Grain Yield: The cross Col x SP 2 gave 116 per cent more grain yield, and the reciprocal cross 54 per cent less yield than the Col parent. When compared to the SP 2 parent, the cross Col x SP 2 yielded 383 per cent more and the reciprocal cross four per cent more. The SP 2 cytoplasm inhibited the expression of the hybrid nucleus.

Plant Height: The differences between the reciprocal crosses were also striking, but not marked to such an extent as in the case of grain yield. The cross Col x SP 2 manifested 22 per cent more, and the reciprocal 21 per cent less plant height than the Col parent. When compared to the SP 2 parent, Col x SP 2 was 99 per cent taller, whereas the reciprocal cross was only 30 per cent taller.

Days to 75 Per Cent Silking: The cross Col x SP 2 (56 days) showed the earliness of the earlier parent Col (51 days), the reciprocal cross (68 days) was 12 days later in silking and approached the late parent SP 2 (74 days).

Additional data from several reciprocal crosses between primitive and advanced races are being analyzed, and a number of quantitative traits are being studied. The indications are that the degree of inhibition exercised by the cytoplasm on the expression of the hybrid nucleus varies with different races so as to give a range from complete masking to little or no masking. It appears that in the study and exploitation of heterosis one should not only look for superior hybrid nuclei but also for superior sources of cytoplasm. Fleming et al (Agronomy Journal, 1960) and Brown (Iowa Academy of Science, 1961) have presented preliminary data relating to this phase of study.

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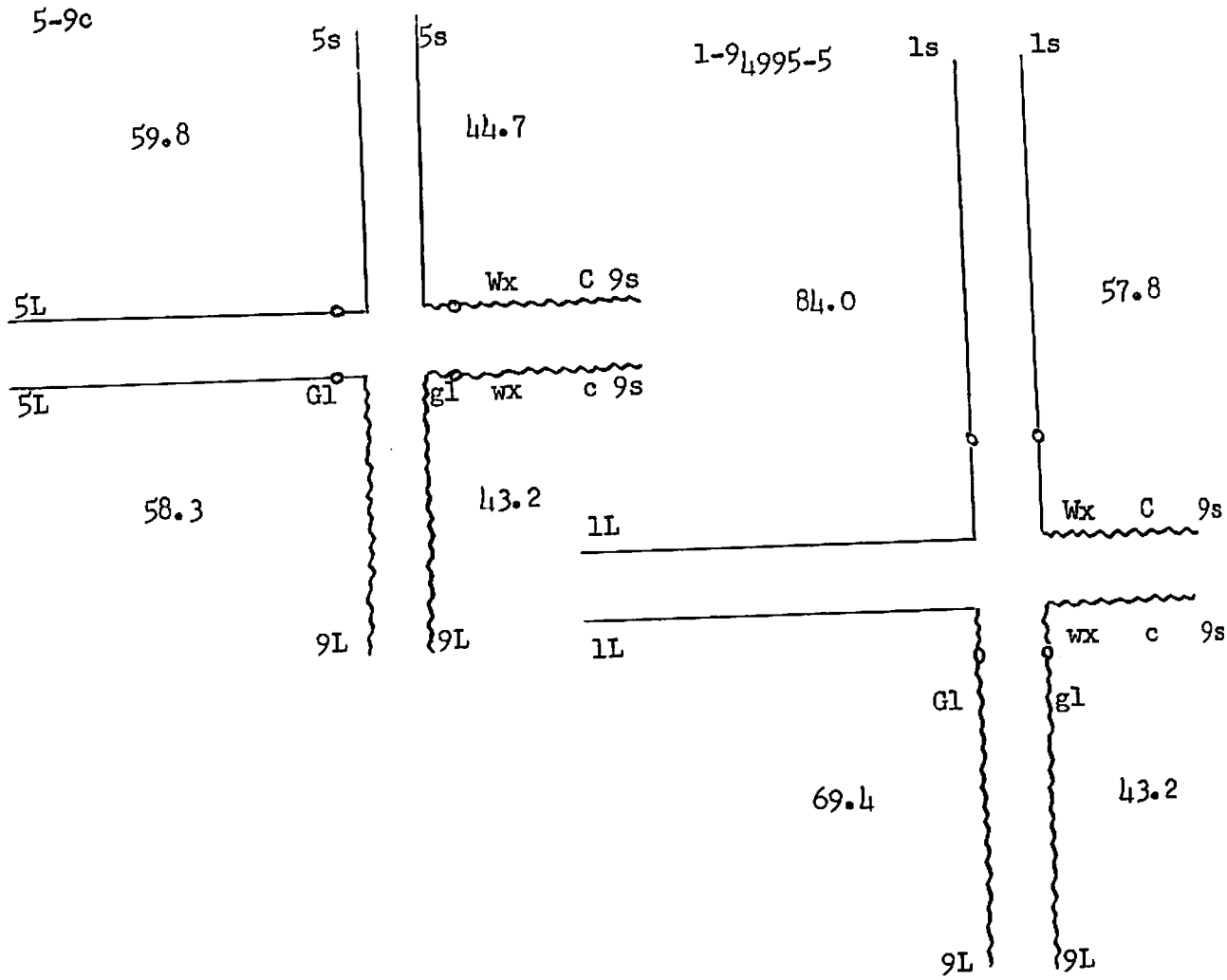
1. Cytological location of gl_{15}.

Linkage studies of gl_{15} (Coe, MNL 32:100) have shown that it gives 7% recombination with wx. The order in chromosome 9 is sh-wx-gl, but the centromere position with respect to wx and gl was not clear. A test of the location of gl was made by a genetic analysis of plants heterozygous for this gene and for translocations 5-9c, 3-9c, $1\text{-}9_{4995\text{-}5}$ and 7-9a with breakpoints in chromosome 9 at 9L .1, 9L .12, 9S .20, and 9S .07 respectively. The results from studies with two of these translocations will be discussed. Diagrams of chromosome pairing in the translocation heterozygotes and the postulated gene locations are included in this report. The relative length of each chromosome in microns is also given, as determined from Longley's chromosome measurements and the reported breakpoints.



Data from the BC1 and BC2 generations for the two translocations have been combined and are presented below:

	C Wx Gl	C Wx gl	C wx Gl	C wx gl	c Wx Gl	c Wx gl	c wx Gl	c wx gl
T 5-9c	650	94	0	170	171	14	21	483
T $1\text{-}9_{4995\text{-}5}$	590	163	5	110	114	24	39	581

Since the C Wx Gl plants were consistently used as female parents in the backcrosses, transmission of n + 1 gametes is possible and the inclusion of tertiary trisomics in the population must be considered. Certain trisomics appear as crossover types and therefore the true recombination between genes located in different arms of the translocation cannot be obtained unless all trisomics are identified by chromosome counts or by progeny tests.

In the backcross data from T 5-9c and T $1\text{-}9_{4995\text{-}5}$ the discrepancy in the C Wx gl versus c wx Gl classes indicates that the C Wx gl class

includes both trisomics and Wx-Gl crossovers. Additional evidence of trisomics comes from a comparison of the c Wx gl and C wx Gl classes from these translocations. The c Wx gl class could arise as a tertiary trisomic following a single crossover between C and Wx. This would account for the greater size of this class as compared to the C wx Gl class which comes from double crossovers. Progeny tests were made on a few suspected trisomics. In the T 5-9c backcross, 10 C Wx gl plants with pollen classified as normal or low sterile proved to be trisomic. When these plants were used as pollen parents on c wx silks, the transmission of C was 13.0% and of Wx, 3.4%. A few c wx Gl plants with intermediate pollen sterility from both the T 5-9c and T $1\text{-}9_{4995\text{-}5}$ populations also were trisomic. Three c wx Gl plants from the T 1-9 backcross progeny were self-pollinated and gave 63 Gl: 46 gl, indicating a Gl/gl/gl constitution. Thus, two of the four possible kinds of trisomics have been identified. The genetic data indicate that gametes with $5 + 9 + 9^5$ are more frequent than those with $5 + 9 + 5^9$, and $1 + 9 + 1^9$ more frequent than $1 + 9 + 9^1$.

The identification of trisomics of C Wx gl phenotype in the T 5-9c backcross indicates that Wx and Gl are in different arms of the translocation and that Gl must lie beyond 9L .1. Thus, the order in chromosome 9 is Wx-centromere-Gl.

Ellen Dempsey
Victor Smirnov

2. Linkage of du and oy.

A backcross of plants heterozygous for the du and oy mutants on chromosome 10 gave 488 individuals distributed as follows:

Du Oy	Du oy	du Oy	du oy
48	219	165	56

The du-oy recombination value is 21.3%, which agrees well with the value of 18-19% obtained from F_2 data (MNL 37). Since oy does not show linkage with R and R-du is about 20% (Kramer), oy is probably located in the short arm of chromosome 10.

Ellen Dempsey

3. Linkage studies with the Ms factor of KYS sterility.

An attempt was made to locate the Ms factor of KYS sterility. The F_1 of Mangelsdorf tester (ms ms S S) and a pale green stock (Ms Ms S S) was crossed with a KYS male parent (ms ms s s). The progeny consisted of 39 plants with normal pollen (ms ms S s) and 22 plants with partly filled pollen grains (Ms ms S s) and no completely male sterile plants. All were selfed and tested for segregation of bm_2, lg_1, su, y, gl_1, wx, and g. If ms is linked with one of the genes in the Mangelsdorf tester, most of the plants with normal pollen should segregate for that particular factor, while most of the plants with partially filled grains should