# IN THE LABORATORY

## A Method for Determining the Volume of Small Solid Objects[1]

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Frequently it is difficult to determine with accuracy the volume of small objects of unknown density, especially when the object must be kept moist. In this laboratory we found it necessary to determine the volume of a large number of teeth which could not be permitted to dry. The most logical solution to this problem appeared to be the measurement of fluid displacement. The illustration shows the plan by which the fluid displaced by the object (F) is measured in a small-bore pipette. The potential accuracy of the instrument is primarily dependent on the ratio of the volume displaced to the bore of the pipette.

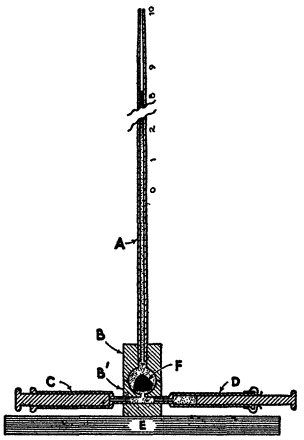


FIG. 1

The equipment consists of an ordinary graduated pipette (A), accurately faced methyl methacrylate blocks (B and B'), a large glass syringe (C), a smaller syringe (D), and a metal base (E). The syringes and the pipette are fitted into the plastic blocks through ground joints, making it possible to use various syringe combinations as well as pipettes of various sizes, provided that they are uniformly tapered. For our work, a 1-cc. pipette, a 2-cc. and a 1-cc. syringe were adequate. Stopcock grease should be used between the plastic blocks in order to prevent leakage. Volume determinations are made by filling both syringes and a portion of the lower chamber with distilled water. The upper section is then put in position and the plunger of the larger syringe inserted completely. The height of the water in the pipette is then adjusted to the zero mark by means of the smaller syringe. The plunger of the adjusting syringe should have a tension clamp to prevent free movement. Then, by withdrawing the plunger in the larger syringe, the water is removed from the upper unit and partially removed from the lower chamber. The blocks then are separated, and the object whose volume is to be determined is placed in the lower chamber. The upper unit is put in position as before, and the plunger of the large syringe is inserted completely. Since the same volume of fluid has been replaced in the system, the difference between the original height of the column and the present height is equal to the volume of the object in the chamber. The reading may be taken directly from the calibrated pipette. After each determination, the water column must be adjusted for the initial reading as described above. This method is rapid and, we believe, quite accurate. The size of the apparatus is dependent on the volume of the objects to be studied. Any fluid compatible with the materials in the apparatus may be used.

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## A Contact Culture Method for Detecting Molds on Surfaces

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A number of methods for the detection of molds on surfaces have been devised. In one of these (*2*) melted agar is placed on the surface to be tested, while in others (*1*, *3*) solidified agar is brought into contact with the surface. The method described below is of the latter type. It differs from other methods of this type in that a culture area equivalent to that in a standard-sized Petri dish is employed. The materials necessary for its preparation are readily available in the laboratory. The method has been used for culturing molds from contaminated surfaces in food plants. With the acid types of media employed yeasts also appeared on the plates, and by the choice of appropriate media the method could also be used for bacteria.

From a coarse type of filter paper discs approximately 8.5 cm. in diameter are cut, a small tab approximately 5 x 15 mm. being left on one side of each disc. The discs are soaked in a 0.5 per cent water solution of methylene blue until thoroughly colored and then rinsed in water to remove excess stain. When the rinse water is relatively free of stain, each disc is placed in a Petri dish and sterilized in the usual way by dry heat. Three ml. of melted sterile agar is added to hold the paper flat to the bottom of the plate. After cooling, 7 ml. of sterile agar, of appropriate composition to make a thin coating over the paper, is added. When the agar hardens, it is ready for use.

To test exposed surfaces in food plants for contamination with molds and yeasts, the agar-coated paper disc is removed