Gethman, R.C. University of Chicago, Illinois. An age dependent, polarized effect on crossing over.

In a recent series of experiments designed to measure simultaneously crossing over and mutation in a particular X chromosome, a reduced frequency of crossing over was observed. As seen in Table 1, the frequency of recombination between yellow (y^2, 0.0) and singed (sn^3, 21.0) is reduced from an expected value of 21.0% to 14.8%, as measured in progeny from eggs laid on the first six days. In the second six day period, the frequency is not significantly different from the standard value. However, the frequency measured from 12 to 24 day old females was significantly higher. Note that the recombination frequency between singed and scalloped (sd, 51.5) did not deviate significantly from the standard map distance.

Table 1. Recombination frequencies in the cross of y^2 sn^3 sd/+ x y^2 sn^3 sd

	Age of the female parent (days)			
class	1-5	6-11	12-24	standard
y;sn	0.148	0.206	0.279	0.210
sn:sd	0.284	0.288	0.267	0.305
N	2062	1754	2542	

Subsequent crosses indicated that the effect was not a simple one, but was influenced by both X chromosomes. The results given in Table 2 are from a series of experiments designed to characterize this effect. The progeny from all of the crosses were counted for the first six days, and recombination was measured only between y^2 (or sc, 0.0) and sn^3 (or ct^6, 20.0). Ignoring cross #5, these results would seem to indicate that both the + and y^2 sn^3 sd chromosomes lower the frequency and operate in an additive fashion. In cross #5, an increase, rather than the anticipated decrease, was observed. Since male progeny are segregating for both signed and forked, a misclassification of the bristle phenotype is possible. However, since the heterozygous females were back crossed to y^2 sn^3 sd males, there should be no ambiguity in the bristle phenotype of the female offspring. Cross #5b lists only the female progeny, and the recombination frequency here is also high. Thus, it would appear that this increase in recombination is real, and is not due to any misclassification. The meaning of these results are not clear.

Table 2. Recombination frequencies between y^2 and sn^3 (crosses 1, 2, 5) or sc and ct^6 (crosses 3, 4).

	Age of female parent (days)				
Cross	1-2	3-4	5-6	average	N
1 y^2 sn^3 sd/+	0.128	0.103	0.168	0.129	1679
2 y^2 sn^3 sd/ORE-R	0.181	0.139	0.179	0.164	1415
3 sc ec cv ct^6 v g f/+	0.161	0.154	0.189	0.169	1489
4 sc ec cv ct^6 v g f/ORE-R	0.198	0.209	0.191	0.200	1254
5 sc ec cv ct^6 v g f/y^2 sn^3 sd	0.277	0.249	0.263	0.260	1925
5b (females only)	0.277	0.253	0.252	0.259	1000

The change in recombination frequencies cannot be due to viability; first, all the reciprocal classes were of similar sizes, and second, if it were due to viability, different classes would have to be lethal, depending on the age of the female parent. The effect is probably not due to any aberration, such as a small inversion, as all single recombinants in a cross of y z ec ct^6/+ were recovered. Finally, it should be noted that the crosses were made under standard mapping conditions, using newly emerged females. The females were singly mated to 4-6 males, and were raised in shell vials on standard cornmeal media.

The changes in crossover frequency seem to be restricted to the distal region of the X chromosome, and the direction of the change is dependent on the age of the parental female. It is not known whether this effect is also seen on the autosomes. The general behavior over the first six days is similar to that of polarized, meiotic mutants.