

NEW APPARATUS

AN APPARATUS FOR THE DETERMINATION OF VOLUMES OF INJECTIONS IN SINGLE DOSE CONTAINERS

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THE Addendum 1951 to the British Pharmacopœia 1948 specifies the excess volume permissible for liquids for injection in single-dose containers. Foster¹ has described a simple apparatus which enables the total volume of liquid in 10 containers to be measured and, if required, individual volumes to be obtained. This method, which involves measurement of volumes in a glass measuring cylinder, is of unspecified accuracy and since the B.P. requires that the volume in not more than 1 container in 10 should deviate from the stated volume by more than 15 per cent., it was considered desirable to construct an apparatus to measure volumes with an accuracy of 2 to 3 per cent.

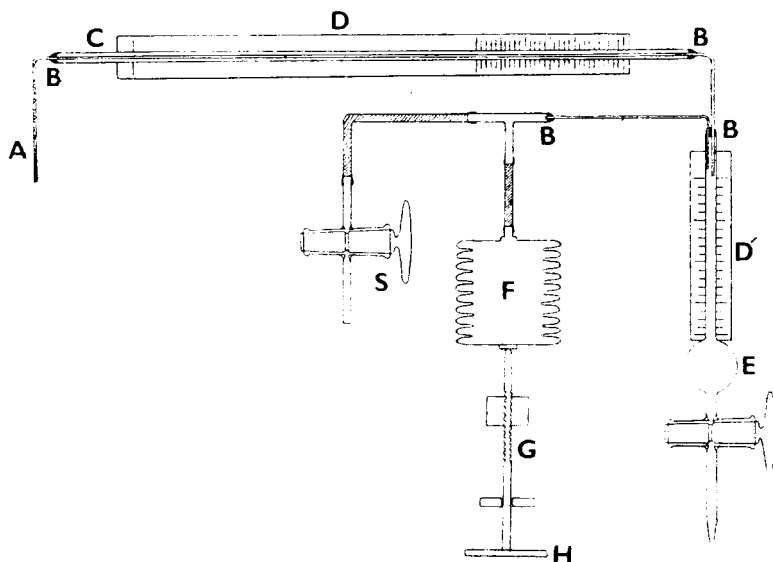


FIG. 1. Diagram of apparatus.

- A Stainless steel tubing, internal diameter about 0.05 mm.
- B Metal to glass seals, with Araldite sealing compound.
- C Thick-walled capillary tubing, internal diameter 2.3 mm.
- D Sliding scale.
- D' Fixed scale.
- E Burette
- F Flexible metal box.
- G Threaded rod.
- H Large milled knob.
- S Stop-cock, to vacuum line.

The basis of the apparatus is the direct measurement of volumes of separate containers in a calibrated capillary tube, the liquid from 10 measurements being collected in a burette where the total volume is measured. An apparatus was constructed to measure the volume in 1.0 ml. containers, and two other trial apparatus are under construction for measurement of volumes in 1.5 ml. and 2.0 ml. containers, and in 3.0 ml. containers. Figure 1 shows the essential construction of the apparatus.

Description. The apparatus was calibrated by filling the capillary tube with mercury between two graduation marks, weighing the mercury, calculating the volume of the tube between the marks and attaching an engraved scale to the tube. The liquid is drawn into the horizontal calibrated capillary tube by reduction of air pressure in the apparatus by any convenient means. In this case the air pressure is varied by the compression and expansion of a flexible metal box (F) of the aneroid barometer type, taken from an ex-service bombsight computer, connected to the apparatus through a nozzle. The compression and expansion of the box is controlled by a threaded metal rod (G) operated by the rotation of a knob (H). After measuring, the liquid is swept over into the burette (E) by opening the stopcock (S) which connects the apparatus with a vacuum line. Since the liquid wets the glass capillary tube, not all of it is drawn into the burette, and a correction is made on the scale to allow for the increase in volume of subsequent liquid columns. On 50 quantities of 1.10 ml. of water, which were measured in the apparatus, it was found that an average volume of 0.04 ml. remains in the capillary, and accordingly a correction for this amount was made.

Results of measurements made with the Apparatus. The apparatus was tested by measuring the volume of distilled water added to ampoules from a micro-burette. 50 determinations of 1.10 ml. quantities gave an average deviation from the true volume of ± 1.0 per cent., and the average deviation found on the total volume of 10 consecutive 1.10 ml. quantities was about -1.5 per cent. for five series.

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REFERENCE

1. Foster, *Analyst*, 1951, **76**, 240.