isolation between the 2 types. But the fact that natural populations in the southern parts of the distribution area of *Culex pipiens* (Mediterranean area) show varying degrees of autogeny, does not support this view. Our experiment weakens it still more.

We are convinced that our released males were equal in competitiveness to the natural males or still better. Before the translocation strain was built up for mass production it had been subjected to a rigorous selection by overpopulation in the rearing containers. Furthermore, the translocation males were outcrossed to normal females from wild populations. In this way the fitness of the males intended for the releases was still more enhanced due to hybrid vigour.

The second question, whether the translocation could be introduced into the population to the saturation point, could also be answered in the positive. Figure 2 shows the percentage of egg rafts with reduced hatching due to copulations of wild females with translocation males. The percentage remains low during the first 3 weeks. However, after releases in a ratio of 1:1 and up to an average of 5:1 from on August 18th, the percentage rises very quickly to about 75% in the course of 3 weeks. At that point a cold spell did bring about a stagnation of the percentage. Newborn females were entering into hibernation after they had copulated and were therefore no longer contributing to the percentage figures. But after a stagnation period of somewhat more than 1 week, the percentage was again increasing and went up to 95% or more at the end of September. At that time the number of egg rafts in the open was rapidly decreasing and releases were terminated on September 30th.

It is obvious from the figures presented in Figure 2 that the translocation had been introduced into the population. In fact the saturation point had already been attained before the stagnation period. The saturation point is that percentage of semisterile crosses, that produces more semisterile offspring than normal ones. With the translocation used in the present experiment, giving 50% semisterility, the saturation is obtained with 66% semisterile egg rafts. In this situation equal numbers of normal and semisterile males are produced. When more than 66% of egg rafts show the semisterility, the semisterile males will be more numerous. If both types of males, normal and semisterile ones, have the same reproductive capacity and if the population is totally isolated, the semisterile ones will increase automatically and the normal ones decrease. Normal males will finally disappear and the population will reproduce on the decreased level imposed by the translocation semisterility.

The third question, whether our measures had an influence on the population size, can also be answered, although not in such convincing way as the former questions because comparative data from similar populations without treatment are not available. It can only be stated in a general way that breeding of *Culex* in other villages was still going on without obvious decrease or stagnation at least to the second part of September. Our treated population, however, revealed a decrease in production (Figure 3) parallel to the release of translocation males. After the highest peak in the middle of August there appear still 2 minor peaks towards end of August and early in September. The last peak after the middle of September is already lower and afterwards the production is tapering off. Under normal conditions the population density would at least have remained on the level of early August, but would most probably have still increased. Our releases had the effect that the production did decrease in about 2 months' to a level of about 10% or less of the normal potential.

The present experiment of releases of translocation animals into a natural population is the first of its kind. Considering the late beginning of the releases under difficult conditions, it has nevertheless proved that semisterility can be used with success for control. With the translocation applied here, giving only 50% sterility, it is definitely not possible to eradicate a population. But is total eradication really the ideal goal that should be attained by all means? Depression of the reproductive potential of a population of harmful insects to a level which will, for example, make disease transmission no longer possible, or will minimize economic losses to a bearable extent, seems for various reasons to be more desirable than eradication. With the development of strains with two or more translocations, presently undertaken and already accomplished to some extent, the depression level can be fixed at any point, with other word, we impose birth control on natural populations. The results in producing translocation systems in other insects besides mosquitoes leads us to expect that the translocation method could be developed and applied with the same result against all harmful insects.

Zusammenfassung. Fortlaufende Freilassung von semisterilen Männchen in eine isolierte Freilandpopulation von *Culex pipiens* führte zu einer Verminderung dieser Population auf 10% der maximalen Populationsgrösse.

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On the Relative Position of the Centromere of Chromosome 3 in *Drosophila melanogaster*

According to Lindsley and Grell[1], the chromosome region with the locus Kinked (Ki 3-47.6) in *D. melanogaster* is located on the left arm of chromosome 3, proximal to the centromere. This is a contradiction to the following results, which indicate that the Kinked-region is localized close to the centromere on the right chromosome arm.

The large autosomes, chromosomes 2 and 3 of *Drosophila* are metacentric with a left and a right arm (2L *2R; 3L *3R, asterisks symbolize the centromere). In the laboratory of E. B. Lewis[2] compound autosomes, sometimes called isochromosomes, with 2 equilateral arms attached to 1 centromere, were constructed (2L *2L and 2R *2R; 3L *3L and 3R *3R).

If virgin females, carrying standard chromosomes, are crossed with males from a compound stock, most of the

[1] D. L. Lindsley and E. H. Grell, *Genetic Variations of Drosophila melanogaster*, Carn. Inst. Publ. *627*, 116 (1968).
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Progeny recovered from X-irradiated st Ki p^p females mated to ri; ++ compound-males and results of testcrosses

Experiment	Recovered fly	Tested with	Theoretically expected and actually recovered genotypes of progeny 1	2	3	4
A	ri; Ki p^p	+; ++	ri; ++ (46)	+; Kip^p (54)	+; ++ (2)	ri; Ki p^p (0)
B	ri; Ki p^p	st; ++	ri; ++ (5)	st; Ki p^p (5)	st; ++ (0)	ri; Ki p^p (0)
B	st; ++	ri; + p^p	st; + p^p (13)	ri; ++ (10)	ri; + p^p (0)	st; ++ (0)
C	st; ++	ri; ++	st; ++ (20)	ri; ++ (22)	–	–
C	st; ++	ri; ++	st; ++ (34)	ri; ++ (34)	–	–

Figures in brackets refer to actually recovered genotypes of progeny.

zygotes are lethal because of aneuploidy[3]. A few offspring can be obtained if nondisjunctional maternal pronuclei come together with an appropriate type of sperm[4]. If the same experiment is repeated with X-rayed females, additional progeny will be obtained. Most of the additional offspring will contain 1 paternal compound chromosome and a newly induced compound of maternal origin[5]. Exceptionally, flies carrying 2 newly induced maternal compounds can be recovered[5].

In our experiments, females (2L *2R; 3L *3R) homozygous for the following markers on chromosome 3 were used: scarlet (st 3-44.0), Kinked (Ki 3-47.6) and pink peach ($_{p}^{p}$ 3-48.0). For a detailed description of the genetic markers see LINDSLEY and GRELL[1].

Five-day-old virgin females were irradiated with 400 R (50 keV X-rays, 520 R/min) and crossed to C(3L)RM, ri; C(3R)RM, +males (C = compound; RM = reversed metacentric; ri = radius incompletus 3-47.0). 2 flies with the phenotype ri; Ki p^p and 3 with st; ++ were recovered. All 5 proved to be fertile in crosses with compound-three-partners. The progeny is listed in the Table.

The low frequency of progeny of the 3rd and 4th type (column 3 and 4 in the Table, sometimes called parent-types[6]) can be explained by the segregation behaviour of compound chromosomes in the female meiosis[6] as it is predicted by the distributive pairing hypothesis[2].

The progeny obtained shows that the marker Kinked is located on the parental C(3R)RM chromosome, which is homozygous for pink peach. Therefore the centromere is situated left of the Kinked-locus. HOLM et al.[7] showed evidence for the position of the centromere between the markers eagle (eg 3-47.3) and deformed (Dfd 3-47.5).

Today two hypotheses on the origin of compound chromosomes are discussed: 1. Misdivision of the centromere[5,8] and 2. two-break-aberrations[9,10]. The data presented in this paper do not allow us to distinguish between these two possibilities.

Zusammenfassung. Homozygote *Drosophila-melanogaster*- Weibchen, genetisch markiert mit scarlet (st), Kinked (Ki) und pink peach (P^p) wurden bestrahlt, um Compound-3-Chromosomen herzustellen. Es wurden ausschliesslich st/st- und P^p Ki/Ki(?) P^p-Compoundchromosomen gefunden. Dies zeigt, dass das Zentromer links der Markierung Kinked liegt.

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Enhanced Survival of Germfree Mice after Infection with Irradiated Scrapie Brain

The nature of the etiological agent of scrapie is an enigma. The high resistance to irradiation, heat, and chemical disinfectants (e.g., formalin) distinguish the agent of scrapie from other known living disease-producing agents[1]. The irradiation data has been interpreted by some workers to indicate that the scrapie agent is devoid of nucleic acid[2].

An hypothesis to explain the activity of the extremely resistant material present in the brain homogenate of scrapie infected animals is that this material is an inducer of a latent virus already present in the brain of uninoculated animals, and once induced, the virus makes more inducer substance. Treatment with formalin or high irradiation levels could well be ineffective in inactivating a peptide inducer for example; yet the scrapie agent itself could be a nucleic acid directed replicating system conforming to the current dogma.

A possible way to test the above hypothesis is by the use of germfree animals. By virtue of their caesarian delivery and germfree maintenance, such animals harbour fewer viruses than do their conventional counterparts, although it has been shown that germfree mice carry the virus of latent leukemia[3].

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