SHORT COMMUNICATION:

AN IMPROVISED TECHNIQUE FOR THE MEASUREMENT OF INFLUENCE OF DRUGS ON THE SPONTANEOUS MOTILITY (S.M.A.) OF RATS

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Summary: An improvised, yet simple technique for the evaluation of drugs affecting voluntary activity is described with certain modifications and incorporation of common instruments. The technique imparts semi quantitative information which is lacking in the many described in the literature.

Key words: improvised technique semi quantitative measurement spontaneous motility

INTRODUCTION

In the middle of the last decade, in the literature on Psychopharmacology, a new discipline in its own right, a number of the behaviour study techniques have been reported. Especially, in our country, the paucity of foreign exchange and low budgets of governmental and private medical colleges preclude the possibility of securing sophisticated, complex and costly apparatus. Spontaneous motor activity (S.M.A.) study has been given its due importance and likewise has become a routine method in the screening of psychotropic drugs. For qualitative and quantitative measurement of S.M.A., many techniques have been described (1,4,5,6,7,). Vad *et al.* (4) utilising a modification of jiggle - saw cage, have described a new technique for recording S.M.A. This paper embodies an improvisation of the latter procedure, yet imparting some quantitative idea which was lacking in the above mentioned technique, to study the voluntary activity (S.M.A.) of rats. Changes made in the procedure described by Vad *et al.* (4) are :

(i) A very delicate rubber membrane prepared from prophylactic condom was used instead of conventional rubber of surgical gloves, in a small sized (20-22 mm diameter) Marey's tambour, thus imparting sensitivity for even slightest movements of the animal.

(ii) Cage: Ordinary circular, light wire basket covered with a black cloth was used.

(iii) Almost frictionless, lateral writing lever (3) was used throughout the study (Fig. 1-B).

(iv) At a point which was about 2 to 4 cm from the writing point (described above), an inverted Y-shaped copper wire, 5 to 8 cm long was cemented on the straw of writing lever. Thus the wire was able to move 1 to 2 cm up and down with the movements of the lever.

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(v) The two lower ends of this copper wire were dipped into two small beakers, resting on a frog board fixed to a heavy adjustable stand (the same stand supported the Marey's tambour and magnetic marker). Each of the beaker contained equal quantity of mercury and normal saline. Sufficient quantity of liquid paraffin was added to cover the surface in order to check evaporation (Fig. 1-C).

(vi) One thick silver-plated copper wire was dipped in the mercury, the other end of the same was bent along the outer surface of the beaker. The outer ends of these wires were soldered to a flexible (plastic) wire which terminated in the "In-Put" terminals of the "TECHNO" drop counting assembly (Fig. 1-A).

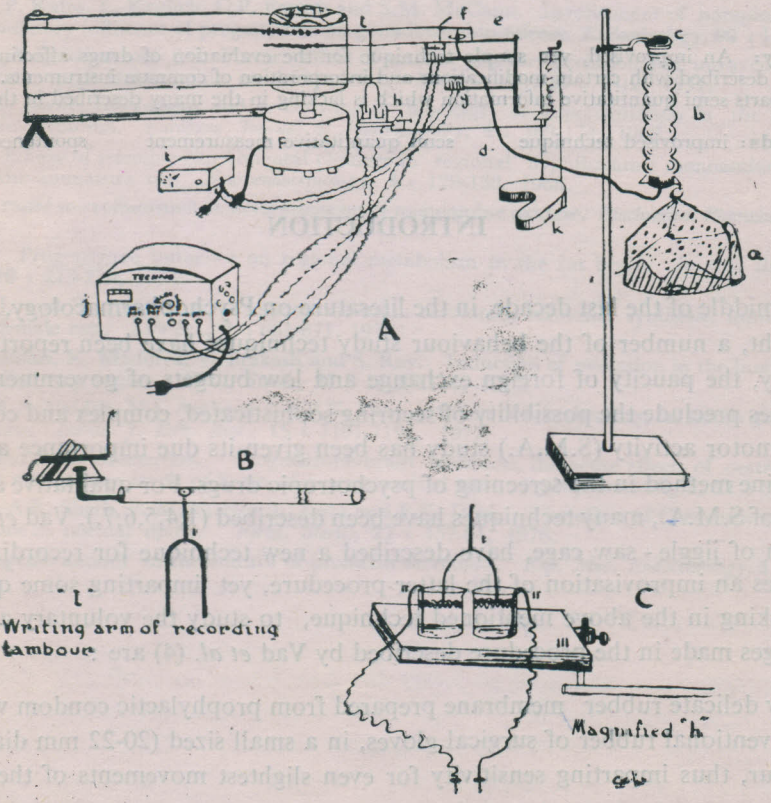

Fig. 1 : A - Showing the set-up used to record Spontaneous Motor Activity; a : wire basket; b : stethograph; c : condensor clamp; d : tube connecting the stethograph with Marey's tambour- (e); f : Output counter; g : magnetic marker connected with time clock-(c); h : beakers with mercury etc. supported on a frog board in which dips the inverted 'Y' shaped wire cemented on the writing arm (i) of Marey's tambour and j : drop counter.

B - Showing the writing arm of recording tambour.

C - Showing details of 'h'.

(vii) In order to obtain permanent records, the "Out - Put" leads were attached to the magnetic marker provided with the above assembly.

(viii) Final adjustments: During the 15 min equilibration period and prior to the commencement of first 30 min session, following adjustments were undertaken:

(a) Adjustment of straw - hence, that of the attached copper wire in a way that the ends of this wire should dip in the saline layer only when the rat actually performs big movements. This was achieved by shifting either the frog board or the Marey's tembour so that smaller movements are not counted.

(b) To obtain the records in single verticle line, the recording tembour, impluse counter and direct wirting time marker were adjusted in one plane.

An illustration (2) :

Complete set was made as shown in Fig. 1-A. Rats of either sex weighing between 150 g and 250 g fasted over-night, were used. One rat was placed in the wire basket. For first 15 min (equilibration period) all the electric connections were switched off. During this time, final adjustments, as stated above were performed. Figures in the digit counter were noted down. After equilibration period all the electric connections were switched on. After 30 min recording electric connections were switched off and figures in the digit counter were noted. The rat was removed from the basket, the drug to be tested was administered and the animal was again placed in the basket. A time period of 30 min was given for equilibration. Again after noting down the figure in the digit counter, all electric connections were switched on and movements were recorded for 30 min. Lastly after noting the figures in digit counter all the electric connections switched off. Thus each animal served its own control. Both the sessions were recorded in succession (2) as shown in Fig. 2. Difference between the figures of the digit counter before and after each session gave quantitative measure of S.M.A. of rat.

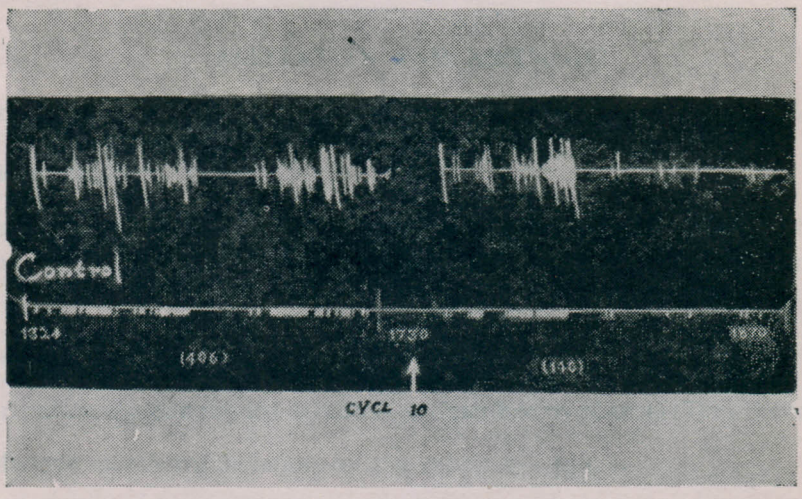

Fig. 2 : Showing the typical effect of cyclizine 10 *mg/kg* administered at arrow head on S.M.A. of rat (2). Upper record shows excursions recorded by the lever of Marey's tambour and lower record shows the actual contacts counted by the counter. Figures below the lower excursions show the readings in the counter while figures in parenthesis show the number of movements.

Conclusion and suggestions:

An improvised procedure for evaluation of the effect of compounds on the voluntary activity (Spontaneous Motor Activity - SMA) has been described. The technique imparts some quantitative measure and the apparatus has been fabricated making use of cheap and commonly available instruments in experimental/research laboratories of medical colleges. This improvisation does not replace the costly and sophisticated electronic devices.

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