

A NEW TECHNIQUE FOR RECORDING SPONTANEOUS MOTOR ACTIVITY

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A simple technique is described for recording the spontaneous motor activity (S. M. A.) of small animals. Reduction in SMA with chlorpromazine and increase with amphetamine is shown. Previous administration of chlorpromazine reduces the effect of amphetamine. The bark of *Ficus bengalensis* produces an effect more or less similar to that of chlorpromazine.

Laboratory screening of psychopharmacological agents has thrown a heavy challenge for the invention of suitable methods, with a resultant establishment of several types of procedures. Many of the screening procedures have rapidly gained acceptance in the original form, while others have been modified from time to time. Observation of the changes in the spontaneous behaviour of animals is one of the standard procedures (Toman and Everett, 1958) but techniques for the measurement of this parameter have varied widely. This paper deals with one such technique.

METHODS

The set-up devised for recording spontaneous activity was a modification of the jiggle-cage used for similar recording. Usually these cages consist of light boxes suspended by wires from two or more corners to allow a free movement that could be recorded by a system of levers or tambours. We used a small animal cage with a thin but rigid handle. This was hooked to a vertically suspended stethograph (pneumograph) of canvas covered corrugated rubber tube. The slightest movement of the animal in the cage produced a stretching of the stethograph, and the change could be recorded by a Marey's tambour connected to the tubing. The up and down movements could thus be well recorded, while the side to side movements of the animal produced only a small change in the record. The wire gauze lid of the cage admitted light which attracted the animal; so it was covered lightly with a piece of thick paper.

Adult albino rats weighing 150-250 gms were fasted overnight and one animal was placed in the cage at a time.

After waiting for ten mins to allow the initial excitement to pass away, the movement was recorded for the next thirty minutes. The animal was

then administered the drug intraperitoneally and kept aside for twenty mins, and ninety mins, in case of oral feeding. It was then placed in the activity cage and after ten mins the record was again taken. Each study was carried out on 4-6 rats using the same animals except in two cases where the animals had to be replaced because of deaths not in any way related to the administration of the drugs.

Drugs used were Amphetamine sulfate and chlorpromazine hydrochloride, both as 2 mg/ml solutions and given intraperitoneally in doses of 1 mg/100 gm. After establishing the type of effect obtained with these two agents, modification of amphetamine effect by previous treatment with chlorpromazine given 2½ to 3 hrs before, was noted. The activity of an indigenous plant material viz., the bark of *Ficus bengalensis* was then observed in the same manner. For this purpose, a hot water extract of the bark was prepared by the method described previously (Shrotri and Aiman, 1960). A 2.5 ml aliquot of this extract containing 5 gms of the original material was given per 100 gms of body weight, by the stomach tube. After two hours the activity was recorded and the effect of amphetamine in such a rat was noted.

RESULTS

Table shows the changes in the spontaneous motor activity (SMA) with different agents. All the results are expressed qualitatively. It will be seen that the tranquillising and psychomotor stimulant effects of chlorpromazine and amphetamine respectively could be well made out with this method. The depressant action of chlorpromazine and *Ficus bengalensis* is shown in figures 2 and 4 when these figures are compared with figure 3 where amphetamine alone has been given.

TABLE

Drugs	Change in S. M. A.	Number of animals showing the change
Chlorpromazine	decrease	6/6
Amphetamine	increase	6/6
Chlorpromazine followed by amphetamine	increase	4/4
<i>Ficus bengalensis</i> followed by amphetamine	increase	5/5
<i>Ficus bengalensis</i>	decrease	4/6

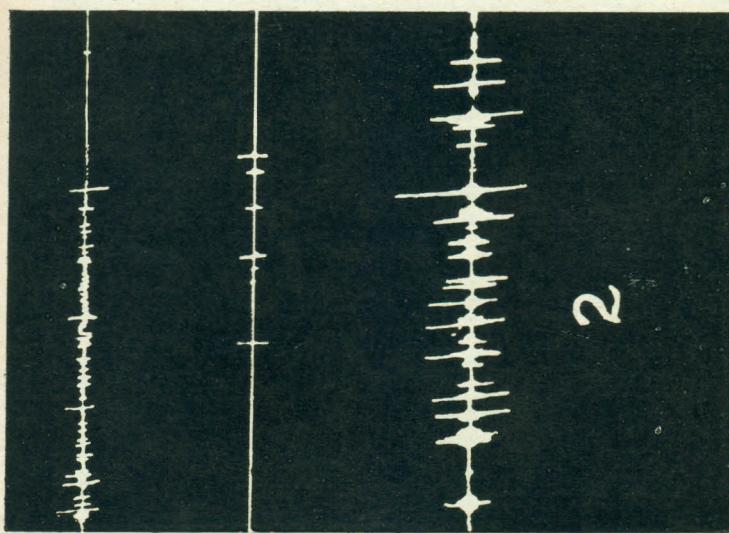


Fig. 2. Control, after Chlorpromazine and followed by amphetamine (read above downwards).

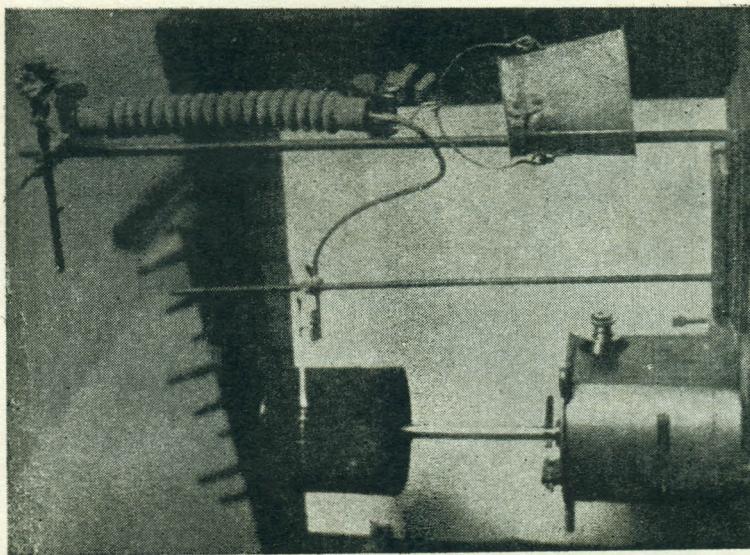


Fig. 1. Set up for recording Spontaneous Motor Activity (SMA.).

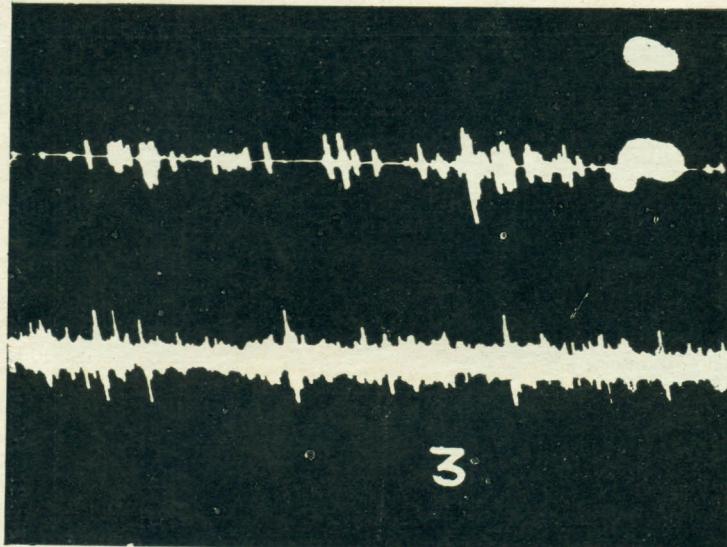


Fig. 3. Control followed by amphetamine (read above downwards).

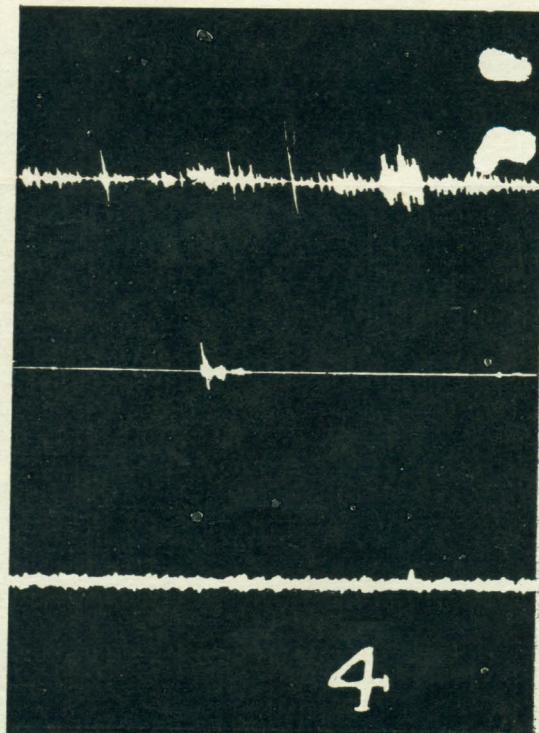


Fig. 4. Control, after *Ficus bengalensis* and followed by amphetamine (read above downwards).

DISCUSSION

From the data presented, it appears that the method described is a satisfactory technique for preliminary screening of tranquillisers or other psychopharmacological agents on a qualitative basis. The spontaneous motor activity can be assessed by using revolving cages and jiggle cages (Schallek *et al.*; 1956; Bastian and Hill, 1957), as well as by fixed cages with beams of light traversing to fall on photoelectric cell counters (Dews 1953). These methods can give a very good quantitative result which should always be preferred for a thorough screening of the drug. But in the absence of such an equipment, the set up described above should serve the purpose for gaining a rough idea about the compound. This can also be used as a convincing method for demonstration of the drug effects to students of Pharmacology. The result obtained with *Ficus bengalensis* suggests the possibility of this plant being a central Nervous system depressant. It has been vaguely described to possess a cooling property in *Ayurveda* and was found to have an apparent central nervous system depressant action in rabbits while one of us (D. S. S.) was working on its antidiabetic properties.

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