Figures supplied by +Department of Forests B.S.I.P., and ++Department of Agriculture Stock and Fisheries Rubber Research Station Bisianumu T.P.N.G.

It was noted that Mount Austen had received less than 1/10 of its average rainfall during the 1966 wet season. It is suggested that the relatively poor species diversity found in that area was related to the dry conditions.

Further, only one specimen of D. tetrachaeta was recorded from 18,000 flies caught at Bisianumu and none was found at Brown River. Unpublished records show that this species is common in previous catches made in this season at these places. A prolonged dry period occurred during the seven months from May to November 1965. Only 18.11 inches of rain fell at Bisianumu - the wettest part of the Port Moresby area. It is suggested that D. tetrachaeta is dependant on factors particularly related to rainfall to maintain its populations.

The range of D. tetrachaeta has been extended to Guadalcanal.

Malich, C. W. and R. M. Binnard. NASA Ames Research Center, Moffett Field, California. Variations in the transmission of broken chromosomes of D. melanogaster.

The dominantly marked Y chromosome $y^{+}\cdot Y\cdot B^{S}$ of G. Brosseau has been used by a number of workers to study chromosome breakage and loss, by inspection of adult Drosophila for transmitted markers. Chromosome breakage may result in bridge formation causing cell death at division, eliminating the damaged nucleus. Selective killing can thus affect the observed rates of transmission of the markers in such an experiment. We have used the $y^{+}\cdot Y\cdot B^{S}$ chromosome as incorporated by I. I. Oster in one of his multipurpose stocks to compare the breakages induced by irradiation with a variety of heavy particles. Males with the treated Y are routinely crossed to females with rod X chromosomes homozygous for yellow. There has been little variation among the particles in the apparent losses of one or both markers using this stock. The results tabulated for alpha particles are typical.

Recently we increased the fertility of the exceptional flies by crossing the treated males to special females having both arms of the Y attached to the X chromosome: $Y^{S}\cdot X\cdot Y^{L}$, having no free Y. The rate of exceptional flies increased as well as the fertility. The results listed in the table show no significant change in the rate of loss of single markers for either X-rays or alpha particles. Loss of both markers has almost doubled with this new stock. The ratio of double marker losses to single marker losses shown in the last column shows with greater precision the similarity between types of radiation and the variation between the two stocks.

Table 1. Transmission of chromosomes broken by different radiations. Rates are the total observed ones, including induced and spontaneous losses.

Radiation	#F_1♂	No. of Losses y^{+}	No. of Losses B^{S}	No. of Losses Both	Rate of Losses X10^{6} y^{+}	Rate of Losses X10^{6} B^{S}	Rate of Losses X10^{6} Both	Ratio of Double to Single Losses
REGULAR STOCK								
Alpha	30,288	45	138	268	0.8	2.3	4.5	1.47
x-ray	27,102	49	145	301	0.8	2.3	4.7	1.55
SPECIAL STOCK ($Y^{S}\cdot X\cdot Y^{L}$, no free Y)								
Alpha	3,534	9	26	90	0.9	2.6	9.1	2.57
X-ray	8,263	20	45	184	0.9	2.0	8.0	2.83

Fertility with the special stock is 72% for loss of y^{+} (21 of 29 tests), 87% for loss of B^{S} (61 of 70 tests), and 94% for loss of both markers (245 of 260 tests). Loss of both markers is usually taken as an indication of loss of the whole Y, so the lower fertility of single marker losses with the $Y^{S}\cdot X\cdot Y^{L}$ chromosome containing all fertility factors could indicate selective killing of cells with a broken fragment. However, cytological studies of 9 of the double marker losses disclose a more likely cause for the higher rate of transmission. Five of the 9 flies had ring Y chromosomes, far more than the usual fraction found with the standard stock. Only 1 of these ring Y chromosomes is fertile when crossed to standard stock. The other four ring Y's must contain deletions

which are lethal unless covered by the Y in the $Y^S \cdot X \cdot Y^L$ chromosome. Since these are nearly half of the small sample of flies tested cytologically, we conclude that most if not all of the doubling in rate of the double losses is due to these normally lethal ring Y chromosomes being transmitted in the special cross. This illustrates one problem of germinal selection even at low induced rates.

Keller, E. C. Jr., H. E. Keller and E. Liner. University of Maryland, College Park, Maryland. Heterosis in xanthine dehydrogenase activity levels.

Males of ten highly inbred wild-type strains of D. melanogaster and their F_1 interstrain hybrid progeny were tested for their respective levels of xanthine dehydrogenase (XDH) activity. The ten strains were collected in 1954 from the same locality and have been previously classified as within the "normal" XDH activity range (Keller, 1964). The method of assay was the fluorometric technique similar to that described by Keller and Glassman (1964). Progeny from the two genetic types (F_1 interstrain progeny and parents) were reared at two temperatures (18°C and 26°C) with the same parents being used for both temperature experiments. The total sample size of the balanced experiment was 604 flies.

Table. Average Xanthine Dehydrogenase Activity Levels and Variances for Ten Wild Type Inbred Strains and Their F_1 Progeny.

Genetic Type	TEMPERATURE				Average
	18°C		26°C		
	Average	Variance	Average	Variance	
Inbred Parents	4.03	0.542	3.16	1.463	3.59
F_1 Progeny	4.22	0.802	3.86	1.608	4.04
Average	4.12	------	3.51	------	3.82

The Table shows the mean XDH activity levels and their respective variances (for the experimental groups only) over the two temperature conditions for the two genetic types. On the average, the F_1 progeny showed significantly greater XDH activity than their parents (at both temperatures). Also, there was a greater activity differential between the F_1's and their parents at 26°C than at 18°C. One-tailed unpaired "t" tests were used, within temperatures, to complete the statistical tests. Preliminary tests showed that the F_1 progeny always had greater XDH activity levels than their inbred parents. The "t" value for the difference between the means of the parents and their offspring was 3.74 (285 d.f.) at 26°C and "t" = 1.75 (314 d.f.) in the 18°C experiment. The former "t" value is significant beyond the 0.1% probability level, the latter "t" value is significant beyond the 5% probability level. Examination of the average XDH activity levels at different temperatures revealed that flies reared at 18°C showed significantly greater enzyme activity than those