

observed are quite similar and extremely close to 60%. The 54.9% of the negative geotropic strain is unique. Apparently this group had a weaker preference for the high ceiling than did the other groups, yet this strain has been selectively bred for negative geotropism. Since they do not exhibit the strongest preference for the high ceiling, negative geotropism and depth perception preferences are probably not correlated.

Summary: An apparatus has been successfully tested which will allow *D. melanogaster* to exhibit a preference based on depth perception. The preference exhibited was for the higher of two visual ceilings in a box. Strain differences relative to the strength of the preference were observed. A strain of *D. melanogaster* selected for negative geotropism showed a weaker preference for the high ceiling than did any other strain tested. This latter observation suggests that depth perception preference for a high ceiling is independent of negative geotropism.

References: Erlenmeyer-Kimling, Loise, Hirsch, J. & Weiss, Jane M. Studies in behavior genetics: III. Selection and hybridization analyses of individual differences in sign of geotaxis. *J. comp. physiol. Psychol.*, 1962, 55, 722 - 731.

Lewontin, R. C. On the anomalous response of *Drosophila pseudoobscura* to light. *Amer. Naturalist*, 1959, 93, 321 - 328.

Jost, P. University of Oregon, Eugene.  
Segregation in males with a normal or a  $sc^4-sc^8$  X chromosome and an attached-4.

The segregation behavior of an X chromosome deficient for a considerable portion of the basal heterochromatin ( $sc^4-sc^8$ ) shows a high frequency of primary non-disjunction (Gershenson, *J. Genet.* 28:297; Sandler and

Braver, *Genetics* 51:573; Peacock, *Genetics* 51:573). Peacock confirmed cytologically that a high frequency of univalents occur in meiosis. From Gershenson's conclusion that in  $sc^4-sc^8$  YY males pairing was predominantly of the YY type, with the X unpaired, it can be reasoned that in a  $sc^4-sc^8$  Y male the presence of a third unpaired chromosome that has exhibited a tendency to segregate non-randomly from the Y (in the female) might exhibit a non-random segregation. E. H. Grell (unpublished, cited by R. F. Grell, *Genetics* 50:151) and Jost (unpublished) have confirmed that an attached-4 chromosome does tend to show a non-random segregation in XX Y 44 females. The present experiment was designed to evaluate the behavior of an attached-4 (44) in  $sc^4-sc^8$  Y 44 males.

Homozygous  $y w; AF, c_i ey^R/gv l sv^n$  (no free 4) females were crossed with two types of R males, both carrying the  $sc^8 \cdot Y$ , which is marked with  $y$ , and an attached-4,  $AF, c_i ey^R/c_i ey^R$  (no free 4). The X chromosomes used were a normal X, marked with  $y w^a$ , and  $y sc^4 f v cv sc^8$ . All disjunctional and non-disjunctional classes of both parents were phenotypically distinguishable and diplo-4. An assumption of random segregation of the attached-4 with respect to the sex chromosomes was used to calculate the expected values shown below:

	$y w^a/sc^8 \cdot Y$		$sc^4-sc^8/sc^8 \cdot Y$	
	Observed	Expected	Observed	Expected
Y, 44 non-disjunction	417	424	701	741
X, 44 non-disjunction	445	457	961	921

The frequency of recovered gametic types is consistent with those reported by other authors, with the exception that X and Y were recovered with approximately equal frequency. This is in contrast to the data of both Sandler and Braver and of Peacock, whose results showed that the X was recovered on the order of twice as frequently as the Y. The data, without considering the attached-4, are shown below:

Paternal genotype	Sperm types				Total F <sub>1</sub>	Proportion of X-bearing gametes		
	X	Y	XY	0		Of Total	In dis-junctional classes	In nondis-junctional classes
$y w^a/sc^8 \cdot Y$	2828 (0.554)	2276 (0.446)	1	3	5108	0.554	0.554	---
$y sc^4 f v cv sc^8/sc^8 \cdot Y$	1360 (0.395)	1258 (0.365)	188 (0.055)	637 (0.185)	3442	0.450	0.520	0.228

If the Y and  $\overline{44}$  tend to form a bivalent and the  $sc^4-sc^8$  X remains unpaired (and if there is a tendency not to recover unpaired chromosomes), it might be expected that 1) the recovery of the X would be greatly reduced when compared to the recovery of the Y, and 2) the  $\overline{44}$  would segregate non-randomly with respect to the sex chromosomes. Neither of these expectations is met. Instead the  $\overline{44}$  segregates randomly and the X and Y are recovered with approximately equal frequencies. Estimation of nullo-X gametes cannot be made from these crosses, since their recovery is dependent on the frequency of  $\overline{44}$  gametes from the test female. If the ratio of  $\overline{44}$ /nullo- $\overline{44}$  gametes is the same for both sexes (the data are not yet available to evaluate this), the recovery of  $\overline{44}$  from the male is consistent with the reduction in viability associated with the  $ci\ ey^R$  phenotype. No viability considerations are involved in evaluating other segregation classes since both 4th chromosome phenotypes occur in each class.

The possibility remains that the excess Y, expected from the formation of a Y,  $\overline{44}$  bivalent and the unpaired  $sc^4-sc^8$ , is compensated for by a higher frequency of recovery of the shorter of the two chromosomes forming the bivalent. If this were the case, the proportion of nullo-XY class in the non-disjunctive gametes might be expected to show an increase. This proportion, however, is consistent with, but somewhat lower than, that found by earlier workers. Lastly, the presence of undetached YY males in the stock would, of course, tend to distort the results and this possibility cannot be excluded from the information available. These data must be considered as tentative and further tests will be made.

Novitski, E. and E. Ehrlich. University of Oregon, Eugene. Segregation in males carrying various chromosome rearrangements and the Segregation Distorter chromosome.

It has been shown by Peacock and Erickson (Genetics, 1965) that the action of SD is not through chromosome breakage, but that the virtual 100% recovery of the SD chromosome probably is caused by the preferential movement of the SD chromosome into the functional products of meiosis, much :

proposed by Novitski and Sandler (PNAS, 1957). The results described below provide convincing evidence that a segregation phenomenon is in fact involved.

In the first place, when the non-SD chromosomes are involved in a Y translocation, the action of SD may be drastically modified, even to the extent of reversing the effect. With an ordinary T(Y-2) translocation, the percentages of recovery of SD are as follows: T(Y-2)A, 97%; T(Y-2)B, 34%; T(Y-2)C, 93%; Y(Y-2)E, 98%; T(Y-2)G, 78%; T(Y-2)J, 98% and T(Y-2)rl, 93%. All except the second show typical SD recovery rates. On the other hand, four Y-2 translocations involving the Y marked with  $y$  gave rates of recovery 18%, 8%, 24% and 11%, respectively.

That this is not caused by the presence of the translocation involving the second chromosome per se is shown by the following series of results. Females carrying a normal and an XY X-chromosome and a normal and an SD second chromosome, produce  $F_1$  males heterozygous for SD and carrying either a normal X or an XY X-chromosome. Those carrying the normal X gave the following rates of recovery of SD: 95%, 100%, 51%, 94%, 98%, 99%, 87%, 98%, a series not incompatible with the known action of SD. On the other hand, their brothers, who differed only by the possession of an XY instead of an X, gave the following: 58%, 67%, 55%, 60%, 66%, 56%, 64%, 50%, 86%, 70%, 63%, 57%, 50%, 76%, 61%, 63%, 52%, 65%. In no case was any result similar to the typical SD recovery.

From these observations, we conclude that the preferential recovery of SD is not only a segregation phenomenon dependent upon the physical make-up of the chromosomes, but can be reversed by the appropriate selection of homologs and may even be modified drastically by the judicious selection of structurally altered non-homologs! The basis for the latter effect may possibly be found in a non-homologous pre-segregation phenomenon such as that postulated by Novitski earlier (Genetics, 1964).