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REPRODUCIBLE VOLUME DELIVERED BY AN 0.01 ML "LOOP"

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(Received for publication September 25, 1966)

SUMMARY

A platinum cylinder is described which may be used in place of a standard loop to give improved accuracy.

Jasper and Dellinger (2) recently made a thorough study of the variations in volume of milk delivered by a standard 0.01-ml loop. The volume was found to depend on the speed and angle of withdrawal of the loop and providing these two factors were kept under control the variation in volume delivered was found not to be too great for the purpose of making leukocyte counts in milk. However, it is clear that the variability must depend on the skill of the worker and it seems probable that if the variation between workers were included the total variation would be greater than that which was recorded. If something more accurate than an ordinary loop were available it would be (a) less dependent on a high level of skill in use or (b) available for more precise work.

As Jasper and Dellinger point out, the volume withdrawn by the loop is a function of the shape of the liquid-air interface. Thus the smaller this interface can be relative to the volume, other things being equal, the more reproducible will the volume be. Reducing the interface leads eventually to the capillary pipette, and the convenience of a loop has been sacrificed. A cylinder open both ends and of suitable dimensions forms an attractive compromise. A platinum cylinder 0.2 mm thick, 3 mm long and 2 mm in diameter (volume = .00943 ml) was tested by Berridge (1). It was welded to a platinum wire 0.5 mm in diameter at right angles to the axis of the cylinder.

RESULTS

In a set of experiments to determine the repro-

ducibility of volumes transferred by means of this cylinder, several workers were asked to make transfers in triplicate with no instructions or previous practice. The first group was seven in number and included inexperienced laboratory assistants and one engineer. The volumes transferred were measured by using 5.0 N hydrochloric acid, rinsing, and titrating with 0.25 N caustic alkali in a stream of nitrogen using an "Agla" micrometer syringe. In this experiment the individual values ranged from 86 to 118% of the general mean.

After this, five of the assistants were asked to repeat the experiment according to a set of instructions which was now provided. In this case the individual values ranged from 95 to 105% of the general mean, the spread for each worker being considerably smaller.

Contrary to expectation, the cylinder was found to be easy to keep clean. The only precaution beyond that used for an ordinary loop was to rinse once with distilled water before flaming to avoid the excessive accumulation of ash.

CONCLUSION

It is clear that a cylinder of this type is capable of higher reproducibility than is a normal loop and that it is less dependent on the skill of the worker.

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