entered a section if its head and three of its paws were over the dividing line.

The results in terms of section entries are shown in Fig. 2. The decline in activity between the first and last minutes of the first trial for Groups I and II is characteristic of this type of situation and is in each case highly significant ($P < 0.008$, signs test). It is clear from the graph that there is no appreciable difference between the groups on the second trial. The decline between the first and second minutes of the second trial is significant at below the 0·008 level for Group I and Group II and at the 0·07 level for Group III (two tailed signs tests). There are no significant differences in activity between the three groups individually either overall or in any 30-sec period, but Groups I and II combined are slightly more active than Group III in the first 30 sec of the second trial ($P = 0.05$ signs test).

It appears, therefore, that after a rat has explored one type of environment, and has to some degree reduced the capacity of that environment to evoke exploration, it is just as exploratory in a new environment as a rat with no immediately preceding exploratory experience. The slight difference between the groups in the first 30 sec of the second trial is, of course, in the wrong direction for any view which predicts that previous exploratory activity has a depressing effect on subsequent exploration. It may perhaps be due to some sort of 'warm up' effect, but is too slight to merit much discussion. In this type of situation at least, the motivation for exploratory behaviour seems, therefore, to be aroused by the stimuli in the environment, rather than to be present in the animal, perhaps as a result of 'deprivation', and reduced by exploratory experience. In this respect, at least, this motivation is therefore more analogous to such externally aroused drives as fear than to hunger or thirst.

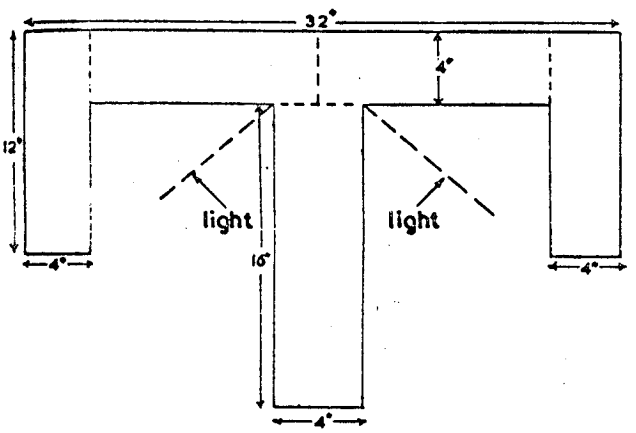

Fig. 1. Plan of T-maze. The dotted lines represent maze sections

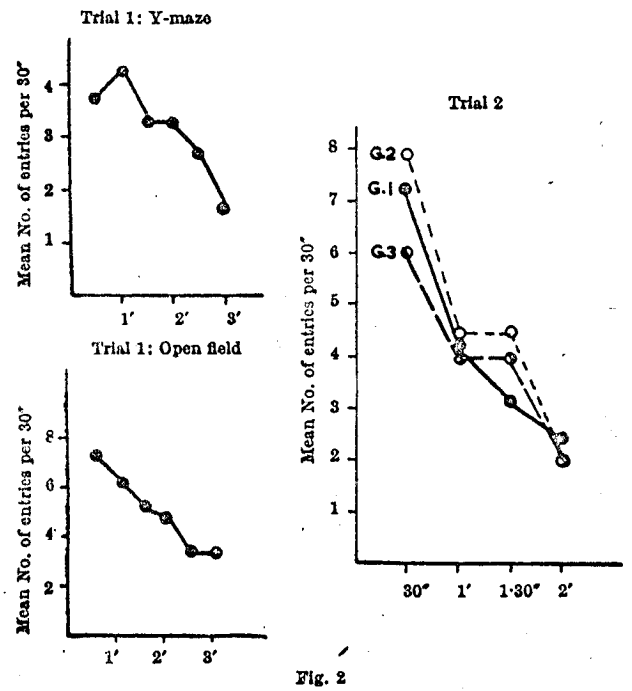

Fig. 2

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Time Contraction and Psychomotor Performance produced by 'Psilocybin'

It is particularly rewarding to investigate the experience of chronosystole, or time contraction during sympathetic excitation, as this state, which is connected with an increase in metabolic rate, can be elicited at will through psychotomimetic, pyretogenic drugs such as mescaline, marihuana, D-lysergic acid diethylamide (LSD), 'Psilocybin'[1,2]. We may define time contraction in terms of an alteration in the signal per noise ratio of the sensor, or in an adaptation of Stroud's[3] terminology, an increase in data content. In short, if more events are happening within a chronological time unit, the phenomenon of time contraction is experienced. Hofmann's self-observation, in what may be called the first description of time contraction after a dose of 0·25 mg of LSD (ref. 4), relates "the impression of being unable to move from the spot" on his way home from the laboratory on a bicycle. Delay's[5] systematic description of the psychic effects elicited by 'Psilocybin' also refers to experiences which may be considered phenomena of time contraction: "J'ai l'impression que le temps passe plus lentement, qu'il a plus de densité". "Tout est d'une longuer indéfinissable."

Within the framework of space–time equivalence, time contraction can be illustrated through the concomitant expansion of space; specifically, by the increased size of handwriting samples at the peak of the psychotomimetic drug experience[2]. When finger-tapping rates are used as a measure of intensification of time, the magnitude of the drug reaction may be assessed in relation to the control value, the baseline of a subject. (See in this connexion Wilder's[6] law of initial values.) Therefore, patients in various states of excitation and depression cannot be expected to experience changes in time perception analogous to those of an average healthy subject, that is, the patient's experience of time contraction may be different in degree or may not occur at all. (This explains the divergent results of Kenna and Sedman[7].)

Among the various attempts to define 'Psilocybin' reactivity, the most notable is that of Isbell[8], who found a close correspondence between the maximum effect of various drug doses on pupillary size and that on mental response. No effort has been made, however, to quantitatively differentiate the degrees of reactivity in subjects who have ingested the same dose of 'Psilocybin'. Long experience has shown us that a dose of 115 μg/kg 'Psilocybin' is likely to produce one of the following reaction types: 'non-reactors', 'mild reactors', 'reactors' and 'strong reactors'. Hence the problem presents itself of characterizing them with relatively simple, quantifiable parameters.

We have refined the use of two already existing variables for the measurement of time contraction—handwriting samples and finger-tapping rates. As shown by the following representative examples, the former proved useful for the characterization of 'strong reactors' and 'non-reactors', the latter for that of 'reactors' and 'mild reactors'.

Handwriting size can be quantified to measure the extent of psychomotor drug reactivity. A planimetric comparison of pen-and-ink handwriting samples on flat paper[9] reveals that whereas only 60·00 cm² is needed to cover the first five written lines for our 'strong reactor' under control conditions, 81·30 cm² is required at drug peak—an increase of 31 per cent (compare the upper and lower halves of Fig. 1). On the other hand, the handwriting space of a 'non-reactor' shows no increase at drug peak as compared with the control performance (see upper and lower halves of Fig. 2).

Table 1. Quantification of Time Contraction

Mean tapping rates and variances (at an 8-min period)

	At peak of 'Psilocybin' experience		Next day (control) at the same time	
	Mean	Variance	Mean	Variance
Subject *A* ('mild reactor')	2·21/sec	0·018	1·16/sec	0·003
Subject *B* ('reactor')	1·31/sec	0·001	0·42/sec	0·001

Mean tapping rates and variances at drug peak, that is, 100 min after oral ingestion of the drug, were obtained using silent Morse-key tappings at a freely chosen speed during an 8-min period. These were also measured during a control period the following day. Afterwards, power density spectra were derived according to the procedure of Ralston and Wilf[11], using a 'Bendix' *G*-20 digital high-speed computer. (The results of spectral analysis are to be published[10].) The tabulated mean values of the fluctuations, and the variance in tapping rate for the 8-min periods for two subjects—a 'mild reactor' and a 'reactor'

I want it known that I regard all I have said as trivial ≡ except that I do + have write now of God of religion ≡ if blasphemy perhaps—but it is within creation — my beliefs + essential loyalties are not changes. The relations to people we love (+ do not love) binds us — more than the external correlative noises, more than the prospect of discussing this ad nauseum at Princeton cocktail parties — fidelity ≡ human fidelity

The study of espionage suggests intriguing implications for the future growth of international law. We look towards the day when outer space can be used for territorial observation. Our Midas and Samos satellite programs such this result in the decade ahead. We hope thus to close the 'intelligence gap' and to perfect the DEW-line system. The Soviet Union fears surprise attack and objects to our plans by invoking its sovereign control over territorial air space.

Fig. 1. Handwriting samples of a 'strong reactor' 2 h after the ingestion of 115 μg/kg 'Psilocybin' (upper portion of figure) as contrasted with control sample obtained on the following day (lower portion); half the original size

so far, the experience seems to have been limited entirely to physiological changes - an awareness of the outlines of the body, a sense of trembling in the skin tissue. Sensory experiences seem to have remained the same -- neither more intense nor less so. The sense of strangeness may still be due to the unusually concentrated self-observation (it would never occur to me to write this sort of thing normally, or even to bring it into the form of stories either). In tapping, I felt little that I was able to shut out the conscious will and to let the tapping proceed automatically, so that, attending to it once more, I was surprised that in the meantime I hadn't forgotten to tap.

The feeling of disappointment recedes, but an uneasiness remains - as after a flunked test. Control is all well and good, but it shouldn't be tyrannical. Certainly my conscious intent was to have a novel experience -- I wasn't aware of putting myself against the drug, nor did I want to. The question is: What did "I" - or my censor -- keep down? And behind that the much more disturbing question: Is there anything to be kept down? Perhaps I am so much and so little a child of the times that I have accepted the pseudo-scientific substitution "subconscious" for "soul"; and now I may have to confront the possibility that I have no soul any more -- that I stand iron guard over a potentially dangerous prisoner who in the meantime has died and become a heap of ashes. It would be a pretty ludicrous stance.

Fig. 2. Handwriting samples of a 'non-reactor' 2 h after the ingestion of 115 μg/kg 'Psilocybin' (upper portion of figure) as contrasted with control sample obtained on the following day (lower portion); half of the original size

—show that there is a significant increase in tapping rate at the peak of the 'Psilocybin' experience relative to the respective control value (see Table 1).

This increase also reflects the degree of the excitation syndrome which 'Psilocybin' can produce in an individual. It can be seen from Table 1 that subject *B* with a low mean control tapping rate (0·42/sec) and a low variance (0·001) increased his performance more than threefold at drug peak, whereas subject *A* with a high baseline (mean control tapping rate 1·16/sec) increased his performance not quite twofold at drug peak with a larger variance. This again indicates that the baseline (control value) of a subject is important in the assessment of his drug reactivity.

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