inadequate but suggest that the total duration of meiosis was of the order of 68 hours (synizesis 50 hours, pachytene 6 hours, diplotene through telophase II 6 hours, and quartet stage 6 hours). All of the figures are rough estimates of means with unestimated variances. (On the average the longer stemmed spikelet of a pair is slightly more advanced than the short stemmed, but is often found at the same or a slightly earlier stage.) The durations of the pachytene (exclusive of synizesis) through quartet stages may be such that some cells scored at quartet stage were treated at least partly at pachytene while others were past pachytene. Some scored at quartet stage in 5 hour samples, are thought to have passed through metaphase during treatment, and these may show a tendency for treatment at this stage to depress the frequency of normal quartets (effect on disjunction); data are too sparse for significance in this respect. Further tests for this effect are planned. Because the quartet stage scoring method has poor resolution and probably inherent sources of error, studies have been initiated to search for effects of temperature treatment on crossing over within and coincidentally within and proximal to heterozygous inversion 5083 where a more direct method of scoring crossover frequency and much better resolution are available. Other inversions may also be used.

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2. Incorporation of tritiated thymidine by microsporocytes of maize.

Preliminary experiments on tritiated thymidine (H^3-TdR) uptake in maize microsporocytes have indicated that a major period of incorporation precedes the synizesis stage. Following submergence of freshly cut ends of tassel branches in a culture medium containing H^3-TdR, label was frequently found in nuclei at premeiotic interphase and less frequently at synizesis in sporocytes from the first two or three spikelets above the cut. Nuclear label was found after incubation periods of 5 hours, 22 hours and 72 hours at temperatures of 23°C and 27°C in medium containing tritiated thymidine in concentrations of 6 µc/ml (6.7C/mM), 10 µc/ml (6.7C/mM), 3 µc/ml (1.9C/mM) or 10 µc/ml (1.9C/mM). The culture medium contained 4% sucrose, 1% casein hydrolysate, 2% Vogel's solution (containing trace elements, minerals and buffers) and 1% vitamin mixture (containing thiamin, riboflavin, pyridoxamine, pantothenic acid, PABA, nicotinamide, folic acid and lipoic acid). After the incubation period the tips of branches were washed and then submerged in test tubes of medium supplemented with 20 µg/ml unlabeled thymidine for two hours. The material was then fixed in alcohol:acetic 3:1 mixture; anthers were squashed in aceto-carmine and prepared for autoradiography as described by Schmid (in Human Chromosome Methodology. Academic Press, New York, 1965). Maximum exposure of film was 20 days. The approximate stage of treated microsporocytes at the beginning of the experiment was estimated by observation of microsporocytes from bracketing spikelets, collected at that time and presumed to be nearly the same stage. No significant chromosomal incorporation of tritiated thymidine was found during pachytene or the latter half of synizesis. It is uncertain whether some of the label found in cells at synizesis might have been incorporated during earlier phases of this stage or in the

premeiotic interphase. Attempts to induce incorporation of label into sporocytes of excised whole or chopped up anthers submerged in medium containing H^3-TdR have been unsuccessful.

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3. Further studies on disjunction at anaphase I of the chromosomes of a trivalent configuration.

It was reported in the 1965 M.G.C.N.L. that progeny of 21 chromosome plants carrying reciprocal maize-Tripsacum interchange chromosomes appeared to show a deficiency of 21 chromosome plants from non-disjunctive distribution for the distal region of the maize chromosome 2 short arm. The preliminary results were consistent with the interpretation that a tendency existed for trivalents destined to have non-disjunctive distribution to orient so that only the 2^T chromosome was directed toward the basal position. After addition of data from the 1966 season there is no significant difference in numbers of 20 and 21 chromosome progeny from non-disjunction as compared to disjunction and, therefore, no cause to suspect non-random metaphase I orientation of trivalents:

	disjunction	non-disjunction
20 chrom. progeny	430	260
21 chrom. progeny	448	251

(Correction for estimated 8% non-disjunction of maize centromeres is included).

Frequencies of disjunction and non-disjunction for distal chromosome 2S from the trivalent described above have been studied from two lines of descent, one which had been outcrossed to L289 and the other repeatedly backcrossed to a Coop chromosome 2 tester. These have been found to differ significantly in non-disjunctive frequency (19% and 37% respectively) although each was internally homogeneous.

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1. Evidence for the inheritance of acquired characters.

The R gene conditions aleurone pigment in the endosperm of maize. When R is removed from a heterozygote with its allele R^{st} (such R alleles are symbolized R^1, one generation with R^{st}), less pigment is produced. This phenomenon is called paramutation and has been reported on by the Wisconsin Maize Laboratory over the past ten years.