tation is obvious when one wishes to analyze the urine for a compound which may be present also in the feces.

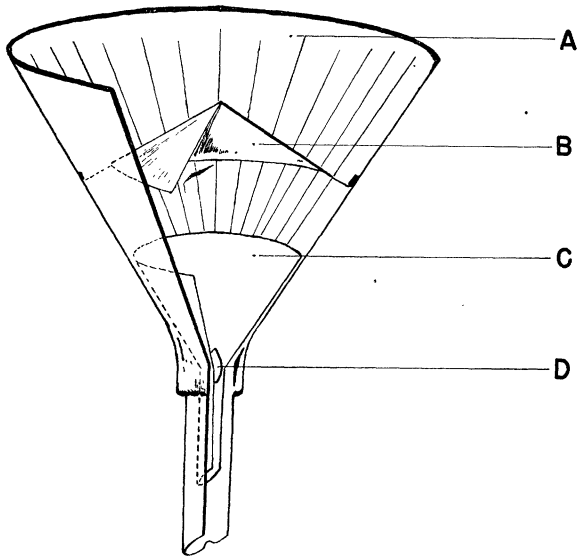

FIG. 1

The essential features of the new separating unit are shown in Figs. 1 and 2. A 3-in funnel (C) placed inside of a 10½-in ribbed funnel (A) collects the feces which either roll down the sides of (A) or hit the conical shield (B) and are deflected first to (A) and then to (C). The rim of the smaller funnel should be thin, approximately 1/32 in. A glass plug (D) prevents feces from entering the neck of funnel (C). Funnel (A) is a ribbed Mooney air vent model, preferred because of its small neck. Shield (B), detailed in Fig. 2,

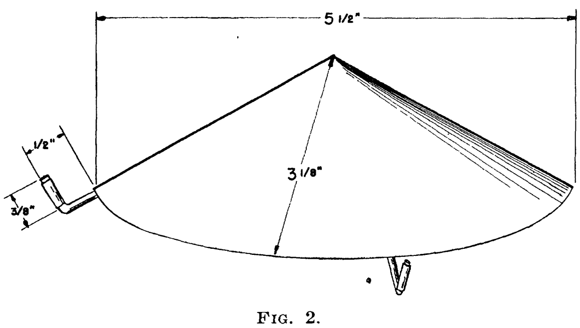

FIG. 2.

completely covers funnel (C) and deflects all urine to the surface of (A) where it runs between the funnels into a collecting graduate. This shield is a right circular cone with a slant height of 3⅛ in and a diameter of 5½ in at the base. It is supported by three rods 3/32 in in diameter and bent at such an angle that the terminal ⅜ in rests snugly on the sides of funnel (A). That portion of the rod which contacts the funnel is covered with rubber to prevent slipping. The cone is made of copper coated with tin and covered with a thin uniform layer of paraffin.

This assembly (Fig. 1) is supported by a 6-in iron ring anchored to a large ring stand. The animal is confined in a cylindrical cage 8½ in in diameter and 9 in high, made from ½-in wire mesh. This cage is anchored to the same stand by an L-shaped iron rod which supports it in funnel (A) so that its bottom is ½ in below the rim of the funnel and ½ in above the vertex of cone (B).

Twenty of these units have been in use for more than two years and satisfactorily accomplish the purpose for which they were designed.

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Penicillin in Relation to Acid Production in Milk by Starter Cultures Used in Cheddar Cheesemaking[1]

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The extensive use of penicillin in control of bovine mastitis has resulted in warnings to cheese factory milk producers (*1*) that sufficient penicillin may be carried over into the milk to interfere with normal development of acid by starter culture organisms when added to this milk in manufacturing Cheddar cheese. Slowness of acid production in the vat extends the time of manufacturing appreciably and results usually in low quality cheese.

The problem was studied by inoculating mixed or single strain starter cultures at the rate of 3% into pasteurized milk, dispensing 100-ml amounts into bottles, and adding a known amount of penicillin (ranging from 10,000 to 0.05 units) to each bottle. The bottles were incubated in a water bath at 98° F; 9-ml aliquots were removed at hourly intervals for titration with 0.1 N NaOH using phenolphthalein as indicator. Complete inhibition of acid production was obtained with 100 units, and virtually complete stoppage with 50 units penicillin per 100 ml milk. Partial inhibition was evident with 0.5–5.0 units in both the mixed and single strain starter series.

Penicillinase[2] when added at the rate of 0.02 mg per bottle completely canceled the effect of 5–10 units of penicillin and permitted appreciable acid production in the presence of 100 units of the antibiotic. The devel-

[1] Contribution No. 275.

[2] Kindly supplied by Miss E. Campbell, Laboratory of Hygiene, Department of National Health and Welfare, Ottawa, Canada.

opment of starter cultures composed of penicillin-resistant strains of lactic streptococci is another possible means of overcoming this difficulty. Cysteine did not do this even when added at the rate of 1–10 mg per bottle. Pasteurization of milk containing varying amounts of penicillin failed to inactivate the antibiotic.

Where occasional mastitis-infected animals are treated with penicillin this problem of inhibition of starter activity in the milk may not arise owing to dilution of the penicillin in the pooled milk supply. However, where extensive use of penicillin is being made, its inhibitory effect can be a source of considerable concern to the cheesemaker. Whitehead (*1*) suggests that milk obtained from cows during the 3-day penicillin treatment, and for one day thereafter, be used for purposes other than cheesemaking. The loss of this milk could be obviated most simply by addition of penicillinase.

Reference

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A Convenient and Rapid Method of Calibrating Warburg Manometers

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Although several methods have been described for the calibration of Warburg constant volume respirometers (*1, 2, 6*), it is generally agreed that calibration with mercury is the most reliable. Present descriptions (*1, 5, 7*) advise filling the inverted manometers through the neck from above, which is often cumbersome in practice due to the trapping of air bubbles in the column of mercury. We have recently used a variation of this method in which mercury is allowed to flow up into the manometer from below, thus avoiding this difficulty.

Using the method illustrated in Fig. 1, the time required for calibrating a manometer is reduced to less than 5 min. The only experimental value needed for calibration is the total volume (V) of the cup-manometer system, which for convenience is measured in two separate weighings. A scratch is placed on the neck of the manometer about halfway between the ground glass joint and the glass prongs that hold the fastening springs. The volume below this scratch will be referred to as V_C or the volume of the cup; while that above will be referred to as V_M, the volume of the manometer. The sum of V_C and V_M yields (V). Since the change in density of mercury between 20° and 28° is not significant in the determination of Warburg constants to two decimal places, these volumes are obtained simply by dividing the weight of mercury by 13.54.

Once (V) has been obtained, k_{O_2} and k_{CO_2} at 25° and at 37° may be read directly off the nomogram published by Dixon (*3, 4*) for the determination of Warburg manometer constants. For this, a hair line is stretched from the extreme left hand (V) scale across to the extreme right hand (v_F) scale, where v_F stands for the arbitrarily agreed on volume of fluid in the manometer cup.

For the convenience of workers unfamiliar with manometer calibration, the present method will be described in detail. All weighings are made on a crude pan balance to the nearest tenth of a gram.

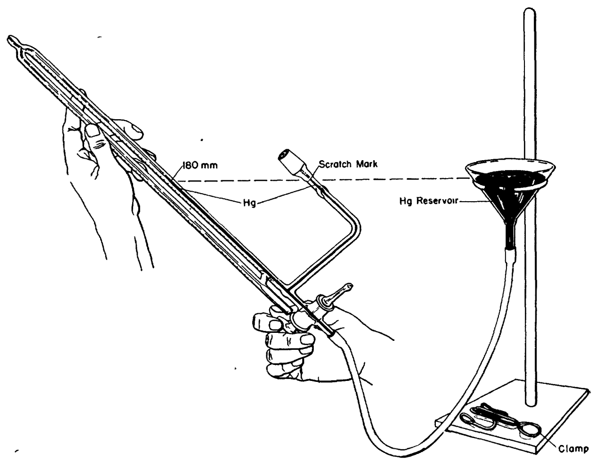

FIG. 1.

To obtain V_C:

1. Weigh the empty cup, stopper in place. Fill the cup completely with clean mercury, adjusting the level with a medicine dropper until the column of mercury just reaches the scratch mark when the cup is ground onto the manometer. Reweigh, and divide the net weight by 13.54 to obtain V_C.

To obtain V_M:

1. Attach a funnel to a ring stand as illustrated, and wire onto it a 3-ft piece of rubber tubing selected to fit snugly on the end of a manometer. Place a clamp on the end of the tubing and fill with about 100 ml of clean mercury.

2. Hold the inverted manometer above the level of the mercury reservoir and attach its lower end to the tubing. Remove the clamp and, slowly lowering the manometer, allow the mercury to flow evenly up into both the manometer limbs.

3. Leaving the mercury in free communication with the mercury in the reservoir, adjust the level of the mercury simultaneously in the two limbs until it just reaches the scratch mark on one side and the desired null point (180 mm for example) on the other. It is convenient to mark these two points with a thin red crayon for rapid identification.

The above adjustment is best done freehand with the elbows firmly planted on the table. The funnel should be adjusted to a convenient height depending on the operator. When the mercury columns are properly adjusted by combining the movements a) tipping the manometer, and b) raising and lowering it relative to the mercury in the funnel, the stopcock should be closed one-