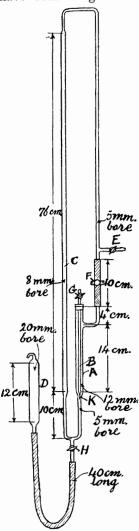
CCCXLIX.—A Simple Pressure Regulator.

By JOHN DOBNEY ANDREW JOHNSON.

MANY of the pressure regulators which have been designed for

distillation under diminished pressure either require special electro-magnetic devices or involve the motion of long columns of mercury; in the latter case, there is an obvious danger of breakage. The apparatus now described appears to be novel and can be readily constructed in the laboratory. Various modifications of it have been tried and found effective, but it is not necessary to describe them in detail. The construction of the regulator is apparent from the diagram and attention is directed to a few points in order to ensure its successful working.

The internal diameters of the tubes should be as nearly as possible those indicated, since the sensitivity largely depends on the ratios of these diameters. A quantity of mercury is placed in the reservoir D, so that with the taps H, Gand E and the screw-clip F open it rises some distance in tubes A and C. The screw-clip F is then closed, and the regulator connected at E to the distillation apparatus, pump and gauge. The mercury rises in C and falls slowly between K and H because of the large diameter of D. The diameter of D must not be too large, otherwise the setting of the regulator for a given pressure cannot be accomplished sufficiently sensitively. When the gauge registers approximately the pressure required, D is adjusted until the mercury is almost touching the fine jet K, the tap H then being



closed. The mercury now falls more rapidly in the arm KH, but by opening the screw-clip F slightly and cautiously air is allowed to enter the apparatus through the tube B. F is opened until the mercury in the gauge begins to fall; it also falls in \hat{C} and rises in A until the jet K is below the mercury surface. The entry of air is then restricted and after a few minutes a steady state is reached such that a decrease in pressure causes air to enter through K more rapidly and an increase of pressure restricts the access of air. In practice, the quantity of mercury which is being agitated around \overline{K} in the tube A should not be great : the lower the pressure the smaller the quantity agitated. If, in order to arrive at the required pressure, the screw-clip F has to be opened so much that a large quantity of mercury gets into tube A, the reservoir D should be lowered slightly, tap H opened, and mercury thus withdrawn from A. After H has been closed, F may be readjusted. When the pressure in the distillation apparatus is suddenly altered by any large amount, e.g., in changing the receiver or stopping the distillation, taps E and Gshould be closed *simultaneously* and, in the latter case, the regulator should be disconnected at E. The diameter of the jet K in the present apparatus is about 0.7 mm.

A little trouble is almost certain to be experienced at first in adjusting the regulator, by mercury moving out of the top of C, and particularly with the screw-clip F. When the pressure tubing at F is new, it is difficult to open it slightly by the screw-clip and mercury is apt to rush into tube A and out at E. However, when the tubing has been used for some little time, and after experience, the regulator can be set to within 1 or 2 mm. of the required pressure and with care the pressure will not vary more than 2—3 mm. The regulator is least sensitive below a pressure of 100 mm., but between this and 760 mm. it holds the pressure steady to within 1—2 mm.

GUY'S HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON), LONDON, S.E. 1. [Received, September 3rd, 1931.]