Tennessee of the Reelfoot Lake Biological Station under the management and control of the Tennessee Academy of Science. The John T. McGill Laboratory is a modernly equipped building containing four laboratories fitted with proper work tables, cabinets, aquaria, etc., several stock and preparation rooms, and a large assembly room. This laboratory, located on the east side of Reelfoot Lake in Obion County, lies in a region which represents well the water and land fauna and flora of the Mississippi bottom. It is a few minutes walk from the comfortable Walnut Log Lodge, where special rates are available for workers at the laboratory. It is the policy of the executive committee of the station to allot free working space in the laboratory for research work of scientific interest. Application should be made to Dr. A. R. Bliss, Jr., University of Tennessee Medical School, Memphis, Tennessee.

In addition to the dedicatory exercises, approximately thirty papers were presented during four sessions of the meeting. These interesting programs were composed of reports on research work on diversified subjects and were presented by representatives of the following institutions: The University of Tennessee, Memphis; Southwestern University; George Peabody College; Vanderbilt University; Tennessee Department of Public Health; U. S. Department of Agriculture; Lambuth College West Tennessee Teachers College; Freed-Hardeman College; University of Tennessee Junior College, Martin; State Teachers College, Murfreesboro. Numerous groups made field excursions both on the lake and into the surrounding woodlands for the collection of specimens and material from this interesting territory. These trips and the congenial atmosphere of the Walnut Log Lodge contributed not a little to the success of the meeting. The academy is indebted to Dr. A. R. Bliss, Jr., and his committee on arrangements for making possible one of the most pleasant and successful of the academy meetings.

FRANCIS G. SLACK,
President

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A TELEPHONIC DROP COUNTER

THE drop counter here described operates on the mechanical contact principle, but uses a telephone transmitter as the contact mechanism in place of the conventional metal vane making contact in a pool of mercury. The small current variations of the transmitter are amplified by a powerful vacuum tube relay, which gives a large current output sufficient to operate any type of recording apparatus.

Fig. 1 represents a Western Electric telephone

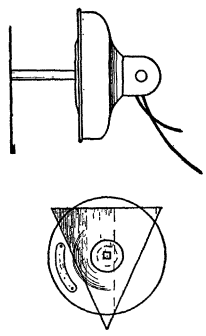

FIG. 1. Transmitter with vane attached to diaphragm.

transmitter with the rubber mouthpiece removed. A triangular vane of thin mica or celluloid, about 5×7 cm, is fastened at its center to a light celluloid spindle some 7 cm long, and the lower end of the spindle is cemented to the diaphragm of the transmitter with celluloid-acetone cement. The vane is mounted parallel to the diaphragm and about 5 cm above the top of the transmitter to allow a layer of sound-deadening cotton to be spread over the transmitter. The transmitter is laid in a boxful of cotton to prevent outside vibrations from actuating the mechanism, and the pipette is adjusted so that the drops fall on the vane.

Fig. 2 shows the electrical system used to amplify

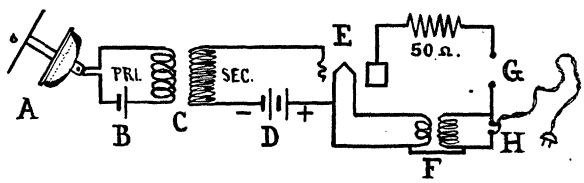

FIG. 2. The amplifying system of the apparatus.

the current variations of the transmitter. A is the transmitter, B a 1½ volt dry cell, C a microphone transformer with a 60 to 1 ratio between secondary and primary, D the bias battery of 9 volts made of two 4½ volt C-batteries in series, E is the amplifying tube, F the filament supply transformer, G the output connections and H the 110 volt supply leads.

The amplifying tube is a General Electric Thyratron FG-17, a mercury ionization vacuum tube of peculiar properties which operates on raw 110 volt alternating current and requires no B-battery. In this device the plate current does not follow the grid voltage up and down as in the ordinary amplifying tube, but no plate current at all flows until the grid voltage reaches a certain value, when the mercury vapor suddenly ionizes and an output of about 50 watts results. The tube consequently is an excellent

off-and-on relay, and is well adapted to many recording and controlling processes in the laboratory. The output is half-rectified alternating current, which operates most direct current magnets satisfactorily. The tube fits an ordinary 4-prong radio tube socket, but the plate connection is made to the metal knob on top of the tube instead of the plate contact on the base. Filament current at 2.5 volts and 5 amperes is supplied by a small transformer to be had at any radio supply store, and no rheostat is necessary. The output circuit of the tube should contain a 50 ohm resistance to limit the current flow to 0.5 ampere in case of a short circuit, since the filament can be ruined by excessive current passed through the tube.

In operation the current to the Thyratron is turned on, and the tube allowed to heat for 3 or 4 minutes until the contained mercury is vaporized. The microphone battery is then connected and the apparatus is ready to work. As the current through the transmitter and primary of the transformer may amount to 25 milliamperes, the microphone battery should be disconnected when not in use, and for long runs one 2-volt cell of a storage battery may be used for economy's sake. There are no adjustments to be made when the apparatus is in operation. The response of the Thyratron to each drop can be made longer or shorter by a decrease or increase in the negative bias impressed on the Thyratron grid by the bias battery D, so that the length of time the current continues for each impulse can be set for the inertia of the moving parts in any recording apparatus. The value of 9 volts for the bias battery is an average which will give a quick magnet response to drops falling as rapidly as they can without coalescing into a stream.

The apparatus is not at all critical in its adjustment; in fact, the transmitter has a great excess of sensitivity, and with its normal battery voltage of 4.5 volts and a small negative bias in the grid circuit will operate the Thyratron when a sheet of paper is rustled before the uncovered mouthpiece. The wires from the transmitter to the amplifying set and the wires of the output circuit can be made of any convenient length, since moderate resistance or capacity affects these circuits but little. It is convenient to mount the pipette at the edge of a table and let the drop fall about 30 inches to the transmitter resting on the floor.

The use of the apparatus is not confined to drop counting, but it can be adjusted to make a record of the fall of any body large enough to shake the diaphragm. When adapted to sound recording by an increase in the sensitivity of the transmitter, it can be used to pick up the ticks of a pendulum and send out time signals, to respond to a single note when the transmitter is placed in a tuned resonator, to record sounds in general, or to operate mechanical devices at a definite level of sound-intensity. Laboratory workers may find the apparatus useful in ways not contemplated in the present application.

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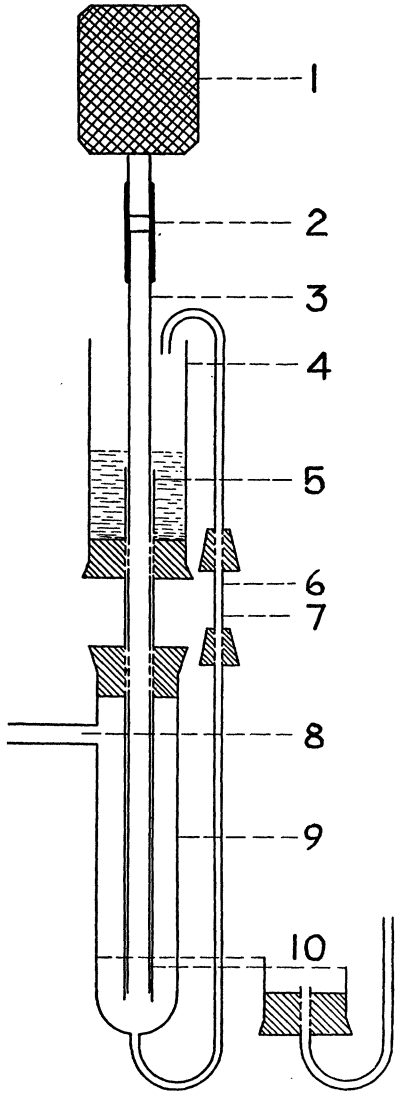
A DISINTEGRATOR FOR YEAST CELLS

A SIMPLE device to break up yeast cells is desirable in order to obtain certain growth-promoting factors which are not available without rupture of the cell wall. Such an apparatus can be made from glass rod and tubing with a few rubber connections and a suitable motor. The accompanying diagram shows the structure of the apparatus.



A rather concentrated suspension of yeast placed in the reservoir (4) flows by gravity through a long bearing (5) in which a vibrating shaft (3) is revolv-