Wargent, J.M. University of Sheffield, England. Position-effect variegation in the Revolute of Bridges strain of Drosophila melanogaster.

The strain Revolute of Bridges contains an inversion with breakpoints in section 52D5 of the euchromatin and section 40F of the heterochromatin in the salivary second chromosome. The wings of the flies show a variable mutant phenotype, expressed as upward or downward curling and variation in the angle at which they are held to the body.

The effect of temperature on mutant expression was determined by phenotypic comparison between 24 hour old adult females of genotype Rev^B/vg^C, bred entirely at 25°C, or bred at 14°C and allowed to eclose at 25°C. The phenotype was assessed on an arbitrary scale, ranging from Grade 0, representing no mutant expression, through to Grade 5, the maximal mutant expression observed. The results, shown in Table 1, indicate that low culture temperature enhances the expression of Rev^B.

Table 1

	25°		14°	
Grade of expression	No. of flies examined	%	No. of flies examined	%
0	223	26.87	12	1.93
1	197	23.73	25	4.02
2	166	20.00	86	13.85
3	130	15.66	145	23.35
4	73	8.79	176	28.34
5	41	4.94	177	28.50
Total No. of flies observed	840		621	
	$\chi^2 = 455.74$	n = 5	$p < 0.001$	

The effect of the Y chromosome on the mutant phenotype was observed in 24 hour old progeny of the cross: XX; Rev^B/vg^C ♀♀ x $\overline{XY}$; +/+ ♂♂. Grade 0 mutant expression, which is indistinguishable from wild type, was not scored since flies not carrying the Rev^B chromosome segregate from this cross. It can be seen from the results in Table 2 that Rev^B expression is

Table 2

	XX; Rev^B ♀♀		$\overline{XXY}$; Rev^B ♀♀	
Grade of expression	No. of flies examined	%	No. of flies examined	%
1	261	45.63	112	40.29
2	126	22.03	107	38.49
3	103	18.01	47	16.91
4	53	9.26	10	3.60
5	29	5.07	2	0.72
Total No. of flies observed	572		278	
	$\chi^2 = 37.59$	n = 4	$p < 0.001$	

	XY; Rev^B ♂♂		XO; Rev^B ♂♂	
1	302	46.97	128	23.10
2	171	26.59	185	33.39
3	101	15.71	133	24.00
4	43	6.91	72	13.50
5	26	4.04	36	6.50
Total No. of flies observed	643		554	
	$\chi^2 = 78.07$	n = 4	$p < 0.001$	

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Schäfer, U. University of Düsseldorf, Germany. Some observations on bobbed in Drosophila hydei.

There is good cytological evidence that in addition to the nucleolus organizer (N.O.) in the X chromosome, in both D. melanogaster (Cooper, 1959) and D. hydei (van Breughel, 1970), a second one is located in the short arm of the Y chromosome. However, contrary to the situation in D. melanogaster, XO males of D. hydei with a normal bb^+ X chromosome show the bobbed phenotype (Hess and Meyer, 1963; van Breughel, 1970). It seemed, therefore, possible to genetically confirm the localization of the N.O. in D. hydei by the use of different Y chromosome fragments.

Males of the following 6 different sex chromosome constitutions were used:
1) $X(bb^+)/T(A;Y^{TCN})$. The latter is an autosome-Y translocation chromosome which carries the entire short arm and a proximal part of the long arm of the Y chromosome. Cytologically this chromosome includes the sites for the lampbrush loops "tubular ribbons" (T), "clubs" (C), and "nooses" (N) (Hess and Meyer, 1968).
2) $X(bb)/T(A;Y^{TCN})$.
3) $X(bb^+)/T(A;Y^{ThP})$. Here the reciprocal half of the translocation chromosome described in 1) was used. It carries a distal part of the long arm of the Y chromosome with the loci for the lampbrush loops "threads" (Th) and "pseudonucleolus" (P).
4) $X(bb)/T(A;Y^{ThP})$.
5) Nondisjunction males with $X.Y^S$, the Y fragment containing only the short arm with the loop forming sites for the "nooses".
6) Nondisjunction males carrying $X.Y^{Th}$, in which the Y fragment comprises only the tip of the long arm including the site for the "threads".

Contrary to the expectation that only those males carrying fragments of the short arm of the Y chromosome would show the bb^+ phenotype, in all 6 cases the males were found to be wild-type.

Ritossa (1968) and Tartof (1971) have shown that the lack of a certain number of the ribosomal RNA cistrons (rDNA) could be compensated for in XO males of D. melanogaster. The results from the present experiments seem to indicate that such "compensation" does not occur in XO males of D. hydei, but does occur in D. hydei in the presence of various - even very small - fragments from different parts of the Y chromosome.

The situation becomes considerably more complex, however, in view of Hennig's report (1968) that XX and XXY females of D. hydei have 0.25% and 0.08% rDNA, respectively, in their total complements of DNA. Both types of females are, furthermore, phenotypically bb^+. On the basis of these measurements one would expect that, at a minimum, 0.125% of the total DNA in the XO males would be rDNA. Under such conditions, however, the observation that XO males in D. hydei show the bobbed phenotype while XXY females with less rDNA do not show bb is difficult to reconcile with the explanation of the bobbed mutation (Ritossa, Atwood, and Spiegelman, 1966).

A biochemical analysis of this problem is currently in progress.

References: van Breughel, F.M.A. 1970, Genetica 41:589; Cooper, K.W. 1959, Chromosoma 10:535; Hennig, W. 1968, J. mol. Biol. 38:227; Hess, O. and G.F. Meyer 1963, J. Cell Biol. 16:527; Hess, O. and G.F. Meyer 1968, Advanc. Genet. 14:171; Ritossa, F.M. 1968, P.N.A.S. 60:509; Ritossa, F.M., K.C. Atwood and S. Spiegelman 1966, Genetics 54:819; Tartof, K.D. 1971, Science 171:294.

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suppressed in females with a Y chromosome, and males lacking this chromosome show enhanced mutant expression.

Examination of the Malpighian tubules from third instar female larvae of genotype Rev^B/lt revealed that the tubules are composed of yellow (wild type) cells and colourless cells similar to those of the light mutant.

These results suggest that the variable Rev^B phenotype occurs as a result of position effect at the relavent locus, induced by the Rev^B inversion, and that the same inversion is also responsible for position effect at the light locus.