A FERTILE AND PHAENOTYPICALLY NORMAL
TRIPLO-X FEMALE OF DROSOPHILA PSEUDO-
OBSCURA (RACE A)

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(With One Text-figure)

A female of Drosophila pseudo-obscura (Race A) has been encountered which, judged by her progeny, must have been equipped with three X-chromosomes. The source of these and their distribution among the progeny are shown in the following pedigree:

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\begin{array}{c}
\text{I} \\
\text{I} \\
\text{III} \\
\text{IV} \\
\text{V} \\
\text{VI} \\
\end{array}
\]

The mother of this triplo-X female possessed a wild-type X-chromosome, derived from her father, in which a mutation had occurred at the singed locus, and this, together with her other X-chromosome as well as that of her mate, was transmitted to this triplo-X daughter. The new singed \((sn^3)\) was a very exaggerated form of the well-known singed character (which in \(D.\ pseudo-obscura\) is not very pronounced). In singed\(^3\), the bristles are short, twisted and depressed. In combination with singed\(^2\), it is only slightly, if at all, modified so that the two allelomorphs are very easily recognized and separable. The father of this triplo-X female was yellow carrying scutellar\(^2\), an allelomorph of Lancefield's scutellar, which removes all four scutellar bristles. It is reliable in expression, and since it is located very close to yellow (crossing-over about once in 300) it can be used to distinguish one yellow-bearing chromosome lacking scutellar from another which includes it. In this
particular instance it was introduced into the experiment for the reason that at the time it was suspected that the new singed was the expression either of a deficiency or of a duplication, so that it became desirable to introduce a chromosome which would enable cross-overs in the neighbourhood of singed to be detected.

But this suspicion proved to be unwarranted, for the offspring of the sn² female by this yellow male showed normal segregation: the sons exhibited both singed allelemorphs and cross-overs appeared, whilst the daughters were either wild-type (presumably $\frac{sc \cdot y \cdot sn^2 \cdot v}{sc \cdot y}$) or else yellow $\frac{y \cdot sn^2 \cdot v}{sc \cdot y}$ in appearance. The triplo-X daughter was in no way remarkable phaenotypically and was assumed to belong to the former class. Though she carried two yellow and two singed genes in association with one wild-type allelemorph of each, as was demonstrated by further breeding, she was wild-type in characterization. Furthermore, although she was a triplo-X female, unlike the phaenotypically abnormal and infecund 3-X female of D. melanogaster (Morgan et al. 1925), she was normal in appearance and fertile in mating. As her autosomes were insufficiently marked, there is no genetic evidence as to whether or not she was completely triploid. But the fact that no intersexual forms appeared among her progeny may perhaps be taken as negative evidence, though the possibility remains that the difference in chromosome balance between the two species, D. melanogaster and D. pseudoobscura, may be such that the same chromosome disturbances do not yield the same phaenotypical abnormalities in both.

If crossing-over between the three X-chromosomes of the triplo-X female were at random, every kind of combination could have been observed in the $F_1$ (VI) males, but the females which received a cross-over chromosome bearing only $y (\frac{y \cdot sn^2 \cdot v}{y \cdot sn^2 \cdot v})$ would be indistinguishable from those which carried the non-cross-over (sc y) chromosome $\left(\frac{sc \cdot y}{y \cdot sn^2 \cdot v}\right)$. Similarly, the $y \cdot sn^2 \cdot v$ class might include females with the cross-over chromosome sc y sn² v. An attempt to estimate the number of cross-over females included in these classes was made, and the visible cross-overs (y sn² and + females) were also bred, so that the exact constitution of their X-chromosomes might be known.

Table I shows the types of recombination expected on the basis of random crossing-over between the three chromosomes, and gives the number actually obtained. No crossing-over between scutellar and yellow.