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carinata and *Anodonta imbecilis*, in a few places, and the three common species, *Lampsilis siliquoidea*, *Lampsilis ventricosa* and *Ligumia recta*. Since the other drainages of the state except the Lake Superior drainage offer a greater variety, and since the upper Mississippi has all the characteristics of a good mussel habitat, the only explanation seems to be that the post-glacial migration was prevented by the St. Anthony Falls.

Growth rate of mussels can be studied by counting the rings on the shell and measuring the distances between them. These rings represent interruptions in growth due to withdrawal of the mantle. A preliminary study of growth rate was made on the two species of *Lampsilis* in the upper Mississippi, and curves were drawn. In both species growth was rapid during the first three years, became slower the fourth year, and after about the fifth year reached a consistent level which it maintained. They may live as long as fourteen or fifteen years. Comparing *Lampsilis ventricosa* and *Lampsilis siliquoidea* from the same environment, *Lampsilis ventricosa* grows much faster.

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INCREASED FERTILITY IN DROSOPHILA IN THE HETEROZYGOTE OF TWO ALLELOMORPHS EACH HOMOZYGOUS INFERTILE

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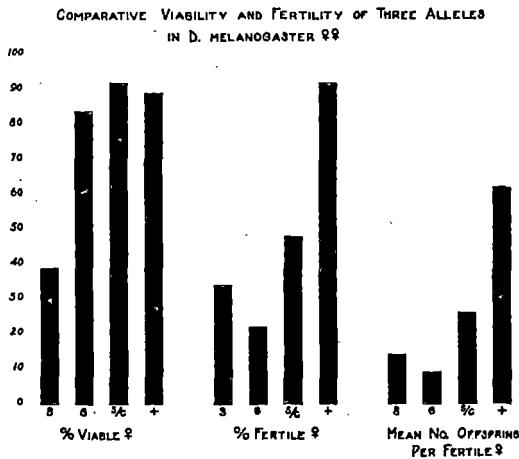
It is generally conceded that most or all genes are manifold in their action, i.e. they take part in the development of more than one trait of a given organism. This fact has been accepted, without contradiction, by the majority of geneticists, yet very little concrete evidence and few critical experiments have been offered in its support.

The data to be presented represent an analysis of three sex-linked alleles in *Drosophila melanogaster* whose action is clearly manifold. The mutation of the normal gene to either of the recessive alleles *glossy* or *spectacle* has resulted in a number of modifications of the wild-type phenotype. The most obvious modifications in the phenotype are characterized by marked alterations in the color, shape, and structure of the adult eyes. Concomitant with the eye mutation, an alteration of the pigmentation of the Malpighian tubules occurs. Moreover, the mutant individuals are also characterized by a reduced viability, and the females exhibit a further modification, viz., a reduced fertility. The phenotype of the heterozygous females, *glossy/spectacle*, is indistinguishable from that of the homozygous *glossy* individuals and is also characterized by a decrease in fertility in relation to that of the normal females.

Whereas changes in the structure, shape, and pigmentation of the eyes are obvious by mere examination, alterations in the fertility and viability of individuals are not as easily demonstrated and consequently were subjected to a rather rigorous analysis.

In the analysis of the viability and fertility of the mutant females, individual females of each type were mated to single *glossy* males. At the end of four days the matings were inspected and the number of viable females determined. Fertility of the females was determined on the basis of individuals living at least four days.

In figure 1 the viability is represented as the percentile frequency of females viable at the end of four days. It is obvious that the viability in only the *spectacle* females deviates significantly from that of the normal. As a result only about 40 per cent of these females were living at the end of four days.



However, examination of the data in figure 1 concerning the fertility of the tested females shows that the frequency of fertile females of each mutant type tested is significantly less than that of the normal control females. Thus only 22 per cent of the viable *glossy* females, 33 per cent of the viable *spectacle* females, and 48.5 per cent of the viable *glossy/spectacle* females produced progeny. In contrast to this, about 92 per cent of the normal controls bred. Moreover, in cases where mutant females were fertile, they produced significantly fewer progeny than the normal controls. Thus the average number of offspring was 9.25 for each breeding *glossy* female, 14.51 for each breeding *spectacle* female, 26.30 for each breeding *glossy/spectacle* female, and 62.38 for each breeding control female.

Furthermore, within the group of mutant females, the *glossy/spectacle* females were fertile more frequently and produced a signi-

ificantly greater number of progeny than either homozygous *glossy* or *spectacle* females.

The apparent causes of the infertility of the mutant females were disclosed when examination of the internal genitalia was made. It was found that in all cases the spermathecae and pars ovariae, which compose part of the accessory genitalia, were absent in mutant females. The tubular receptacle, which completes the accessory genitalia, was present in all cases and does not appear to differ from that of the normal female. Since it has been observed that the spermathecae and pars ovariae act to store and maintain the sperm before they fertilize the ova, it follows that their absence would result in the failure of most of the sperm to remain viable in the female tract before fertilization. The tubular receptacle might serve to maintain some sperm cells thereby accounting for the partial fertility of the mutant females.

However this fact alone cannot account for the apparently greater fertility of the *glossy/spectacle* females in comparison to the homozygous *glossy* and *spectacle* females, for no difference between the internal structure of the genitalia of the *glossy/spectacle* and the homozygous *glossy* and *spectacle* females was observed. Very likely other factors are involved in the determination of the infertility of the mutant females. The data presented indicate that these unknown factors act to decrease the fertility more completely in the homozygous *glossy* and *spectacle* females than in the heterozygous *glossy/spectacle* females.

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NOTES ON THE CAVE BATS OF MINNESOTA

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Bats have long figured in the legends and arts of people the world over, usually as omens of evil; although in the Chinese culture they have been regarded as bearers of good fortune. The secretive-ness of these creatures have guarded well their habits, and through the ages comparatively little has been learned of their ways.

Because of the scantiness of our information concerning Minnesota forms, this study was undertaken. Although a few notes had been gathered at an earlier date, the problem was first given serious consideration in the fall of 1940. The study is yet young, but much of interest has been learned; and it seems well to set forth the available information at this time.

In Minnesota there are found seven species of bats which fall into two well defined, though arbitrary, groups—those known as tree bats which roost in trees and on cliff faces; and those termed cave bats which gather in caves, buildings, and hollow trees. The