After this note was submitted for publication, Mr. Gerald Thorne, of the United States Bureau of Plant Industry, who was sent a manuscript copy, wrote as follows (personal communication): "There are many species of *Discolaimus* and *Actinolaimus* in my collections . . . which I know to be predacious. But it was only about a month ago that Mr. McBeth . . . saw our first *Aphelenchoides* feeding on another nema."

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A CIRCULATION PUMP[1]

IN a series of experiments on adrenaline secretion[2] need arose for a pump with which to pump the blood from the adrenals of a cat into its carotid artery. A description of the main features of this pump, which has been found to function satisfactorily and which can be used for the perfusion of organs with blood or other fluids or for the maintenance of the circulation of a whole animal, follows.

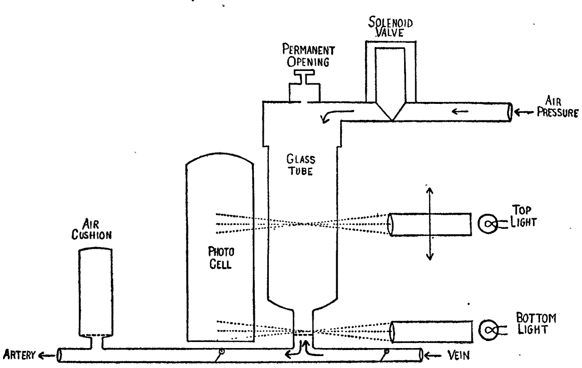

FIG. 1

The blood, leaving the vein, enters a vertical glass-tube. Its top is connected with the outlet of a solenoid air-valve, the inlet of which leads to an air-cylinder. When this valve is opened, the pressure, delivered by the tank, acts on the blood in the glass-tube and pumps it out. Two glass-valves direct the blood from the tube into the artery during the systole and prevent back flow from the latter during the diastole of the pump. When the glass-tube is emptied the air-valve is closed, and new blood is thus allowed to enter.

The air-valve is opened and closed by a photo-electric cell activated by two beams from two light sources, which pass through the glass-tube and can be interrupted by the blood column. These light-beams are focussed by lenses in such a manner that one passes through the bottom of the tube, while the other one is focussed on it at any desired height above. The wiring of the relay-contacts of the photo-electric outfit, the solenoid valve and the light sources result in the following operations of the pump. During systole the air-valve is opened and the top-light is out. Air pressure pumps the blood out of the tube into the artery until the blood column reaches the beam of the bottom-light. This beam is thus allowed to pass through the glass-tube and activates the photo-cell, which then closes the air-valve and switches the top-light on. During the ensuing diastole the top-light keeps the solenoid-valve closed until the rising blood level cuts the light off the photo-cell, which, by opening the pressure valve and switching the top-light off, starts the next systole. A narrow permanent opening at the top of the glass-tube allows the blood to replace the air enclosed in the tube during the diastole.

The output per stroke is determined by the height at which the top-light-beam passes the glass-tube. With each stroke, the tube is emptied, since the lower beam passes through the lowest part of the glass-tube. Increase or decrease in venous return are answered by a corresponding change in rate. The desired systolic pressure is adjusted by the reduction valve at the pressure tank. A large inside diameter of the glass-tube prevents significant changes in venous pressure, as small changes in level correspond to large changes in volume. An air-cushion chamber as used in other circulation pumps between arterial valve and artery maintains blood flow and pressure during the diastole. By placing the lower end of the glass-tube below the level of the vein, a slight suction may be obtained, which facilitates venous return. The parts of the pump which are placed close to the animal in order to avoid dead space in the connections between pump and vessels are: the two flow-valves, glass-tube, which by means of a metal fitting is screwed into the bottom of the air-valve, the two light-bulbs with lenses and the photo-electric cell (see Fig. 1). These parts are mounted on a metal holder and connected with the rest of the set-up by cables. All parts conducting blood can be heated electrically. They may also be kept sterile. We have used the pump with a maximum speed of about 100 strokes per minute, although usually a lower rate was preferred.

This pump resembles the artificial heart of O. S. Gibbs,[3] as with a constant, but adjustable output per stroke its output per minute depends on the venous return. Unlike the Gibbs-pump it avoids the contact of rubber with the blood. All the major parts used

[1] Aided by a grant from the David Trautman Schwartz Research Fund.

[2] Gerhard Katz and Gertrud Katz, *Jour. Pharm. and Exp. Therap.* (in press).

[3] O. S. Gibbs, *Jour. Pharm. and Exp. Therap.*, 38: 197.

are commercially available and comparatively inexpensive.

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A NEW TECHNIQUE FOR THE STUDY OF DROSOPHILA EGGS AND LARVAE

WHILE carrying on hybridization experiments on two subspecies of *Drosophila virilis* it was suggested to the writer by Dr. A. H. Sturtevant that egg counts be made. In attempting to improve on the present technique of egg collection it was discovered that a fly will readily deposit her eggs through cloth mesh onto the proper medium. To make use of this fact

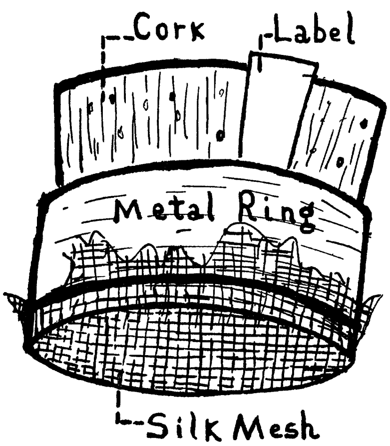

FIG. 1

the apparatus shown in the figure was devised. It is a tiny Drosophila cage, consisting of a metal gas-hole ferrule or ring $\frac{7}{8}$ inch in diameter and $\frac{1}{2}$ inch high. Over one end of this ring is stretched tightly a piece of black silk bobbinette, trade No. 400 for large species of Drosophila and No. 418 for small species. This silk net is held in place by a rubber band. Into the smaller end of the ring fits a cork of such a size that it projects part way into the ring. The label may be written on a small slip of library card which fits between cork and ring. This ensures a sufficient air supply.

In most experiments one female per cage is used. For securing eggs the cage is placed directly on the medium and the fly lays her eggs through the silk mesh. Few if any eggs stick to the mesh, and these may be seen against the black background. The medium of corn-meal molasses agar or banana agar with a little animal charcoal added for contrast is poured into a small waterproof paper plate of a size conveniently examined on the stage of the binocular. Yeasting is done by spraying a fine suspension from an atomizer onto the plate shortly before using. The medium should contain an extra supply of agar to ensure stiffness and to keep the silk from getting wet.

Several experimental cages may be placed on the same plate. To guard against contamination an inverted paper plate covers the apparatus and is held in place by paper clips or rubber bands. After a given time the cages are lifted off and transferred to a fresh agar plate. The egg output of each female is then counted. If the experiment calls for the rearing of larvae a piece of the medium containing a certain number of eggs is cut off and placed with food in a culture vial or bottle. The agar plate may then be covered, and from time to time egg hatching and early larval stages examined directly under the binocular.

This apparatus has advantages in the collection of large numbers of eggs and larvae, life history studies and various problems dealing with the rearing of Drosophila. Its use facilitates the introduction of quantitative methods.

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THE EAR-OSSICLES IN CRANIA

IN removing crania, human, or other, from fossil areas, the ear-ossicles have not been looked for in the surrounding earth, or still within the cranium. But in handling the temporal bone the ossicles may fall out unless cotton at once be placed in the external auditory canal. By such care a stapes was recovered from the left temporal of Lake Pelican man, Otter Tail County, Minnesota. This is an appeal to excavators to place cotton in ear-hole at once, and to examine earth for specimens.

THOMAS HORACE EVANS

BOOKS RECEIVED

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Report of the First Scientific Expedition to Manchoukuo under the Leadership of Shigeyasu Tokunaga. June–October, 1933. Section IV, Part III, Myxomycetes of Jehol. Pp. 55. 161 figures. 1 plate. *Section IV, Part IV, Index Florae Jeholensis.* Pp. 108. 3 plates. *Section V, Division I, Part X, Article 38–52, Insects of Jehol (VI).* Pp. 143. 20 plates. *Section VI, Part II, Palaeolithic Artifacts Excavated at Ho-Chia-Kou in Ku-Hsiang-Tung, Manchoukuo.* Pp. 107. 53 figures. 26 plates. Faculty of Science and Engineering, Waseda University, Tokyo.

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