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In addition, diploid stocks homozygous for <u>el</u> are available. These stocks are of different maturities and are related to the inbreds, WF9, W22, W23, Oh40B, K155 and R4. Hybrids between some of these strains also are available.

C. S. Levings, III
D. E. Alexander

4. Performance of advanced generations of hybrids of autotetraploid maize and Euchlaena perennis.

In 1957, crosses were made between elongate-derived autotetraploid strains of corn and the 40 chromosome teosinte, <u>E. perennis</u>. The F_1 was weakly perennial. One plant was maintained in a pot in the greenhouse for three years and continued to flower intermittently for two and a half years before dying.

Advanced generations of the hybrid continue to resemble the F_1 closely with respect to tillering, plant morphology, flower morphology and time of flowering. A few segregates, however, have been found that possess eight-rowed and six-rowed ears; none of the segregates is strongly rhizomatous.

These observations suggest that preferential pairing occurs. This has not been verified cytologically, however.

Seed of <u>E. perennis</u> and of advanced generations of the hybrid through F_6 is available to anyone interested.

D. E. Alexander
J. B. Beckett

5. Genetic location of centromeres in maize.

Ordered tetrads of some of the fungi provide us with a mechanism for the mapping of centromeres. Autotetraploid maize likewise provides us with a unique mechanism for the mapping of centromeres although this mechanism differs from that of the ordered tetrads. This technique is based upon the occurrence of the phenomenon of double reduction. Double reduction occurs when the meiotic mechanism partitions 2 chromatids from 1 chromosome to the same gamete, which is in contrast to the ordinary circumstance when each gamete regularly receives one chromatid from each of 2 chromosomes of the 4. α has been designated by Mather as the coefficient of double reduction. In order for this phenomenon to take place a single cross-over must occur

between the centromere and the locus in question and the crossover chromosomes at first division must segregate to the same interphase nucleus. The segregation of crossover chromosomes to the same interphase nucleus has been designated as genetic non-disjunction in the literature. Genetic non-disjunction, if it occurs at random, will occur 1/3 of the time.

The formula for computing the coefficient of double reduction is: α = ae, where a equals the frequency of genetic non-disjunction and e is the frequency of crossing-over between the centromere and the locus in question. By solving this formula for e we can obtain the frequency of crossing-over, e = α/a.

Mather has presented formulas for the solution of alpha by combining the backcross and F_2 data into maximum log likelihood equations. Presently, this backcross and F_2 data is being obtained for marker genes on chromosomes 2, 3, 4, 5, 6, 9, and 10. From this data estimates of alpha value will be obtained and subsequently the amount of crossing-over between marker gene and the centromere will be ascertained. The value of e (i.e. the cross-overs between the centromere and the marker locus) represents the map units between the centromere and the gene in question. Hence it will be possible to genetically locate many of the centromeres of maize.

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1. Colorless components of the A^b:Ec and A^b:P complexes in maize.

It has been reported earlier (MNL 33) that when alpha derivatives of crossover stable, crossover mutable and noncrossover classes from A^b:Ec and A^b:P are compounded with A^b and A alleles, colorless cases (a*) of both crossover and noncrossover origins are recovered from all three classes of alphas from A^b:Ec and from the crossover mutable alphas of the A^b:P source; the crossover stable and noncrossover pale isolates from A^b:P do not yield any colorless cases of recombinant origin. On the basis of similarity in frequencies of a* cases of crossover origin in case of crossover stable and noncrossover alpha isolates from A^b:Ec, and the complete absence of a* derivatives of crossover origin from noncrossover and crossover stable pale cases from the A^b:P source, it was concluded that the noncrossover alpha isolates are not a result of the mutation of the β element of the respective A^b complexes. The two classes of alpha