not segregate. No indication of linkage was found between Ms and any of the above markers.

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4. Recovery of a chromosome which fails to enter the telophase I nucleus.

Plants heterozygous for T6-9b, in which the 6^9 chromosome consists of 6S, a small portion of 6L and the distal .6 of 9S, were studied cytologically in order to follow the behavior of the 6^9 chromosome through microsporogenesis. This chromosome was marked with wd and Wx and gave normal transmission of these alleles through the male gametes. However, at metaphase I it occurs as a univalent in about 30% of the cells and it is frequently excluded from the interphase nuclei altogether. Examination of anaphase I, telophase I, and interphase stages showed that the 6^9 chromosome seldom divides equationally in the first meiotic division; it is generally found on the plate at early telophase I and when the daughter nuclei are about to be formed, it moves slightly toward one pole. At interphase it is found lying in the cytoplasm as a round vesicle with chromatin somewhat dispersed. Droplets resembling nucleolar material often collect around the 6^9 chromosome. Condensation of the 6^9 chromosome occurs as the prophase II chromosomes become shorter and more distinct. After the nuclear membrane disappears, the 6^9 chromosome rejoins the other chromosomes and there is no evidence of discarded chromatin in the cytoplasm at metaphase or anaphase II or in the quartets. In a few metaphase II cells it was possible to identify the 6^9 chromosome; it was slightly apart from the other chromosomes and was a little more condensed and shortened. The 6^9 chromosome is apparently unaffected by its exclusion from the nucleus.

A similar behavior has been postulated for a univalent chromosome in monosomic wheat (Sears, Chromosoma 1952 and Sanchez-Monge and MacKey, Hereditas 1948), but their results were complicated by the occurrence of misdivision and the frequency of male transmission could not be ascertained because male gametophytes lacking this chromosome are usually non functional.

In MNL 37 it was suggested that the low transmission of translocated 6^9 chromosomes through the ovules was caused by a loss of the 6^9 chromosome in the inner two megaspores following an equational division at anaphase I. It now appears more likely that the 6^9 chromosome fails to be included in any of the megaspore nuclei and is permanently discarded in the cytoplasm. The difference in behavior in male and female flowers may be due to the orientation of the second division spindles at right angles to the first division spindle in microsporogenesis. A cytoplasmic fragment at telophase I is thus strategically located near the future site of the equatorial plate, whereas in megasporogenesis it occupies the future position of one of the poles and is less likely to move onto the plate.

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