

Columbia Univ

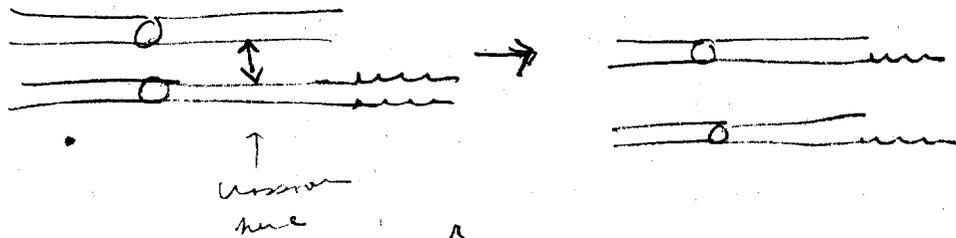
February 24, 1948

Dear Joshua:

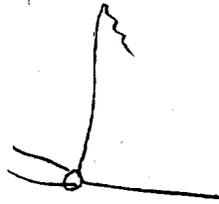
Your letter re: chromosomal segregation came today and I will answer it before it becomes buried in the debris on my desk. First let me say I am delighted you are enjoying your new position at Wisconsin. You are in a good group and should find things interesting.

Now about the preferential segregation with chromosome 10 in maize. We have a great lot of data on this now. Preferential segregation is related to the formation of extra spindle fibers (these are produced by some effect of the extra chromosome in the somatic chromosome 10). Preferential segregation occurs only when a crossover has occurred between the locus studied and the centromere and hence occurs at the second division. Preferential segregation is caused by the orientation of the chromosome in AI persists, until AII (the same thing as a crossover heterozygote where no egg sterility was found). Further preferential segregation for chromosomes other than No. 10 occurs only if one of the two homologues carries a knob while the other is knobless. Also extra spindle fibers are formed only when knobs are present. So the whole thing hangs together and makes

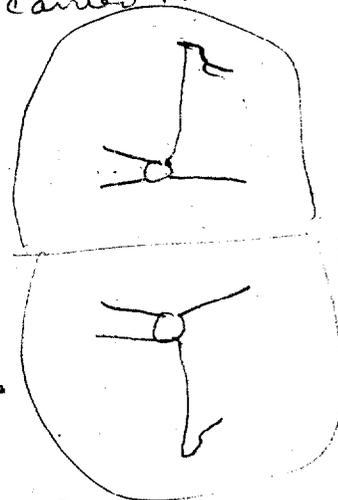
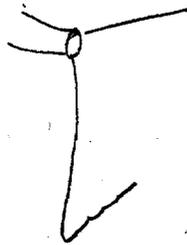
a neat and clear cut story. Diagrammed below is the relation between crossing over, extra spindle formation, and hereditary segregation.



The unit is with extra chromosome from extra spindle fibers in AI



This orientation in AI is carried over to MII & gives



The following orientations on spindles, one to each pole, result in chromosomes with extra chromosomes

The cross holds for chromosomes other than No. 10.

If the same case set in prophase I will be again.

Ryan

W. W. Rhoads