DEMONSTRATIONS

An improved apparatus for automatic sampling and the control of isolated preparations

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The equipment shown diagrammatically in Fig. 1 is a development of that described by Colquhoun & Tattersall (1970) and is based on a modified EEL Auto-sampler (model 178). This has a total capacity of 48 tubes which are held on a turntable rotated by a pulse driven stepping motor. A probe, also driven by a stepping motor, is lowered into each tube presented beneath it and the fluid is drawn into a reservoir to a volume predetermined by an electrical contact. Excess sample is removed from the probe by purging with air and the measured sample introduced into a previously drained organ bath via a water-jacketed heating column. The tubes are sampled sequentially and the flexibility of arrangement of samples and standards on the turntable allows easy change of assay design. The drug contact, bath emptying, wash and rest periods are controlled by electro magnetic taps using the principle applied by Boura, Mongar & Schild (1954). The control logic and sequence timer used are constructed from digital integrated circuits (Texas Instruments).

The apparatus is currently used in conjunction with the guinea pig ileum to assay histamine. Experimental samples are first roughly assayed to determine the dilutions required to bring their histamine contents within the range of 2-20 ng/ml. Up to 32 suitably diluted samples are then assayed by interpolation between groups of standards. The direction of the turntable can be reversed when the complete set of samples has been tested and repetition of reversing allows each sample to be tested up to nine times (four is usual). The cycle time (contact, wash, etc.) for one sample is 1.2 min and hence four runs of a turntable containing 46 samples (14 standards and 32 unknowns) takes approximately 3.5 hours. No attendance is needed during this time.

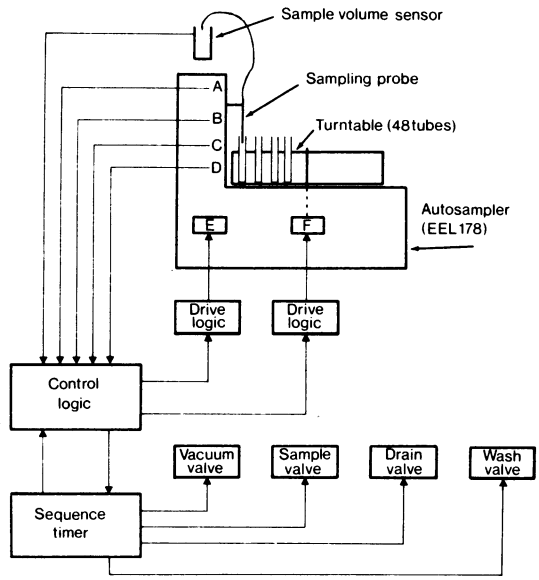

Fig. 1 Functional diagram of the apparatus. A and B—arm position sensors, C—tube sensor, D—turns indicator, E and F—stepping motors controlling the probe action and turntable respectively. The vacuum valve controls the introduction of a measured volume of sample into the reservoir and the sample valve controls the passage of this volume into the organ bath. Operation of the drain valve empties the bath after the selected contact period and before a new sample is introduced. Overflow washing between samples is achieved by opening the wash valve.

References

BOURA, A.L.A., MONGAR, J.L. & SCHILD, H.O. (1954). Improved automatic apparatus for pharmacological assays on isolated preparations. *Br. J. Pharmac. Chemother.*, 9,24-30.

COLQUHOUN, D. & TATTERSALL, M.L. (1970). Rapid histamine assays: A method and some theoretical considerations. *Br. J. Pharmac.*, 38, 241-252.