(non-Bl) F_2 flies of each culture, and then to examine the F_2 to see whether non-Curly non-Lobe flies are present (their absence indicating a lethal), or are reduced in number relative to the Curlys (an indication of a detrimental), or are sterile (because of a recessive sterile), or visibly abnormal. If evidence of the presence of a crossover chromosome is found, as shown by S and Sp, flies of this kind are eliminated and F_3 virgins without these markers are chosen to continue the line. Thus the F_3 provide the basis for readily establishing a stock, not requiring further selection, of any second chromosome mutant found.

The chief advantage of the "sifter" method is, as its name is intended to imply, its almost automatic sifting of the F_2 zygotes, so as to make it unnecessary to obtain virgins from the numerous F_1-F_2 cultures, at the very stage of operations where this requirement has usually constituted the limiting factor on the size of the body of data obtainable. As abundance of data is especial importance in most mutation work, the door is thereby opened to studies which would not hitherto have been feasible. The method is applicable to the study of second chromosomes of virtually any composition, and therefore can be used not only for determinations of the frequency of occurrence of mutations in the laboratory but also for the analysis of the composition, as regards their second chromosomes, of flies taken from populations existing in nature.

The warning must however be given that sifter flies are rather weak and not good breeders, especially in view of the few viable offspring they produce on crossing. Therefore several virgin sifter females should be provided for every F_1 male bred, and vial cultures provided with the usual anti-mold compounds and with sterilized cellucotton and cotton. Under these conditions ample F_2 are usually forthcoming for the mass cultures of the next life cycle, the critical cycle; and the next generation develops much better.

Muller, H. J. Homosexual copulation in the male of Drosophila, and the problem of the fate of sperm of males isolated from females.

In a culture vial containing about 20 wild-type males which had been kept (at room temperature) isolated from females, ever since their hatching about two weeks previously, a male was observed to be in copulation with another male. The copulating male was dorsal to the other, in approximately the normal position for Drosophila copulation by a male, except that its abdomen was inflexed farther forward, with the extruded penis firmly fixed into the deep space of the neck region on the dorsal side of the other fly, between the posterior surface of the latter's head and the anterior surface of its thorax. The male being copulated with went about as if undisturbed. The copulation lasted about five minutes from the time it was first observed, and so it may have lasted for the normal length of time.

The question arises, to what extent is this a usual method whereby Drosophila males kept apart from females but in company with other males lose their sperm. The work of Harris (1929) showed that the sperm of males kept without females from some two weeks after irradiation still had the high mutation frequency characteristic of sperm irradiated when mature, instead of the low frequency characteristic of sperm derived from similarly irradiated males after they had been kept with females for about two weeks. However, later work has shown that after not much longer than two weeks following irradiation the males that have been kept without females do show a drop in mutation frequency. If, as seems likely, this drop is not entirely due to the admixture of newly formed sperm with the old sperm, the old sperm must after a time become unavialable. There are several conceivable ways in which this could

occur: (1) the old sperm when kept in a male might after a time degererate, possibly becoming resorbed; (2) the sperm might gradually leak out: as in some vertebrates, they might be lost (3) by ejaculations occurring in the absence of copulation, or (4) in the course of copulations other than heterosexual ones. We now see that possibility (4) does occur sometimes in Drosophila as in vertebrates, in the form of homosexual copulation, but there is as yet no evidence as to how common it is, aside from the negative fact that it has not hitherto been reported.

Muller, H. J. Localization of Y:bw$^+$ insertion and cr-u sterile (crs).

The portion of the right arm of the third chromosome inserted into the long arm of the Y in the Y:bw$^+$ chromosome found by Dempster is very similar in length and position to the Pale insertion (P^i) and can be substituted for it for saving the life of an individual having the Pale deficiency (P$^-$) in one second chromosome. However, it does not extend quite so far to the right as does P^i, so that a Minute bristle effect is produced, by a Minute locus lying between the right breaks of these two insertions. Also between these breaks is the locus of the recessive male-sterility gene, "crs" (called "cru-sterile"), originally associated with "cr-u". The symbol "cr-u" represents Bridges' "cream-underscored", a dilutor of eosin, which he had localized in the left arm of chromosome 2 and which he had thought to be itself responsible by a pleiotropic action for the male-sterility effect. Thus males homozygous for crs are rendered fertile if they contain P^i in one of their third chromosomes, but not if they have Y:bw$^+$ (and no P^i).

Muller, H. J., and associates Ultraviolet induction of mutants at loci at which spontaneous mutants are known.

The question has been raised (by Dr. J. Schultz in a personal communication) whethe any mutations which arose after ultraviolet treatment have been found (or made very probable) to be allelic with know spontaneous mutants. The following is a list of such cases known to our group.

X Chromosome

achaete: 1 case by McQuate in 1949, in sc.Y^1 chromosome, not associated with mutations to y or lethal.
fused: 1 case by Edmondson, 1951
Notch: 1 case by Altenburg about 1930; 1 case by Muller about 1941; 1 case by Meyer, 1947; 1 case by Meyers and Byers, 1951.
vermilion: 1 case by Edmondson, 1951.

Chromosome 2

apterous: 1 case by Meyer and Byers, 1949.
black: 2 cases by Meyer, 1950, 1951.
dachsous: 1 case by Meyer, 1951
giant larvae: 1 case by Meyer, 1950.
light (lethal): 2 cases by Meyer, 1950, 1951.
Lobe: 1 case by Edmondson and Meyer, 1949.
straw: 2 cases by Meyer, both in 1951.
lethals: various cases of allelism of uv-induced with spontaneous lethal.

Probable allele where the locus has not been tested:

X Chromosome

narrow abdomen: 1 case by Edmondson, 1951

Chromosome 2

Dent: 3 cases, 1 dominant and 1 recessive by Meyer, and 1 dominant by