If eggs of the same developmental stage are needed, the first hour harvest is discarded: it contains many eggs which were retained during starvation and which are thus at very variable stages. The eggs laid after the preliminary period are very homogeneous: their real age corresponds to the moment of oviposition, as shown by the unimodal and narrow-shaped eclosion curve in figure 2, which describes the hatching of larvae from 100 eggs collected during 20 minutes after a preliminary period of one hour (Urbana wild stock).

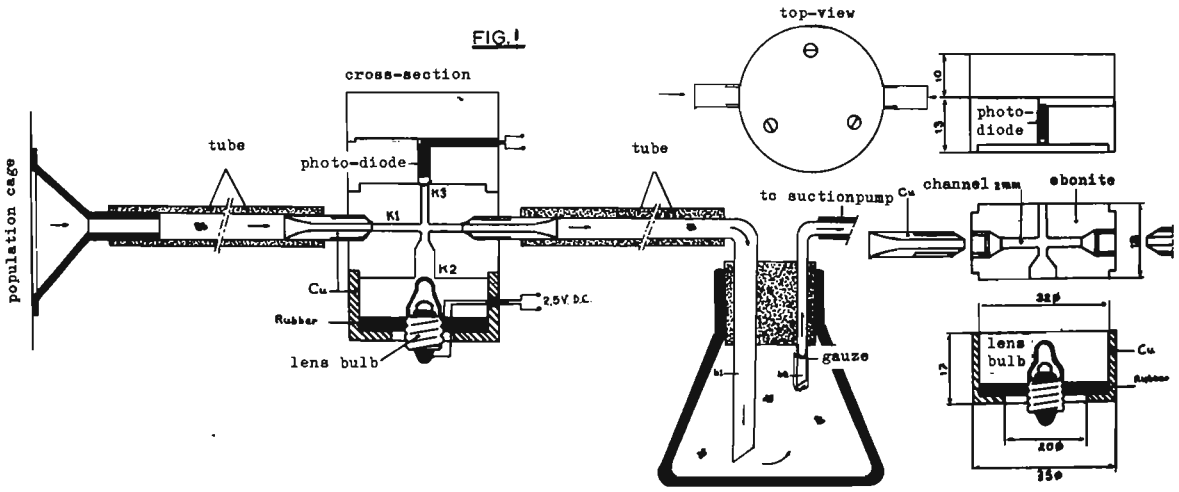
Our system seems to be very simple and rapid: forty bottles can be handled within 10 minutes without difficulty, and twenty thousand eggs of the same age can easily be obtained from young flies during half an hour following the preliminary first hour.

*100 cc water, 3 g agar-agar, 2.5 cc ethylic alcohol, 1.5 cc acetic acid.

Cuperus, P., J. A. Beardmore and W. van Delden. Central Electronics Service and Genetics Institute, University of Groningen, Haren (Gr.), The Netherlands. An electronic fly-counter.

The size of cage populations of Drosophila melanogaster can easily be determined, without etherizing the flies, with the aid of the electronic fly-counter described below. The flies are sucked out of the cage by means of a suction pump, pass through a counting head and are then stored in a bottle. To prevent flies from entering the pump, the opening of the tube from the bottle to the pump is covered with fine gauze.

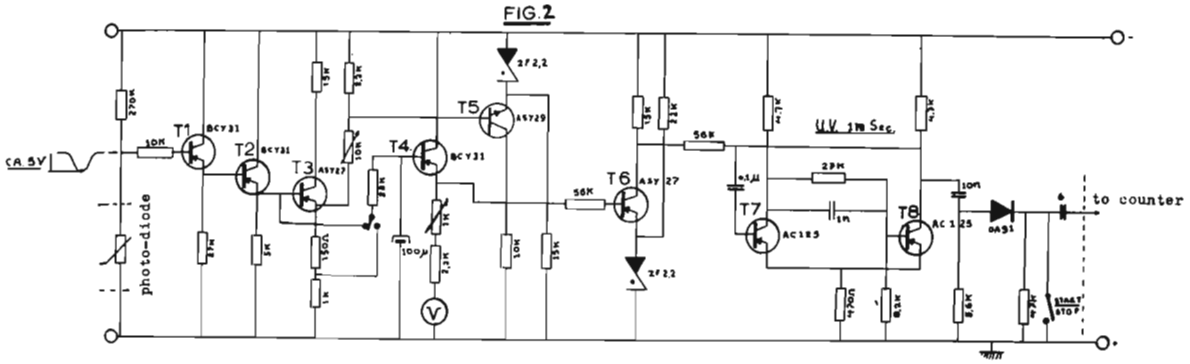
The counting head (figure 1) possesses two perpendicular intersecting channels; the flies are carried through channel k_1 with a tapered entrance leading to a straight section with a diameter of 2 mm*. The other channel (k_2k_3) is the counting channel and has a lens bulb L (2.2 V - 0.25 A, Philips) fed by D.C. at the end of k_2. A photodiode (Philips OAP-12) is fitted opposite to L at the end of k_3. The flies moving through k_1 interrupt part of the beam of light falling on the photodiode.



In the amplifier-discriminator and pulse-shaper, (fig. 2), the photodiode is connected in series with a resistance of 270 k σ connected to the -15 V. supply. The flies moving through k_1 cause a negative impulse of about 5 V over the photodiode. The pulse width

depends on the velocity of the fly. These impulses are fed to T_3 via two emittor followers T_1 and T_2. The emittor voltage of T_3 can be adjusted from 1.5 V to about 5 V by means of the 10 k σ adjustable resistance. This ensures that the impulse to T_3 causes an impulse by the transistor only if it reaches a critical value. The adjustment must be such that only whole flies are counted and smaller parts cannot cause a current impulse by T_3. The T_3 base and emittor voltages can be measured by means of transistor T_4 and voltmeter V. The voltage impulses, which are developed across the collector resistance T_3 are fed to the saturated amplifier which consists of T_5 and T_6. The output of this amplifier steers a univibrator (T_7 and T_8), with a 1 msec. metastable condition. This time span is longer than the time during which the light beam is interrupted by the flies. The univibrator is coupled to a conventional counter, which registers the number of flies passing.

FIG.2



By means of this fly-counter a population of many thousands of flies can be counted within ten minutes with an error < 0.5%.

*This measurement would need to be correspondingly altered for species appreciably larger or smaller than D. melanogaster.

TEACHING NOTES

Moree, Ray and Donald T. Grahn. Washington State University, Pullman, Washington. Demonstration of intra- and inter-chromosomal effects of inversions on crossing over.

The following experiment must be in use in many teaching laboratories, yet I do not recall any mention of it during conversation. It may therefore be worth a note since it adds an interesting contrast to the types of experiments traditionally in use. Using the stocks y w, In(1)y,In(1)w (see DIS 35:7), Cy/Pm;D/Sb, and any wild type stock, F_1 females of the following four types are produced: (1) y w/++;+/+;+/+ (2) In(1)y,In(1)w/++;+/+;+/+, (3) y w/++; Cy/+;D/+, and (4) In(1)y,In(1)w/++;Cy/+;D/+. These females are then crossed to y w males. As carried out by the class the crosses have given, respectively, the following percentages of crossing-over between y and w: 1.5, 0.3, 8.1, and 2.4. Some students often fail to identify D in selecting F_1 females, so the maximum enhancing effect is probably greater than that obtained. Results are clear cut and can be appreciated without resort to a statistical test. The experiments are easily performed and yet introduce an aspect of genetics quite novel to beginning students. That no satisfactory explanation exists for the increase in crossing-over is disappointing to some students but intriguing to others.