brackets and calculated as a decimal, P_2, then (1) may be written as

$$\% \text{ Potency} = \text{Antilog } [(2 \pm c) + d\,P_2] \quad (2)$$

or

$$\text{Log } (\% \text{ potency}) = (2 \pm c) + d\,P_2. \quad (3)$$

From (3) it follows that a straight line on semilog paper satisfies the equation for any assigned values of c and d. The entire information in Knudsen's chart is thus reduced from a network of 50 radial lines to one line on a semilog plot at the expense of requiring the assayer to calculate a simple ratio.

The work of preparing new graphical solutions for other values of c and d is vastly simplified. Following Sherwood further, the equations for three- and four-dose assays reduce to

$$\text{Log } (\% \text{ Potency}) = (2 \pm c) + \tfrac{4}{3} d\,P_3 \text{ and} \quad (4)$$

$$\text{Log } (\% \text{ Potency}) = (2 \pm c) + 5d\,P_4, \quad (5)$$

where P_3 and P_4 are the decimal equivalents of the appropriate fractions. These functions are as susceptible to simple graphical representation as Equation 3.

A family of lines for different values of c, at constant d, has been constructed for routine use here, and the average time of calculation of potency has been reduced to a matter of 2–3 min by use of this chart. Comparison with results obtained by the method of Bliss and Marks shows agreement within the limits of error of the interpolation (less than 1%).

References

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A Method for Obtaining Massive Growth of Bacteria in Fluid Media

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A method has been developed which has been found useful for the preparation of *Brucella* antigen and for the collection of a large amount of bacterial sediment for agglutinin absorption.

A thoroughly washed cellulose sponge of coarse texture is mounted in the upper part of a 250-ml centrifuge bottle. The sponge is so cut and mounted that a pipette may be passed through a central hole to the bottom of the bottle. The dry sponge is readily cut to size and shape by a sharp knife or the moist sponge by scissors. The hole may be cut by a cork borer. When moistened and wrung nearly dry, the sponge may be forced into and out of the neck of the bottle. A glass tube of sufficient diameter to pass a pipette passes through the sponge and rests on the bottom of the bottle, the sponge being supported at about 4 cm from the bottom by a bulb blown in the tubing (Fig. 2). The sponge may be cut square (about $35 \times 35 \times 55$ mm) or cylindrical, but of such diameter that, when wet, an air space remains between the sponge and the sides of the bottle. Other methods of suspending the sponge have been tried but with less satisfactory results (see Fig. 1).

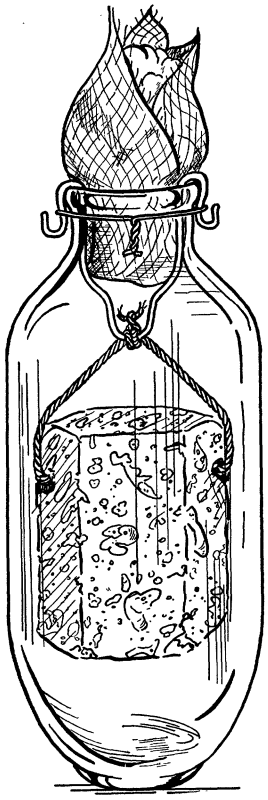

Fig. 1

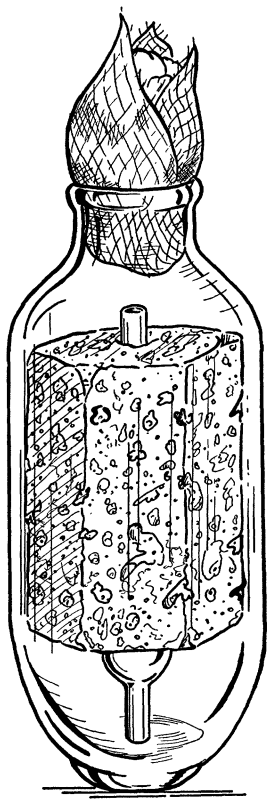

Fig. 2

From 30 to 40 ml of broth is run through the central tube into the lower part of the bottle. This should reach a level not less than 2 cm below the sponge. The bottle is then plugged and autoclaved in the usual manner. The broth is inoculated by means of a pipette, after which the bottle is tilted to wet the sponge—a position which may be maintained for incubation.

To harvest the growth the bottle is centrifuged at low speed (about 500 rpm) for 5 min. A greater yield of organisms may be obtained by rewetting the sponge and recentrifuging two or three times. The turbid broth is pipetted out, transferred to a small centrifuge tube, and centrifuged at high speed to throw the sediment down.

This method may be used for many purposes where a maximum growth surface exposure is desirable or where the use of agar is to be avoided. The yields from a given amount of broth have been several times greater than those from the same amount of broth in bottles without the sponge.