SCIENTIFIC APPARATUS AND LABORATORY METHODS

PARAFFIN "CONWAY UNIT" FOR THE DETERMINATION OF AMMONIA

IN 1933 Conway and Byrne[1] described an apparatus for the micro-determination of volatile substances such as ammonia. The unit consisted of a flat, cylindrical, glass cup with a lower concentric inner wall arising from the floor of the cup. Absorption of ammonia occurs from the outer chamber to the inner one, the entire cup having been sealed by a glass plate resting on the outer wall whose upper edge has been ground to a plane surface and smeared with vaseline. Borsook[2] modified this "Conway unit" by turning it out of lucite on a lathe and varying the dimensions to suit his electrometric determination.

Where a large number of these units are required the cost of having them made of glass, as described by Conway and Byrne, becomes excessive. Under present wartime conditions, the large lucite rods used for the manufacture of the modified form suggested by Borsook are unavailable. We attempted casting the units with acrylic resin (Trulite), the plastic used for dentures, but were unable to eliminate the inclusion of air bubbles with the molding facilities at hand. Turning to other substances we found that high melting paraffin (M. P. 55°–58° C) made highly satisfactory units. These were cast in a brass mold which was turned from a 3-inch piece of brass rod. The paraffin cups are very easily made and being inexpensive can be replaced when they become chipped, broken or discolored after long use. The material is inert to the reagents used for determining NH_3 or urea. Being white and translucent they offer an excellent background for end point titration of the indicator in the inner chamber.

The mold, Fig. 1, is cut on the lathe from a metal rod and the grooves for the walls of the unit are tapered with their bottoms somewhat rounded to facilitate the removal of the hardened cup. Loosely fitting rods fit in holes drilled through the mold as indicated in the diagram. A thin metal plate under the mold prevents these rods from falling through.

To make the cups the surfaces of the mold are first swabbed with mineral oil, then wiped clean with cleansing tissue. The liquefied paraffin is poured and as soon as the paraffin has hardened, the mold is placed in a refrigerator for about ten minutes. The hardened cup can then be easily released from the mold by tapping lightly on the rods. The upper edge of the outer wall of the unit is now ground to a plane surface by rubbing it on a flat paper-covered surface. A glass plate cover used during the period of distillation can then be securely sealed with glycerine, made alkaline to phenolphthalein.

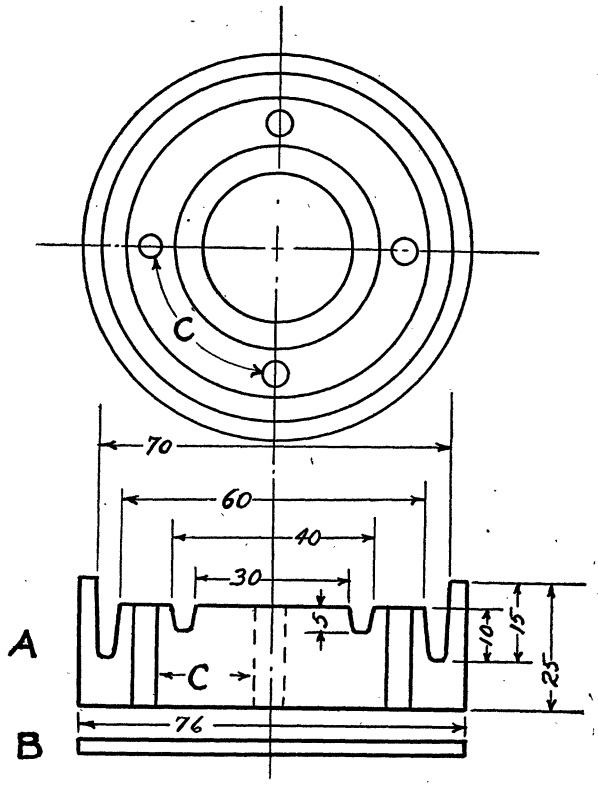

FIG. 1. A. Cross-section of mold. B. Circular metal plate for support of rods in holes C. Dimensions in millimeters.

We believe that paraffin may offer a satisfactory substitute for many other types of simple reaction vessels.

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[1] E. J. Conway and A. Byrne, *Biochem. Jour.*, 27–419, 1933.

[2] H. Borsook and J. W. Dubnoff, *Jour. Biol. Chem.*, 131–163, 1939.

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