears occur with about the same frequency as orange light variegated ears in these families.

Twinned sectors of orange light variegated and self red pericarp have been observed on heterozygous orange medium variegated ears (povov/Pwr). Five twin spots with a minimum number of three kernels in either sector have been further tested. The phenotypes of the progeny ears were in accord with the expected types. Each of these plants was tested for the ability to activate Ds. All plants in the control families (orange medium variegated sibs) and in the families representing

the orange light variegated twin components exhibiting an orange variegated phenotype induced Ds breakage events. None of the white pericarp red cob (P^{wr}) plants activated Ds. Plants with self red ears in two only of the five families representing the red components of the twinned sectors activated Ds. This is in accord with Brink's findings for the red component of twin spots in ordinary variegated pericarp.

The frequency of stripes involving one-fourth or more of the abgerminal side of the kernel in orange variegated and standard variegated proved to be statistically different. The mean grade of the ground color of the orange light variegated ears was lighter than that of the corresponding orange medium variegated class in each of four groups tested.

The Ds breakage pattern induced by orange medium variegateds representing two of the P^{ovov} alleles was compared to that induced by the medium variegateds from the stocks in which these alleles arose. The kernels on the mature ears were scored for the presence of (1) early breaks, represented by colorless sectors involving one-eighth or more of the aleurone in the otherwise colored kernel (other colorless sectors also occurred on these kernels) and (2) very late breaks only, represented by colorless aleurone sectors in which no more than about six aleurone cells were included in any of the sectors on the kernel. No attempt was made to compare the frequency of these breakage events on individual kernels. A highly significant difference in the number of kernels exhibiting only very late breaks is obtained for one of the P^{ovov} alleles compared to the P^{vv} control. The data for the early breaks in this group are not consistent.

In two tests no difference is found, in one test the difference is barely significant at the 5% level, and in one test a highly significant difference is obtained. In the comparison of the other P^{ovov} allele with its P^{vv} control, no differences are found for either early or very late breakage events. This latter group was difficult to classify because of the presence of a pronounced R-mottling in the aleurone pigmentation, and so the data, especially for the very late events, are not reliable. Further tests are being made.

The mutation to P^{ovov} could be (1) a mutation of the P^{rr} gene, (2) a mutation of the Mp element, and (3) a change in the relationship of the two components of the allele. The present results indicate that the P^{ovov} allele is significantly different from P^{vv} in the pattern of early somatic mutations to self red. According to the Modulator hypothesis, these mutations are the result of the loss in somatic tissue of Mp from the P locus, allowing the pigment-producing capacity of this gene to be expressed. The P^{ovov} phenotype also differs from the P^{vv} phenotype in the presence of the ground color. Both the demonstrated response of the ground color to an increase in the number of Mp's in the genome and the linear regression of the shade of the ground color on the frequency of the somatic striping support the conclusion that this component of the orange variegated phenotype as well as the conspicuous striping is a Mp' function. It is believed that the loss of

Mp' from the P locus in a high proportion of the cells late in the development of the pericarp is the basis of the ground color. Variations in shade are due to varying proportions of the two kinds of cells, self red and colorless. The lower frequency of self colored striping and the lighter shade of ground color in the orange light variegated phenotype indicate that the frequency of all somatic mutations is decreased at all stages in the development of the pericarp. The mutation to P^{ovov} is interpreted to be due to a mutation of the Mp component of the P^{vv} allele to Mp'. The results of the comparison of the time of Ds breakage events induced by P^{vv} and P^{ovov}, though not conclusive, support this hypothesis.

F. A. Valentine

TENNESSEE AGRICULTURAL EXPERIMENT STATION
Knoxville, Tennessee
and
U. S. DEPARTMENT OF AGRICULTURE
Beltsville, Maryland

1. Recovered strains of inbred 33-16.

In the 1954 Newsletter (P 19) a report was made of the availability of strains of 33-16 in which the cytoplasmic contribution to male sterility had been eliminated through backcrossing.

Five recovered strains of 33-16 have been maintained through backcrossing by the Kentucky strain of 33-16 following the initial crosses on K64 and CI.43 as female parents and four recovered strains have been maintained by backcrossing with the Beltsville strain of 33-16, following initial crosses on K64 and Ky39 as female parents.

Crosses involving these recovered strains and original 33-16 (Kentucky strain) as seed parents by Ky 27 x CI.61, CI.43 x CI.61, K63, Mo2RF, Ky27, CI.43, and CI.61 as male parents were grown at Knoxville and Crossville, Tenn., Beltsville, Md., and Huntsdale, Mo., in 1956 and the amount of pollen sterility determined. The only pollen sterility observed occurred in test crosses with the original 33-16 as seed parent, indicating that the cytoplasmic contribution to sterility has been completely eliminated from the recovered strains.

Single crosses between the recovered strains and original 33-16 (Kentucky strain) as seed parents and K55, K64, N72 and Ky49 as male parents were compared for yield at Crossville, Tenn., Lexington, Ky, and Huntsdale, Mo., in 1956. Considering the average yields on all four testers, there were no significant differences in yield between any of the recovered strains and original 33-16 at any of the locations. Also