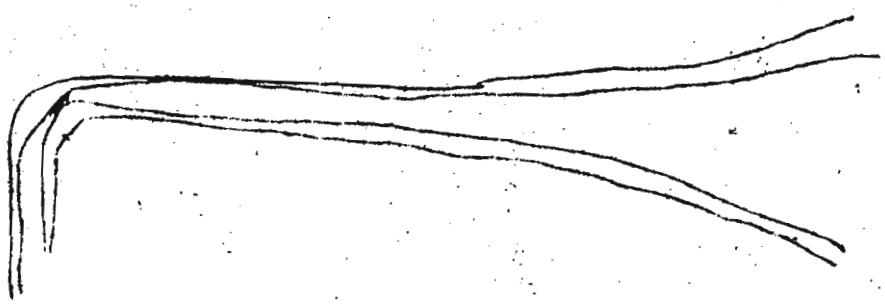
Medvedev, N.N. Pipette in Drosophila transplantation experiments.

In distinction from the pipette described for transplantation experiments on Drosophila by Beadle and Ephrussi we are using the pipette represented in our text-figure.

The very end of such a pipette during performing transplantation is wholly visible in the field of a microscope in a horizontal plane. This peculiarity provides the possibility of checking the movement of an organ under implantation within the capillary of the pipette and at the same time to check more precisely the quantity of physiological solution injected.



Spencer, W. P. Factors involved in oviposition.

As an increasing number of workers are undertaking problems involving the collection and hatching of Drosophila eggs (transplantation experiments, study of larval lethals etc.) a few notes on factors leading up to and inducing oviposition may prove of interest.

(A) Pre-feeding of females. Starved flies will lay few or no eggs. It is important to furnish flies which are to used in egg laying experiments an adequate supply of fresh food, particularly on the day or two days prior to the collection period. It is also well to use flies which have been matured for several days to two weeks depending on the species. If flies are aged in vials fresh food chips should be added or the old ones so cut as to furnish fresh surface, as the surface of a food chip in a vial soon dries or forms a film which cuts down on food comsumption.

(B) Humidity. To elicit the ovipositing reaction the air in contact with the surface where the eggs are to be laid must have a high humidity, probably close to or at the saturation point. This condition is frequently supplied, but sometimes unwittingly. Enclosing moist food medium in a glass container tends to supply the proper humidity. However, a small paper spoon of medium in a half pint bottle,

particularly in a dry climate, may not raise the humidity sufficiently to secure optimum results. The scraping and roughening of the food surface described by a number of workers supplies tiny humid valleys where the ovipositor meets an environment sufficiently moist to induce the reaction. However, eggs will be deposited in or on a smooth surface if the air in contact with it is saturated with moisture. Conversely no eggs are deposited in dry air. In a dry climate fresh medium may be left exposed to flies which will feed on it but will no oviposit. If, however, the same dish of medium is covered so that the humidity rises oviposition occurs. Thus in nature flies invariably oviposit in cracks or on the under surface of exposed food.

(C) Temperature. Ovipositing occurs through a wide range of temperatures differing somewhat for different species of Drosophila. The range however, is not as great as the upper and lower limits of temperature to which the fly is tolerant. Thus females which have been well-fed may be kept at temperatures below 10C for long periods of time without ovipositing. When the temperature is raised the first eggs laid are small and abortive, indicating a resorption of material from eggs held in the uterus for a long period. Roughly the temperature range is somewhere between 10C and 30C with the optimum differing for different species.

(D) Medium for oviposition. When all other conditions are satisfied, i.e. females properly aged and well-fed, temperature neither too high nor too low, and humidity conditions correct, flies will oviposit readily on a great variety of substances from the most elaborately prepared media heavily yeasted to cellucotton or tissue paper soaked in distilled water or tap water. The writer has collected eggs on cellucotton soaked in sugar-water, or yeast solution, or water alone, on raw beet, raw potato, various fruits such as apple, pear, banana, moist oatmeal, moist bran and the usual media. Stangely enough, all previous notes on the collecting of eggs including notes of the writer in DIS-7 mention yeasting the surface as a necessary part of the routine. Actually yeasting has little or nothing to do with inducing oviposition. If the same surface is made to do triple duty as food for the parent fly, ovipositing medium and food for the larva hatched from the egg, then possibly yeasting is indicated. However, the logical time to do the yeasting would be after the eggs have hatched or are about to hatch, as overgrowth of yeast is likely to cover and smother the developing egg. This is particularly true of small, slow-hatching eggs, deeply buried in medium. It is quite possible to provide in the same vial one surface for the feeding of the flies and another of quite a different nature for the collection of a large part of the eggs laid. Where the same surface is to be used for the three purposes mentioned above, and young larvae rather than eggs are desired the writer recommends small wads of cellucotton soaked in sugar water. This serves as an ideal feeding surface for adult flies, and reduces to a minimum the danger of weak adults sticking and drowning. The moist,

porous surface induces oviposition. The addition of fresh baker's yeast dissolved in water or for some species in a Ringer's solution containing particularly Mg and K ions brings the larvae through to pupation under optimum feeding conditions. The dissolved yeast may be added to the cellucotton at about the time the larvae hatch. Eggs or larvae may be secured for study or experiment at any time by shaking a bit of the cellucotton in Ringer's solution.

Spencer, W. P. The use of cellucotton in Drosophila culture.

A porous cellulose compound under the trade name, Cellucotton, furnishes and excellent base for culture media for Drosophila. This material comes in large bats, 2lb, 5lb, and 8lb. It is extremely porous and absorbent. One gram will soak up and hold without dripping 20 cc. of water or other liquid media. The material may be readily cut into wads of convenient size and placed in any design of culture bottle. Liquid media of which the main constituent is a sugar, (cane sugar, either refined or brown, or molasses), together with salts such as are added in the culturing of yeast, may be poured or pipetted onto the cellucotton and the surface seeded with a little powdered yeast. Flies are then put in. If there is any trouble with molds, moldex or other mold preventatives may be used. At any time during the life of the culture food may be added either in the form of the original solution or of baker's yeast in liquid suspension. It is also possible to raise the larvae from the start on yeast suspension, to which for some species salts must be added. In this case a small wad of cellucotton soaked in sugar water should be stuck to the side of the culture vessel as food for the parent flies.

If larvae are raised on yeast alone be sure to add a wad of cellucotton soaked in sugar water before emergence of adults as they will not live long on a yeast diet.

The advantages of the cellucotton will be obvious to anyone using it. There is no cooking of food media necessary. There is no necessity for cutting out a food plug to allow escape of CO_2. There is less tendency for flies to become stuck in the food medium. There is a more effective use of the media by the larvae and an increased yield per culture bottle. Large, well-nourished larvae are more readily available for salivary chromosome study. Much smaller containers can be used for rearing a given number of flies, thus cutting down on incubator space necessary for running an experiment. With proper handling of adults as to numbers and time left in culture overcrowding should not occur. When this is allowed to take place more cellucotton soaked in yeast may be added.