

### 7. Centromere activity.

Comparisons of rings of four at metaphase I in corn and in barley show much stronger centromere activity in the chromosomes in corn than in those in barley. In barley as first reported by Hagberg, often only two chromosomes in alternate positions in the ring are orientated toward the two poles. Further studies are needed to determine if these observations offer any clue as to the cause of directed segregation.

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### 1. Crossing over and chromosome duplication.

The problem of chromosome duplication in relation to time of crossing over can be approached by use of the 5-6c translocation in maize with which crossovers in the interstitial segments of plants heterozygous for the translocation can be determined by abnormal nucleolar organizer distribution in the quartet stage. The following preliminary results with a small number of plants (het T5-6c, homo In5) indicate that high temperature treatment at 35-38°C during mid-pachytene to diplotene increases the frequency of crossover quartets compared with controls at 22-25°C. The heat treatment presumably is being applied after DNA-histone duplication is complete, although this remains to be verified for maize - probably by radioautography since Feulgen staining of maize PMC's generally is too weak for spectrophotometry. The substantiation of these results by further experimentation with larger numbers would indicate separation of chromosome duplication and crossing over in time, a fact which seems to be contrary to the current views of a majority of microbial geneticists.

Sample	Quartet Type			% C.O. Quartets
	Non-C.O.	C.O.	Total	
(35-38°)				
A	31	89	120	74
B	21	48	69	68
C	3	13	16	81
D	19	30	49	61
E	11	32	43	74
	85	212	297	71

Sample (22-25°)	Quartet Type			% C.O. Quartets
	Non-C. O.	C. O.	Total	
A	18	36	54	67
B	73	140	213	66
C	94	155	249	62
	185	331	516	64

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### 1. A small telocentric fragment.

During the course of an attempt to synthesize newer forms of altered abnormal chromosome 10, one B.C.-1 plant was found to possess, in addition to its normal complement, an extremely minute telocentric fragment. This chromosome consists of not more than two discernable chromomeres and thus can easily be mistaken for foreign matter. It is considerably easier to observe at late diakinesis and metaphase I. Unfortunately the origin of this centric fragment is unknown. Inasmuch as the semi-sterile F-1 plant was weak and runty, microsporo-cytes were not sampled.

A project has been initiated to study the behavior of this fragment chromosome and to determine whether any "major" genes are located in this piece of chromatin.

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### 2. Comparison of two K10 chromosomes.

Cytological examination of plants heterozygous for the Longley-Rhoades type of abnormal chromosome 10 ( K10 ) and for Ting's ( K<sub>T</sub> 10 ) type has revealed that the latter is considerably shorter than the former. Furthermore, the knob on K<sub>T</sub> 10 is only about a third as large as that in K10. The following diagram should reveal the gross differences between these two forms of abnormal chromosome 10:

