1. Structural and functional variability in A^b complexes.

The order of alpha (pale-acting) and beta (purple-acting) elements of the closely linked complex constituting the original A^b (Ecuador) is centromere-alpha-beta. Studies based on the crossover derivatives from special, marked heterozygotes carrying A^b and particularly from marked homozygous A^b plants indicate that alpha and beta, or the segments in which they reside, are members of an adjacent duplication in which the genetic materials are ordered in the same direction (tandem, serial duplication).

Similar studies have been made of three b alleles of Peruvian extraction, here designated A^b:P. Analyses of the pale or dilute derivatives from marked A^b:P/a plants indicate that (1) the alpha member of this complex is associated with a more dilute phenotype than is the alpha of the original A^b complex, and (2) the sequence of constituent members centromere-beta-alpha, is the reverse of that in the original A^b. The crucial test of the hypothesis of differing sequence in these two A^b complexes is afforded by an analysis of the alpha derivatives from marked A^b/A^b:P heterozygotes. Twelve dilute derivatives whose origin was associated with crossing over were obtained from this background and all twelve isolated strands carried the same recombinant condition for the markers thus confiming the changed order of alpha and beta in the two complexes.

The finding that A^b/A^b:P heterozygotes, as well as heterozygotes of these complexes of the other. Rather it suggests that the members of the duplication have exchanged position while retaining the serial order of the duplication as a whole. Changed sequence of members of a serial duplication would be expected if the members retain homology and synaptic equivalence and thus may be expected to engage in oblique synapsis. Evidence for the latter is available from homozygous A^b individuals which are found to yield alpha derivatives in association with crossing over.