• *Letter to the Editor*

Laboratory Device for Metering Liquids

There were times that I felt like a fool,
Perched so high on a laboratory stool,
Meticulously adding dribbles of stuff
To judge the quality of shortening fluff,
All for the lack of a tool!

THE PRINCIPLE of the ancient clepsydra[1] can be used in the laboratory to dispense a liquid slowly at a constant rate. The device utilizing this principle can be made with a large burette fitted with a capillary tube discharge (A) and a submerged air inlet (B) near the bottom of the burette. The rate of flow is dependent upon a) the hydrostatic pressure, b) the viscosity of the liquid, and c) the dimensions of the capillary tube.

Since the air inlet is submerged, the incoming air acts against the pressure of the liquid level above the inlet point. This in turn results in a partial vacuum in the space C, thus reducing the effective head pressure of the liquid by a like amount. It is possible to view these pressure and vacuum factors in many ways; but the important over-all result is that the effective head pressure of the system is as though the liquid level in the burette were at the level of the air inlet. To increase the hydrostatic pressure it is necessary to lower the discharge tube with respect to the air inlet, *i.e.,* increase the vertical distance between A and B.

All factors influencing viscosity (*e.g.,* temperature, dissolved solids) influence flow rate and must be held constant. Rate of flow is also controlled by the size of the capillary discharge tube. Flow may be reduced with tubes of smaller diameters or longer lengths; flow may be increased with tubes of greater diameters or shorter lengths. The filling mechanism is not necessary but is a desirable adjunct. The liquid is forced into the top of the burette (D) by a pump (G) or by gravity flow. When the burette is over-filled, the excess liquid is siphoned off, bringing the level to the zero mark (E) and creating the desired partial vacuum in the remaining head-space (C).

When this equipment was used to add water to fat in evaluating water-binding properties of cream whips, the hydrostatic head (distance between air inlet B and capillary discharges A) was about 50 cm.; the capillary tube, 1 mm. I.D. and 10 cm. long, and the water at 25°C. gave flow rates of 15 to 30 ml. per minute. Others will likely require different head pressures and capillary tubes. The air inlet tube (F) is a thin capillary to minimize volume changes in the burette. The capillary discharge tube is connected to the burette by a flexible Tygon hose for convenience.

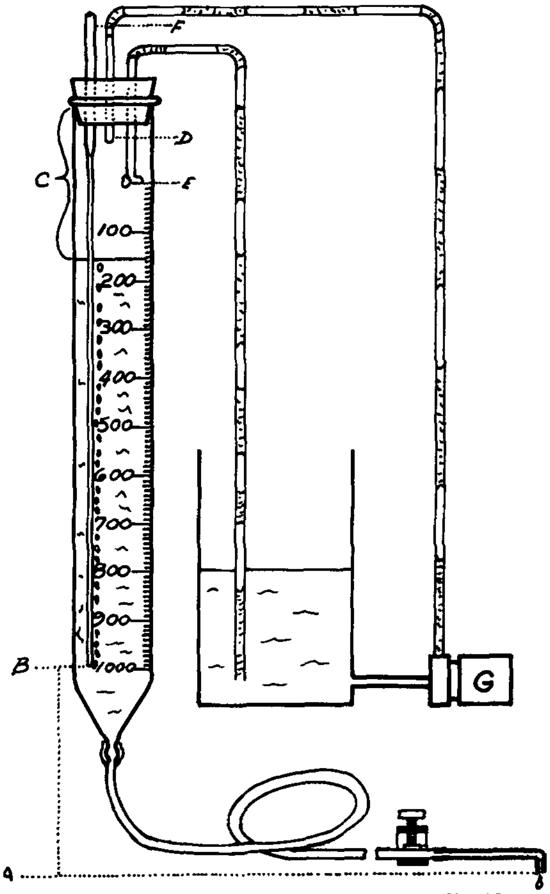

FIG. 1. Laboratory device for metering liquids.

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[1] Water clock.

ABSTRACTS . . . . R. A. REINERS, Editor

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• Fats and Oils

TRISATURATED GLYCERIDES OF MILK FAT. Carolyn Boatman, A.E. Decoteau, and E.G. Hammond (Dept. of Dairy and Food Industry, Iowa State Univ. of Sci. and Tech., Ames). *J. Dairy Sci.* 44, 544–51 (1961). A number of samples of milk fat have been analyzed for trisaturated glyceride by the mercapto-acetic acid method. The amount of trisaturated glyceride varied from 21.5 to 32% by weight. The amount of trisaturated glyceride was found to agree well with the amount calculated by random distribution. The fatty acid composition of the trisaturated glyceride was determined by gas phase chromatography and compared with that of the whole fat. The results show that there is no preferential selection or exclusion of any of the major saturated fatty acids from the trisaturated glycerides. These and other recently determined structural features of milk fat can best be explained in terms of the limited random distribution theory of Vander Wal. It was also found that the relation among the melting point of a fat and the melting point and amount of trisaturated glyceride, which has been found to hold for many fats, does not hold for milk fat. It is shown that this means that the heat of fusion of the last glyceride in the fat to melt changes from sample to sample.

INVESTIGATION OF THE LINEARITY OF A STREAM SPLITTER FOR CAPILLARY GAS CHROMATOGRAPHY. L.S. Ettre and W. Averill (The Perkin-Elmer Corp., Norwalk, Conn.). *Anal. Chem.* 33,