This shows that miniature-$\alpha$ mutates to wild type at the formation of germ cells in miniature-$\alpha$ males and heterozygous and homozygous females.

Miniature-$\alpha$ mutates to wild type in somatic cells as well. Mosaic flies having part of the wing miniature and the other part wild type are very frequent and are easily distinguished. If miniature-$\alpha$ wings are examined under high magnification almost all of them show small areas of wild-type tissue.

*The Frequency of Mutations.*—The frequency of mutations of miniature-$\alpha$ to wild type can be changed by selection. Selection made for low frequency gave a practically constant miniature line, and selection for high frequency of mutation resulted in a line in which over 70 per cent of flies from miniature-$\alpha$ parents were wild type.

*Discussion.*—In its general behavior miniature-$\alpha$ can be compared with well-known, frequently mutating genes in plants which produce chlorophyll and anthocyan variegations. On the other hand, it differs strikingly from the gene for "reddish" (mentioned above) because it mutates in all stages of development. (The mutating period of reddish is strictly limited to the maturation division of heterozygous females.)

[1] Demerec, M., these PROCEEDINGS, 12, 1926 (11–16).

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## *GENETIC EVIDENCE OF A SELECTIVE SEGREGATION OF CHROMOSOMES IN SCIARA (DIPTERA)*

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A cytological study of chromosome behavior during spermatogeneses in *Sciara* gave evidence indicating that a selective, instead of random, segregation of chromosomes takes place here, such that the maternal chromosomes separate bodily from the paternal ones.[1] The evidence also indicated that one parental haploid group was regularly cast off and not transmitted by the sperm.[2] From the behavior of two large "sex-limited" chromosomes, found only in males, it was postulated that the maternal chromosome group was the one regularly cast off.

A genetic test has now been made which reveals the actual behavior of one pair of chromosomes, and shows that, at least so far as this pair is concerned, the earlier inferences were correct in principle. The evidence comes from breeding experiments with a recessive mutant wing character "truncate" in *Sciara coprophila*, Lint., the inheritance of which is as follows:

A truncate female by wild-type male gives in $F_1$ all wild-type offspring, as expected. The heterozygous $F_1$ males, however, breed as if they were pure truncate—i.e., they transmit only the gene derived from the mother. From the reciprocal cross the $F_1$ males, although of the same genetic constitution, breed as if they were pure wild type—again transmitting only the gene derived from the mother. Similarly in subsequent generations a heterozygous male breeds as if he were homozygous for the maternal gene. This is equally true whether the mother is homozygous or heterozygous; i.e., it is independent of the somatic constitution of the mother.

The genetic behavior of the female is apparently of the "ordinary" type. A heterozygous female transmits both truncate and its wild-type allelomorph. Apparently segregation here is more or less at random, although wide deviations from a 1:1 ratio are sometimes observed.

The inheritance of truncate has been followed through four generations, including back crosses of $F_1$ flies of both sexes from reciprocal matings, and numerous back crosses of $F_2$ flies. The evidence, therefore, seems to leave no question that normally the chromosome pair considered here undergoes a selective type of segregation in the male—the maternal member always going to the pole which is to remain in the spermatocyte and be transmitted by the sperm. In the latter respect the actual behavior is the reverse of that postulated from cytological observations, although the principle involved is the same.

The data from these experiments also show that true fertilization takes place in *Sciara* in the production of females as well as of males—a feature which seemed doubtful from cytological evidence alone, and which necessitates the assumption of additional peculiarities in chromosome behavior (considered elsewhere).

Without attempting to present the evidence upon which the above conclusions are based, one experiment may be cited as an illustration of the type of behavior found here. This experiment began with reciprocal matings between wild type and truncate; (*a*) wild-type female by truncate male, and (*b*) truncate female by wild-type male. In both cases the $F_1$ flies were all wild type (73 and 126, respectively). Subsequent matings were then made as follows:

1. $F_1$ males from mating (*a*) were backcrossed to truncate females. These gave only wild-type offspring (90 flies).

2. $F_1$ flies from the reciprocal mating (*b*) were bred *inter se*. These gave an $F_2$ consisting of 59 wild type : 54 truncate.

3. Males (all brothers) from this $F_2$ were mated singly to females (all sisters) from mating 1. Eight of the males were wild-type and twelve truncate. The former gave only wild-type offspring (409 flies), while the latter gave in every case both wild type and truncate (total, 228 : 244).

The results of this experiment (selected because it illustrates several different types of matings) deviate widely from those expected on the basis of ordinary Mendelian inheritance, but are readily interpreted when allowance is made for the aberrant chromosome behavior in the males.

[1] Metz, C. W. 1925. "Chromosome Behavior in Sciara (Diptera)," *Anat. Rec.*, **31**, 346. Cf. also *Science*, **61**, 212 and **63**, 190.

[2] A detailed account is in press in the *Zs. ind. Abst. Vererb.*

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# *DECOMPOSITION OF AMMONIA BY OPTICALLY EXCITED MERCURY ATOMS*

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*Introduction.*—Recently there have been studied various chemical reactions sensitized by mercury vapor activated by the absorption of the line 2537 Å. These reactions are often so complicated as to make their mechanism difficult to elucidate. For instance, in the case of the hydrogen-oxygen reaction, which has been studied by ourselves and later by others, there is the possibility of activating oxygen as well as hydrogen and the possibility of forming hydrogen peroxide and ozone as well as water; this reaction is further complicated by the removal of mercury vapor through oxidation. Consequently, it was desirable to study a reaction which *a priori* seemed relatively simple. It was known that ammonia can be decomposed photochemically[1] by the absorption of light of wave-lengths 2025 to 2140 Å. Preliminary experiments showed that ammonia decomposition could also be brought about by the wave-length 2537 Å when mercury vapor was present, although ammonia itself does not absorb this line. The decomposition products of both the sensitized and unsensitized reactions have been examined.

*Experimental Procedure.*—Light from a quartz-mercury arc was allowed to shine on two concentric cylindrical quartz tubes. The inner tube was connected to a mercury-vapor pump and McLeod gauge and could be filled with ammonia at any desired pressure. In the annular space between the two tubes a solution could be placed to serve as a light filter. In a side-arm connected to the inner quartz tube was placed about 2 cc. of mercury, in order to give a partial pressure of mercury corresponding to its vapor-pressure at room temperature. Through a liquid-air trap a quartz-fibre manometer, whose purpose was the examination of the reaction-products, was also connected to the inner tube. This manometer had two quartz fibres fused together at one end to prevent Lissajou