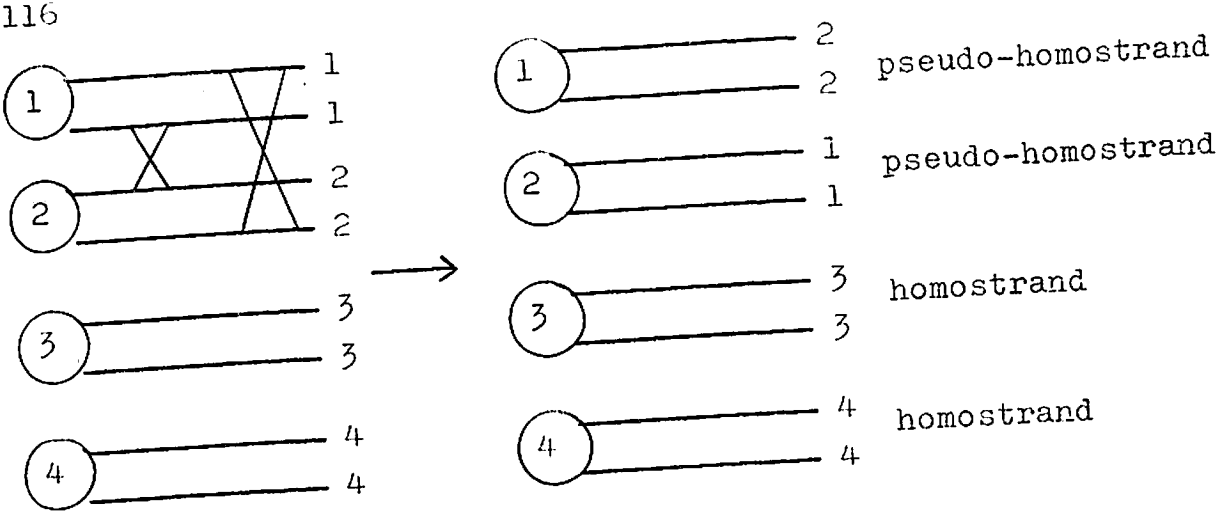

If the centromeres were marked, the pseudo-homostrands would be scored as recombinant strands. However, the crossovers have placed the telomere portion of sister chromatids (i.e. 2-2 and 1-1) on the same centromere. This, of course, precludes double reduction, since at second division they must separate to different gametes. Multiple crossovers, other than four-strand doubles, can also give rise to pseudo-strands. Since recombinants can occur which actually prevent double reduction, crossing-over between a gene and centromere determined from double-reduction values will be underestimated.

A second point should be made. When recombination is estimated from autotetraploid data, it is not directly comparable with diploid estimates (Sved, Heredity 19:585-596, 1964). For instance, the upper limit of recombination in autotetraploids is 75% while it is only 50% in diploids. Therefore, if methods were available with autotetraploids for determining recombination distances between centromeres and genes, these values would need appropriate corrections to be comparable with diploid values.

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1. Neocentromeres as metaphase I chromosome markers.

Analysis of the meiotic behavior of specific chromosomes has been mostly confined to pachynema, though attempts have been occasionally made to extend the analysis to early diakinesis (for example, Miller 1960: MNL 34).

Obviously, the reason is lack of suitable landmarks which can differentiate between chromosomes. Centromeres, heterochromatic knobs, and the chromomere pattern, which so well characterize pachytene chromosomes are of little value as chromosome markers in metaphase 1 and subsequent stages.

The significant observation that neocentric activity is induced at knob sites in the presence of abnormal chromosome 10 (Rhoades, 1952) appears to provide a clue to overcome this difficulty. If all knobs, irrespective of their position in specific chromosomes are capable of inducing detectable neocentric activity, it may be possible to know the number of knobs present in the genome by counting the number of neocentromeres. On this assumption, if specific chromosomes are suitably marked with varying number of knobs, it should be possible to identify particular chromosomes at metaphase I as well as metaphase II.

Before trying to use neocentromeres as meiotic metaphase markers in the manner now suggested, it is necessary to test the assumption made above that all knob sites show detectable neocentric activity in the presence of abnormal chromosome 10. At least two important aspects of this problem can be recognized. (1) Under some conditions, there may be competition between knob sites, particularly if knobs of different sizes and/or physiological states are present in the same chromosome or chromosomal arm. (2) It is important to know the extent of variability in neocentric activity at any knob position due to intrinsic and external factors. Sites showing constancy in behavior should be useful as markers.

Even assuming constancy in neocentric expression and absence of any competition, not more than 3-4 chromosomes out of the ten present in the maize genome can be identified at metaphase I or II, since the same number of knobs cannot be employed to distinguish more than one chromosome of the complement. Further, if more than two knobs and hence neocentromeres are used to mark a chromosome, difficulty may be encountered due to overlapping or crowding of the chromosomal fibers at the neocentromeres.

S. K. Sinha

2. <u>A note on the possible use of neocentric activity as an additional trait for characterizing knob sites and maize races.</u>

The heterochromatic knobs, whenever present in maize races, are valuable aids for the characterization and identification of maize races. Usually observations are taken on the position and the size of the knob. Maize cytologists have tried to evaluate the activity of knob-forming positions