areas being less dense than the remainder of the cell. In Fig. 6, which shows parts of the same cell, another unusual feature may be seen. Some of the elongated *E. coli* show definite "breaks" in the cell, perhaps at the place where the cell would have divided normally. Gates (*6*) reported that his irradiated

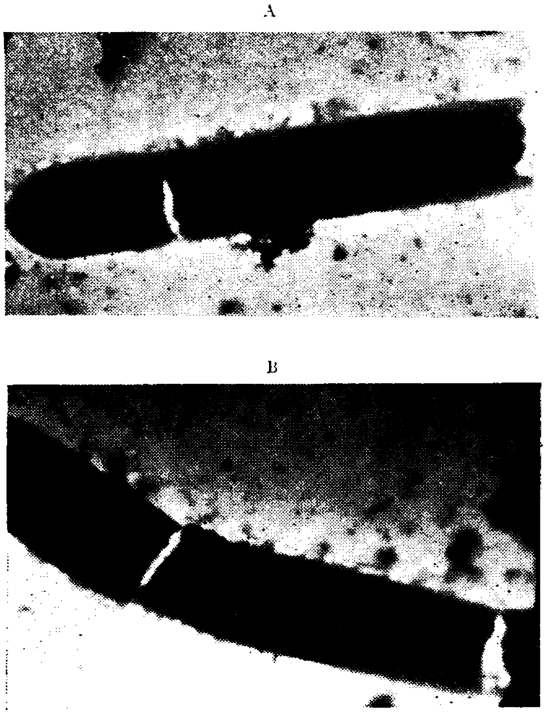

FIG. 6. A: X-ray-treated *E. coli* cell (electron microscope). Note periodic "break" in cell; B: part of same cell.

bacteria broke up into units, which then degenerated without further growth. Fig. 6 may be an indication of this type of behavior.

A possible explanation for "breaks" in the cell is that the enzyme which is responsible for the pinching off of the cell wall in normal bacterial fission has been destroyed by X-rays while other enzyme systems continue to function.

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A Mirror Device for Studying Lower Surfaces of Small Objects Using a Dissecting Microscope

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The problem of viewing all sides of a minute object such as a small flower, a small insect, and the like can often be not only difficult but exceedingly exasperating. The writer has for some time been studying a group of plants, the flowers of which are not over 3 mm. in size. A binocular microscope was necessary for accurate study of these. In order to count parts, observe arrangement, etc., it was necessary, after observing the upper surface, to turn the flower over painstakingly for a view of the lower surface. This method was very unsatisfactory because of time wasted, the possibility of losing the object, and the uncertainty arising from inability to see the entire object at the same time.

Recently, however, a solution to this problem has presented itself and is described here with the hope that it may be of use to other workers faced with similar problems. The device is quite simple and can be constructed in a few minutes by anyone. The model which has been used by the writer (Fig. 1)

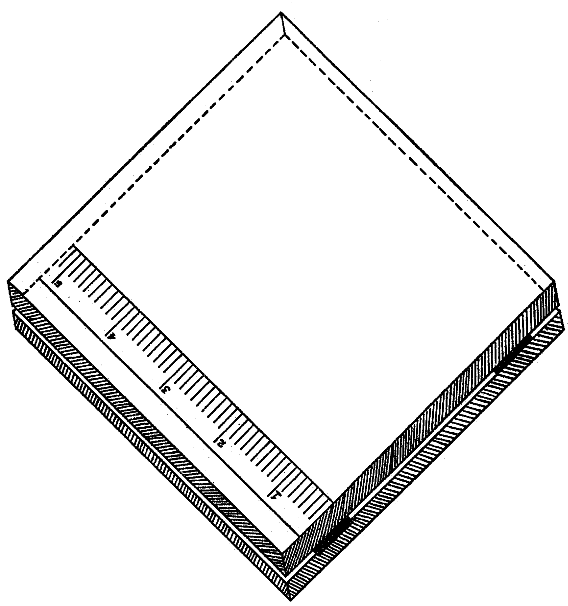

FIG. 1

consists of a piece of plate glass, ⅝ inch thick, mounted on top of a small mirror. This is placed on the stage of a binocular dissecting microscope, and the object to be viewed is placed on top of the glass plate. The lower surface may be seen by merely focusing toward the object a distance equal to slightly less than twice the thickness of the glass used. This action brings the image of the lower surface distinctly into view, and the results are the same, regardless of the magnification used. In the present model a millimeter scale has been slipped between the mirror surface and the plate glass, but a scale, scratched or etched into the glass itself, might be more useful. A strip of material of the same thickness as the scale was placed between the mirror and the glass on the side opposite the scale. This was necessary to offset the tilting effect of the scale.

Glass of a thickness less than that specified above may be used, but with thinner glass the image of the lower surface is not perfectly clear, and only small objects (1–3 mm.) may be studied. If the $\frac{3}{8}$-inch glass is used, the image of the lower surface is as clear as that of the upper. The use of the thicker glass also permits the study of objects up to about 5 mm. in size.

There is also a definite relationship between the distance of the light source from the plate glass and the image obtained. The light should be placed 3–4 inches from the plate glass and as directly over the system as the microscope permits for optimum results.

Saturation Concentrations of Triethylene Glycol Vapor at Various Relative Humidities and Temperatures

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Recent experiments carried out in this laboratory have indicated the relatively narrow margin which exists between the concentration of triethylene glycol vapor required for optimum bactericidal action and the saturation point of this vapor in air of various relative humidities and temperatures. Although the presence of a mist due to supersaturation with triethylene glycol has been shown to produce no harmful effects on animals living in such atmospheres for long periods of time (*2*), this condition is undesirable for psychological reasons in situations of human habitat. It becomes important, therefore, to determine the maximum concentration of glycol vapor which may coexist with water vapor in the air, under various atmospheric conditions.

The following communication deals with the measurements of the saturation concentrations of triethylene glycol vapor in the presence of water vapor over a range of temperature extending from 20° to 29°C. Essentially, this problem resolves itself into the study of vapor-phase equilibria in a two-component system composed of triethylene glycol and water. If each component of this mixture obeyed Raoult's law, the equilibrium concentration of the glycol vapor at a given temperature would diminish linearly with an increase in the water vapor concentration, as shown by the dotted line in Fig. 1. However, the chemical nature of the two compounds suggests that their solutions would exhibit deviations from ideal behavior. Such deviations from Raoult's law have been confirmed by the experimental measurements here presented.

A complete description of the apparatus and experimental technique will be presented in a forthcoming publication. The experimental procedure involved an adaptation of the principle of the condensation method recently developed for the determination of vapor pressures of pure liquids (*1*), which permits determination of the equilibrium compositions of the vapor in multicomponent mixtures. Each component of the mixture (in this case, triethylene glycol and water) is independently vaporized at a constant rate into a stream of inert gas (dry nitrogen), which carries the vapor mixture to a highly polished condensation surface thermostatically maintained at the desired equilibrium temperature. The formation and disappearance of a condensed film on this target serves to indicate whether the composition of the vapor mixture corresponds to supersaturation or undersaturation at the temperature of the target. The ratio of the vapor densities of the two com-

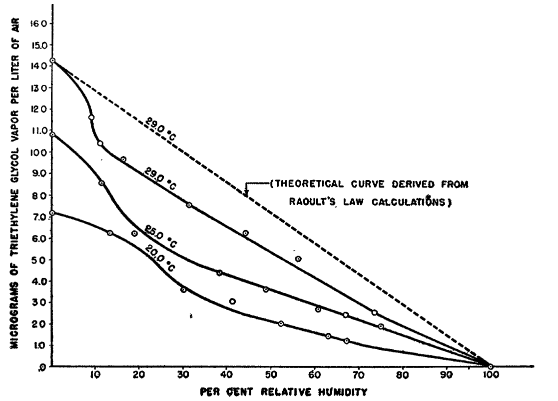

FIG. 1. Saturation concentrations of triethylene glycol vapor as a function of the relative humidity, at three different temperatures.

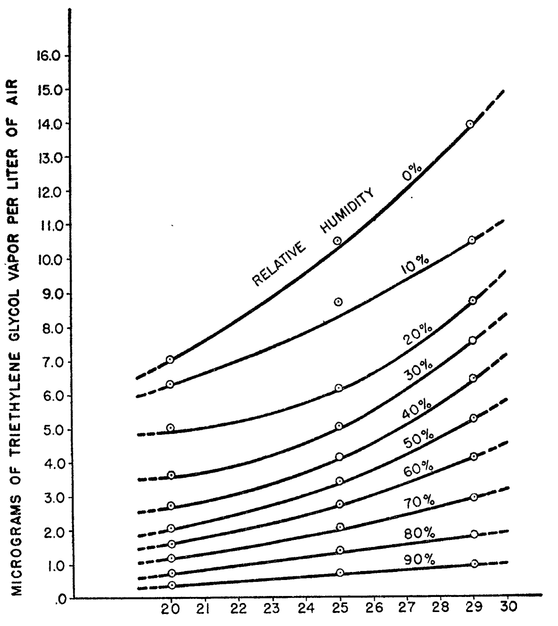

FIG. 2. Saturation concentrations of triethylene glycol vapor at various relative humidities for temperatures from 20.0°C. to 29.0°C.

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