reported on the after-image following exposure for 15 sec at 6 feet distance to a cross in circle pattern illuminated from behind by a 150 W light source; this is a technique for obtaining a stabilized retinal image, and hence after-image, which avoids using contact lenses (Bennet-Clark & Evans, 1963; Evans, 1965). The after-image obtained in this way undergoes changes similar to those described using other methods. Nitrazepam, particularly in the larger dose, was found in comparison with placebo at 90 min and 150 min after treatment to increase the latency (the time between the end of the flash and the first appearance of the image) and shorten the duration (total time over which the image was reported) of the after-image (Table 1). These differences are unlikely to have been due simply to inability or unwillingness to report the subjective experience: the rate of verbal output under the three experimental conditions did not differ significantly and the results from those subjects who actually slept and had to be awoken for the test were indistinguishable from those who did not sleep, whereas the performances on other motor tasks by these two sub-groups were similarly slowed. The possible effect of nitrazepam on dark adaptation is at present being investigated.

TABLE 1. (A) *Latency and* (B) *duration of after-image reports* (in sec)

			Amylobarbitone sodium				Nitrazepam			
	Control		100 mg		200 mg		5 mg		10 mg	
Time after drug (min)	90	150	90	150	90	150	90	150	90	150
(A) Mean	7·1	5·9	6·8	7·8	8·0	4·9	9·3	10·0	10·2	9·5
S.E.	0·9	0·8	1·1	1·6	0·9	0·6	0·4	0·5	0·7	0·4
(B) Mean	82·0	81·7	81·2	71·8	74·5	77·4	65·2	71·6	48·4	57·9
S.E.	2·9	3·2	10·1	9·9	5·4	8·0	9·4	6·4	10·3	9·5

$n=10$.

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Analytic methods for the study of drug effects on avoidance-conditioning in the rat

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Unlike most learning tasks, the measurement of conditioned avoidance (CAR) learning is dependent on time restrictions imposed by the situation used. Thus, any factor delaying or hastening responses in this type of learning has a greater influence on performance than in other learning situations. Three major determinants of CAR behaviour are perceptual ability, motivational level and locomotor capacity. To evaluate a drug action on CAR acquisition it is crucial therefore to differentiate which of these variables are affected. Most studies of drug effects on avoidance conditioning have been concerned with motivational effects (anxiety) alone. In this study an attempt was made to provide independent measures of these three variables.

The apparatus consisted of a straight alley 56 in long × 4 in wide with a start box 11 in × 9 in at one end and a goal box of similar dimensions at the other. Raising the start box door operated a warning buzzer (CS). After 3 sec, a shock was delivered through the grid floor of the start box and alley but not of the goal box. Starting latencies and running

times were recorded automatically on each trial. The apparatus and training procedures have been described in detail by Ross & Russell (1964). Competing responses in the start box (movements towards positions other than the exit door) during either warning or shock stimuli were recorded as errors. The effects of chlorpromazine (0.25–2 mg/kg), chlordiazepoxide (5–80 mg/kg) and amylobarbitone (2.5–40 mg/kg) on acquisition of CAR in rats were investigated. Training commenced 120 min after subcutaneous dosing with chlorpromazine and 30 min after subcutaneous dosing with chlordiazepoxide or amylobarbitone. Control rats received normal saline. Data obtained in these experiments were analysed as follows. Mean numbers of trials to reach criterion levels of one, two, three, four and five consecutive CAR's were plotted for each dose-group. Training was stopped when the rats reached a criterion of five consecutive CAR's. The slopes of these learning curves provided an index of interactions between drugs and increasing task requirement. In each dose-group, latencies recorded for the individual rats during the five final CAR's were pooled. Latency profiles were analysed by compiling frequency distributions of these latency times for consecutive 0.5 sec intervals of the 3 sec CS warning time. Running time profiles were also analysed in terms of interval histograms. These analyses provided information concerning perceptual ability and motivational changes.

All three drugs impaired learning. Both chlorpromazine and chlordiazepoxide caused more pronounced increases in the slopes of the learning curves than amylobarbitone. Chlordiazepoxide and amylobarbitone increased, whereas chlorpromazine decreased, start box errors. Amylobarbitone differed from the other drugs in having little effect on CAR latencies or running times. Differences in the effects of chlorpromazine, chlordiazepoxide and amylobarbitone on CAR behaviour suggested different modes of action.

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The effect of 4-acetamidophenol in reducing fever produced by the intracerebral injection of 5-hydroxytryptamine and pyrogen in the conscious cat

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5-Hydroxytryptamine (5-HT) as well as pyrogen produce a long-lasting rise in rectal temperature when injected into the lateral cerebral ventricles of the conscious cat (Feldberg & Myers, 1964). The action of 4-acetamidophenol, an antipyretic, has been investigated on this effect. Fever was produced in conscious cats by injecting either 5-HT creatinine sulphate (0.125 or 0.5 μ-moles) or pyrogen solution (1 in 200, or 1 in 300 dilution of TAB vaccine) into the right lateral cerebral ventricle through a chronically implanted Collison cannula. All injections were made in a volume of 0.1 ml. and the cannula flushed with 0.05 ml. pyrogen-free 0.9% (w/v) saline solution. The rectal temperature was recorded over a period of 24 hr. 5-Hydroxytryptamine (5-HT) as well as TAB vaccine produced a rise in rectal temperature after a short latent period. The maximum rise, 1°–2° C was reached within 1–3 hr. The temperature remained elevated for 5–15 hr, and in the majority of experiments had returned to the control level in 24 hr. Shivering was observed during the phase of increasing rectal temperature.