TABLE 1

Animal	Drug	Total dose of barbiturate. mgm per kgm	Total dose of picrotoxin mgm per kgm	Time
Dog	Sodium barbital	1,650	20	Died in 1½ hrs.
Dog	Sodium phenobarbital	375	6	Died in 2 hrs.
Dog	Sodium pentobarbital	160	38	Died in 68 min.
Dog	Sodium pentobarbital	100	18	Recovered in 12 hrs.
Rabbit	Sodium pentobarbital	100	24	Recovered in 5½ hrs.

the animal's respiration and carotid blood pressure on a kymograph tracing. While the animal was thus under constant observation further doses (usually ¼ of the M.L.D. was used for a single injection) of the barbiturate originally administered were given intravenously. It was observed that these injections produced in each instance a sharp fall in blood pressure and a slowing or stoppage of respiration. The blood pressure fell after each additional injection. Death was due to a combination of circulatory collapse and respiratory failure.

The antidotal effect of different doses of picrotoxin was manifested in four different ways: (a) Occasional rise in blood pressure; (b) prevention of the steep fall in blood pressure and hastening the recovery from the fall produced by intravenous barbiturate injection; (c) stimulation of respiration when stoppage was produced by barbiturates; (d) maintenance of respiration after barbiturate injection even after cardiac stoppage.

In several experiments, it was noticed that the action of small doses of adrenaline and ephedrine was especially marked following picrotoxin in the barbitalized animals. These drugs not only stimulated respiration with a simultaneous rise in blood pressure, but the hemodynamic effects they produced after picrotoxin was more pronounced and more sustained than in controls. In several cases, intravenous injections of adrenaline (a total of 0.1 cc of 1 to 20,000 solution) produced a gradual and sustained rise in blood pressure. These sustained rises with adrenaline and ephedrine may be explained as shifts in blood volume. Adrenaline and ephedrine then may be employed as effective antidotal agents together with picrotoxin in barbiturate poisoning and possibly in other instances of circulatory collapse and respiratory failure.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

PHYSIOLOGICAL STROBOSCOPE

IN SCIENCE for December 21, 1934, the authors described their physiological stroboscope and its application in the field of the mechanics of phonation. Refinement of the apparatus and the addition of cooperative instrumental units has followed the study of the stroboscope with a model larynx as the subject.

The heart of the instrument is a specially designed amplifier fed by a wide-frequency-range microphonic element. It was a simple step to add to the gaseous discharge lamp in the output a cathode ray oscillograph and a recording device with audio monitor. The chain of instrumental response is currently as follows: A tone originating in the artificial larynx is passed to the microphonic element and into the amplifier, where its electrical component is linearly increased in amplitude; thence into the amplifier's phasing and band pass filter section, where a reduction of the origin tone to its fundamental frequency is achieved and translated in the output into a flashing of the gaseous discharge lamp at a period synchronous with the frequency of the tone emitted by the artificial larynx. Simultaneously, as the lamp held near the vibrating cords of the larynx reveals them in stroboscopic immobility, the fluorescent screen of the cathode ray oscillograph exhibits a wave analysis and the recording device registers and monitors the tone produced by the cordal configuration under observation.

With this apparatus revealing for the first time the tonal conformation of the cords during frequency transitions, and with a visual representation of the sound thus produced, a relationship is postulated wherein a particular tone is reproducible by the reestablishment of a predictable set of mechanical conditions in the larynx. Thus the isolation of individual factors responsible for vocal characteristics is accomplished.

Further study and interpretation of the apparatus operative with the artificial larynx will precede any report of observations made on clinical cases.

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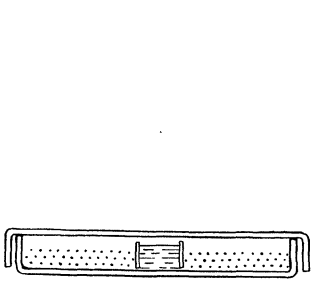
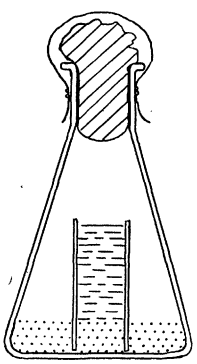
A METHOD FOR IRRIGATING FUNGUS CULTURES

AN adequate study of smaller fungi must always include careful pure-culture work. Information re-

garding various types of fructification can be better secured by observing their development in Petri dish cultures rather than in flask or tube cultures. However, the rapidity with which the substratum dries in cultures of the former type often proves a serious handicap in the study of those species which require long periods of time to complete their life history. This is often true of plates kept at 20° to 22° C., but more often of those incubated at higher temperatures. There has been need of a method for renewing the supply of moisture in the medium without disturbing the growth of the fungus. Such a method would make it possible to continue cultures over a long period of time without either an injury from drying or a disarrangement of conidial fructifications by adding water to the surface of the agar. The following method has been used with good results.

A van Tieghem ring is enclosed in the Petri dish and the two are sterilized together. The ring is easily centered by lightly shaking the dish just prior to pouring the medium. The liquid agar is poured around the ring, spread over the surface of the dish and allowed to harden. The ring thus becomes an empty glass well in the center of the plate (Fig. 1).





FIGS. 1 and 2. Methods for irrigating fungus cultures.

After inoculation and the growth of the fungus, the well is filled with sterile water by means of a sterile pipette before the agar shows any visible sign of drying. From under the lower edge of the ring the water slowly seeps out into the agar, diffusing through the entire plate. This irrigation may be repeated as often as desired, and the life of a single plate culture may thus be greatly prolonged. Since humidity requirements vary with different cultures, a sterile glass cover slip may be placed over the top of the well if it is desirable to prevent too rapid evaporation. If a cover is used it must be so placed as to leave a very small space between its edge and the side of the well, where air may enter as water recedes.

Inoculations are made either at several points immediately outside the glass well, or a continuous circular streak is made with a wire loop carrying a suspension of spores in sterile water.

Van Tieghem rings, sometimes listed as culture rings, vary in size and thickness of glass. Good results have been obtained by using a ring ten millimeters high by eighteen to twenty millimeters in diameter, of glass less than one millimeter thick. The usual ring of thicker glass is more easily lifted from the bottom of the dish by the fluid agar, which then spreads under it, raising the well, and thus opening a wider channel for water seepage. In the case of cultures requiring a very moist substratum this may be desirable; however, for many a culture a slower seepage is to be preferred.

This well can also be used for experiments in nutrition. The acid content of the culture may be altered, or the increasing acidity may be checked. To maintain the purity of any culture a fresh sterile pipette must be used for each irrigation.

Cultures in Erlenmeyer flasks may be similarly irrigated through a piece of glass tubing 18 to 20 millimeters in diameter, inserted into the middle of the agar before it is autoclaved. The length of such tubing must be carefully adjusted to prevent aerial hyphae or fructifications which grow on the sides and the upper edge of the tube from coming into contact with the plug. A two-inch length of tubing is suitable for a flask four inches in height. These flask cultures should be capped with heavy waxed paper or with heavy composition foil before they are sterilized; and all subsequent handling of the plugs should be done without removing this cap from the cotton. This prevents foreign conidia from infecting the plug, which often offers them an ideal chance for germination, and for contaminating growth into the culture below.

DOROTHY PEASE

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