CHICKEN IMPRINTING AND THE TYCHOSCOPE: AN ANPSI EXPERIMENT

by René Peoch

It is not often that we have the privilege of publishing a genuinely innovative parapsychological experiment and one, moreover, that is strikingly successful but this paper by Dr. Peoch surely comes into this category. The author is an authority on animal behaviour and a former pupil of Dr. Rémy Chauvin whose name will be familiar to many of our readers. By a happy chance we are publishing below a paper which Dr. Chauvin sent us quite independently which likewise breaks new ground. Dr. Peoch, who runs his own research institute in Nantes, has been working on the phenomenon which he here reports for some six years. Since Lorenz first drew attention to the imprinting response it has attracted a great deal of research. For example, at the Department of Zoology of the University of Cambridge, work has been going on to ascertain the precise neurophysiological basis of this behaviour. If, therefore, as the author claims to show, it can also function as the basis for a psychokinetic effect this should impress biologists who would otherwise prefer to ignore parapsychology. Readers may recall that in our issue of July 1986 we published Pierre Janin's account of his ingenious device the 'tychoscope', a little machine that performs a random walk, together with an article by Chauvin describing an experiment using the tychoscope with mice. Here Dr. Peoch uses the tychoscope with his chicks who then treat it as if it were the mother hen! Cautious readers may wonder whether it is indeed the chicks who are exerting a PK effect or whether this could be another instance of the ubiquitous experimenter effect. Only the future can give us the final answer to this question but the author, at least, is confident that this is not *a case of experimenter effect and he tells us that a colleague who ran the experiment when he was out of Nantes obtained the same results. At all events, we earnestly hope that, by publishing this article we may inspire others who have the necessary expertise to try the experiment for themselves. Dr. Peoch himself is ready and willing to furnish all the relevant information and advice to anyone who is thinking of taking on this challenge—Editor.*

ABSTRACT

We have here described the influence of chickens on a mobile random event generator (tychoscope) moving at random in all directions. We found:

(1) That isolated chicks which have been imprinted with the tychoscope are able to exert some degree of attraction on it if they are prevented from indulging in a following response (p less than 10^{-7}). Chicks that are not so imprinted have no effect on its random movements (p greater than 0·35).

(2) Chicks tested in groups of 15 also exerted a significant effect on the tychoscope (p less than 10^{-9}) even though they had not been imprinted.

Introduction

The aim of this experiment was to use 'imprinting', a phenomenon discovered long ago by Konrad Lorenz, in order to demonstrate a possible psychokinetic ability in chickens. Young birds, very soon after hatching, follow the first object in motion which they see. It need not necessarily be the mother hen, any moving object, a ball, a person etc. will do. The young bird has to be kept in isolation in the presence of the moving object and, thereafter, it will display the 'follow me'

behaviour that it normally shows towards the mother hen, in other words it treats the moving object as if it were its mother.

If the first moving object it sees is a 'tychoscope' (see article by P. Janin, this Journal, July 1986) then one may draw two hypotheses:

(1) the chicken will follow the tychoscope and
(2) if the chicken is restrained by being placed in a cage such that it can no longer follow the tychoscope *it may exert a PK effect on the tychoscope* in order to bring the tychoscope closer to itself.

Subjects

For all conditions the subjects were female chickens aged 12 hours, obtained from an incubator, strain Warren ISA. Hatching took place at night. The chicks were kept in boxes 20 × 21 × 13 cms with aeration. All boxes were maintained at 31°C under nycthemeral light conditions. The chicks are fed twice a day, at 9 a.m. and 5 p.m. but without their being able to see the person involved. In this way when they come to see the tychoscope it will be the first moving object which they spy.

The Tychoscope

This device (see Janin 1986 and Chauvin 1986) is essentially a mobile random event generator in the form of a cylindrical apparatus in contact with the ground at three points which follows a random trajectory. The three contact points consist of two wheels, each moved by its own motor, plus a steel ball whose movements are free. The two wheels are parallel and revolve at the same speed. If they are rotating in the same direction then the tychoscope moves in a straight line either forwards or backwards. If they are rotating in opposite directions then the tychoscope revolves either clockwise or anti-clockwise. A pencil inserted into the apparatus leaves a trace on the sheet covering the target area in the form of a broken line. The length of each segment, the angle of rotation, the displacement forwards or backwards, right or left, are all determined strictly at random. The mean speed is 8 cm per sec. The energy is furnished by three 1½ volt batteries.

Preparation of Subjects and Design of Experiments

The imprinting process begins on the first day. The chick is taken out of its box and gently put close to the moving tychoscope in a room of 1·3 × 2 × 2 m at a temperature of 21°C. The tychoscope then moves about at random for an hour while the chick which is entirely free follows the tychoscope. At the end of one hour the chick is replaced in its box and the process is repeated for four successive days in all. As early as the second day the chick can be observed to follow the tychoscope just as it would do the mother hen. Then on the fifth day the chick is introduced into a box 14 × 11 × 9 cms all the walls of which are opaque apart from one side which is transparent and through which the chick can see the tychoscope. A rectangular wooden frame, 88 × 59 × 1 cms is placed in front of the cage with its longest side against the wall (see Figure 1). A sheet of white paper covers the inside of the frame. The tychoscope, starting from the centre of the frame, remains in motion for 20 mins. leaving its trace on the paper. The

ground is horizontal as checked with a spirit-level. The procedure up to this point is designed purely to habituate the chick to the conditions of the experiment so that it should no longer feel afraid.

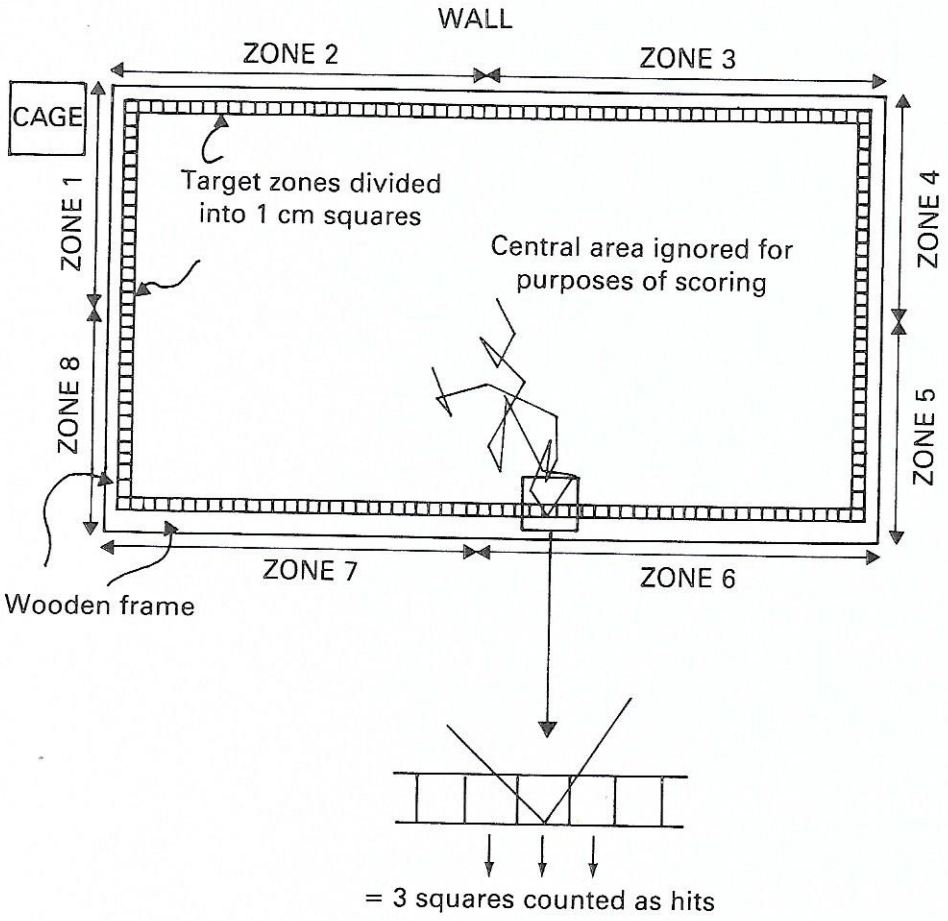

Fig. 1. Set-up for Imprinting Experiment.

On the sixth day the experiment proper begins. Altogether 100 trials are carried out with a different chick on each trial. All results relate to the sixth day only. A control trial is carried out using an empty box, with no chick, immediately following the trial with the chick. All trials take place between 11 a.m. and 5 p.m. but the chick is used only if it is awake, in no case is it specially awakened. The experimenter *never* remains in the room once a trial has commenced, only at the end of a trial does the experimenter return to the room, after the 20 min. trial period has elapsed. The analysis of the tracings from the tychoscope is not carried out until the entire experiment is complete. In this way there is no risk of the experimenter being biased by a premature knowledge of results.

ANALYSIS OF RESULTS

A series of 1 × 1 cm squares is drawn inside the wooden frame and along its edges, 80 squares along the longer side of the frame and 52 squares along the shorter side. Each time the tychoscope leaves any trace on a given square it counts towards the overall score. To improve the analysis the series of squares were divided into eight zones (see Figure 1): zones 2, 3, 6 & 7 each comprises 40 squares in the lengthwise direction, zones 1, 4, 5, & 8 each comprises 26 squares in the breadthwise direction. The cage is situated at the corner of zones 1 & 2 so that the tracings that are scored fall either in the remoter zones, 4, 5, 6 & 7 or in the near zones 8, 1, 2 & 3. Below we compare the scores obtained from these two sectors, the one nearer the cage, the other further away.

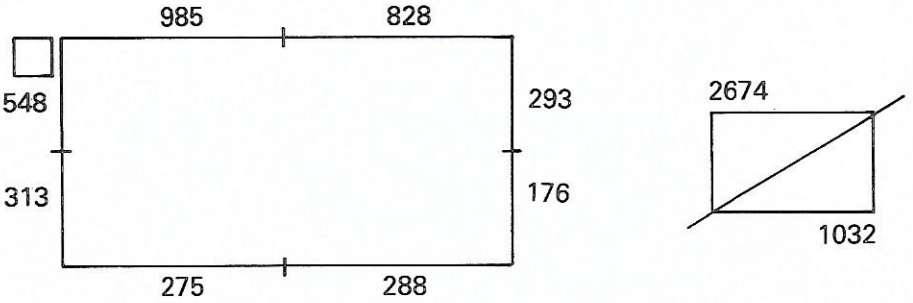

Fig. 2. Results of Experimental Trials with Imprinted Chicks

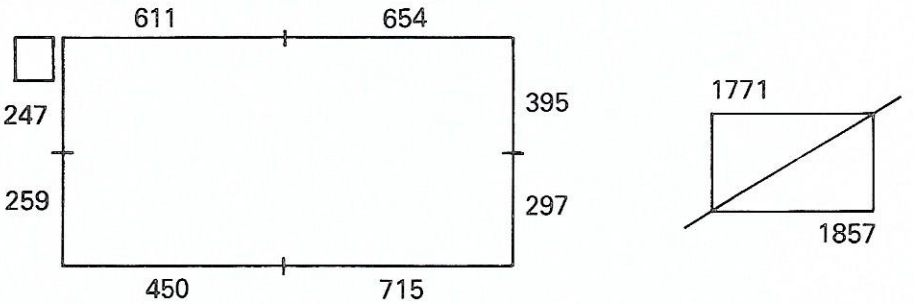

Fig. 3. Results of Control Trials with an Empty Cage.

Two methods were used in assessing the results:

(1) Global analysis: the overall score on the near sector (zones 8, 1, 2, 3) is compared with the overall score on the far sector (zones 4, 5, 6, 7) for both the experimental condition (with a chick) and for the control condition (without a chick). It can be seen from Figure 2 (b) that, for the experimental trials the tychoscope visited a total of 2,674 squares in the near sector but only 1,032 squares in the far sector, a ratio of 2·59 : 1. Likewise it can be seen from Figure 3

(b) that, for the control trials, the tychoscope visited a total of 1,771 squares in the near sector as against a total of 1,857 in the far sector, a ratio of 0·95 : 1.

(2) Trials analysis: in 78 out of the 100 experimental trials the tychoscope hit more squares in the near sector (zones 8, 1, 2, 3) as against 22 trials in which the tychoscope hit squares in the far sector (zones 4, 5, 6, 7). On the null assumption that the tychoscope is moving at random we would expect approximately the same number of hits in both sectors. On a binomial test this difference is significant at p less than 10^{-7}. Comparing this with the results on the 100 control trials we find that there were 54 trials in which the tychoscope hit more squares on the near sector as against 46 trials where the opposite was the case. This difference is *not* significant on a binomial test where there is an even chance on each trial of the one sector having more hits than the other. Thus the combined results may be tabulated as follows:

Condition	Trials on which near-sector hits exceed far-sector hits	Trials on which far-sector hits exceed near-sector hits	Totals
chick present	78	22	100
no chick present	54	46	100
		Chi^2 (d.f. = 1) = 12·8; p < ·001	

From these results it would appear that an imprinted chick is able to influence the behaviour of a tychoscope so as to make it more likely to approach the cage in which the chick is restrained. However, further tests were indicated.

Experiment with Non-Imprinted Chicks

A further batch of 92 chicks were treated in exactly the same way as were the preceding subjects except that they were *not* imprinted with the tychoscope. Results this time show that the tychoscope visited 2,068 squares in the near-sector zones as against 1,836 in the far-sector zones (see Figure 4b). If we

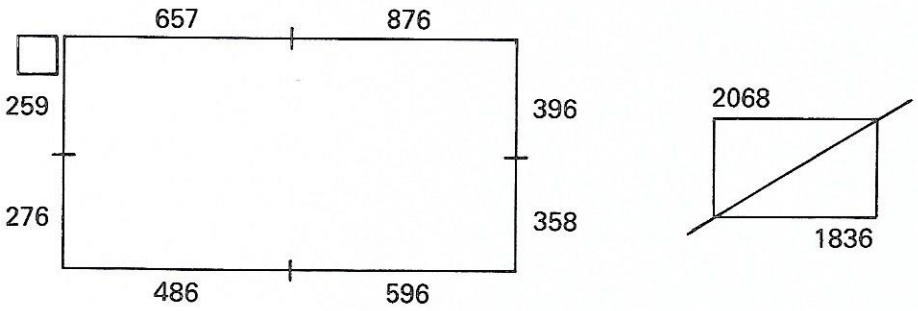

Fig. 4. Results of Experiment with Non-Imprinted Chicks.

further compare the two closest zones (1 & 2) with the two furthest zones (5 & 6) we have a score of 916 hits in the former as against 914 in the latter (see Figure 4a). On a trials analysis we find that, on 51 out of the total 92 trials there more hits on the near-sector as against 41 trials where the opposite was the case. This difference is *not* significant on a binomial test. Combining the results of this experiment with the previous one we get:

Condition	Trials on which near-sector hits exceed far-sector hits	Trials on which far-sector hits exceed near-sector hits	Totals
chick is imprinted	78	22	100
chick not imprinted	51	41	92
		Chi^2 (d.f. = 1) = 11·06; $p < ·001$	

From this we may conclude that the mere presence of a chick is insufficient to explain the bias of the tychoscope, the imprinting appears to play a critical role.

Experiment with a Group of Chicks

What would happen if the experiment were performed with a group of chicks rather than an isolated specimen? Would the tychoscope effect observed still manifest *even if* these chicks had *not* been imprinted with it? To answer these questions we carried out an experiment with 15 chicks aged less than 24 hours tested for 100 trials. As different chicks were used on each trial a total of 1,500 chicks were used altogether. As before, each experimental trial was duly followed by a control trial where no chicks were present. The cage, 20 × 16 × 17 cms, was placed, as in the previous experiments, near the wooden frame (48 × 52 × 4 cms) and close to the wall (see Figure 5). Since the only transparent side to the cage was that facing the frame there was a blind corner, as shown on Figure 5, where the tychoscope would not be visible. The duration of a trial was 30 mins., the temperature was 19°C. Note that the cage in this experiment is situated next to zone 4.

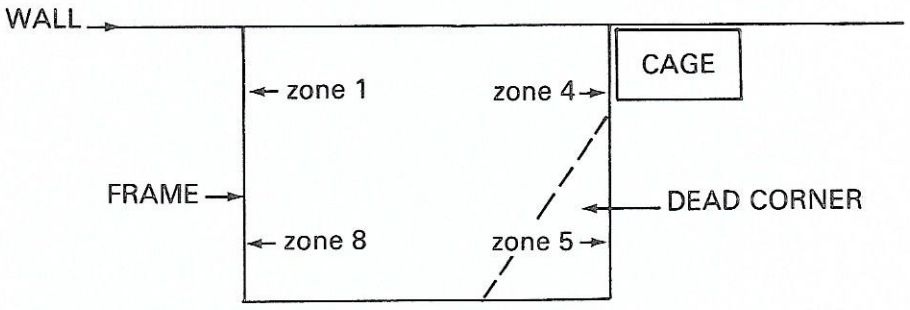

Fig. 5. Set-up for Experiment with 15 Grouped Chicks

Results: For this experiment we compared the sector clearly visible to the chicks, i.e. zones 1, 2, 3, 4, with the sector that was only partially visible or invisible, i.e. zones 5, 6, 7, 8. As can be seen from Figure 6b, the number of squares visited by the tychoscope in the former zones was 5,622 as against only 2,828 for the latter zones, a ratio of 1·98 : 1. On a trials analysis it was found that, out of a total of 100 trials, the tychoscope visited the former zones, 1, 2, 3, 4, more often than the latter zones, 5, 6, 7, 8, on 83 trials as against only 17 trials where the reverse was the case. A binomial test yields a p value of less than 10^{-9}. Comparing this with the control trials (empty cages) we find that the relevant figures are 56 as against 44, a non-significant difference. Combining the results from this experiment we get:

Condition	Trials on which hits on the *more* visible zones exceed hits on the less visible zones	Trials on which hits on the *less* visible zones exceed hits on the more visible zones	Totals
15 chicks present	83	17	100
no chicks present	56	44	100
		Chi^2 (d.f. = 1) = 17·2; p 10^{-4}	

Conclusions: These chicks were *not* imprinted. Nevertheless, they appear to be curious about the tychoscope and act as if they wanted to keep it in sight. It is true that their age corresponds to the time when imprinting is due to occur; it is also true, as Lorenz pointed out long ago, that breeding in groups tends to inhibit imprinting. Contrary to the previous experiment with imprinted chicks, the tychoscope showed no tendency to visit the immediate vicinity of the cage. Indeed, zones 1 & 2 were visited as frequently as zones 3 & 4 (2,860 versus 2,762). The least visited zones, 5, 6, and 7 (see Figure 6a) are precisely those where the tychoscope is least visible. If we compare hits on zones 3 & 4 with those on zones 5 & 6 we have 2,762 versus 1,381, a ratio of exactly 2 : 1. Thus it looks as if the chicks were trying to maintain the tychoscope in full sight not too far from their cage but not too close either.

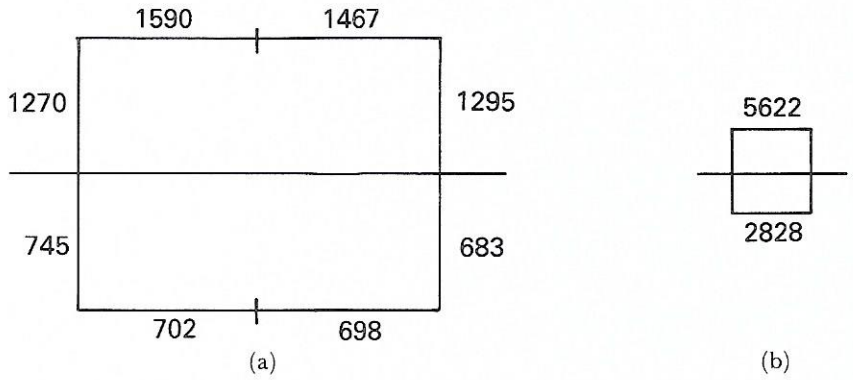

Fig. 6. Results for Experiment with 15 Grouped Chicks

A Note on the Role of Distance

In some of our experiments the electronic random event generator, although still electrically connected to the tychoscope's internal driving circuits, was situated 100 m away. Nevertheless the same attractive effect on the tychoscope was observed. The last experiment requires confirmation but we plan to experiment using greater distances still with the random impulses being transmitted via radio.

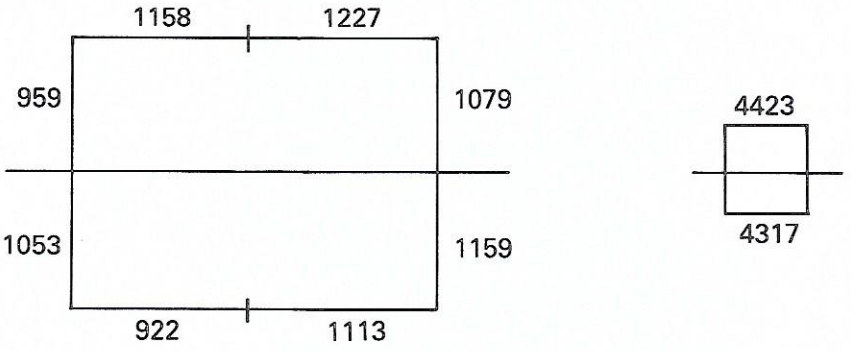

Fig. 7. Results for Control Trials with Empty Cage

General Conclusions

Many researchers have shown that man is able to influence random event generators (Schmidt 1970/73/74). Our experiments suggest that chickens, too, may be able to do so. More specifically, after imprinting they seem able to exert an attractive influence on the apparatus which otherwise would execute a random walk over the target area. As always, in anpsi experiments, it is theoretically impossible to exclude entirely the influence of the experimenter but we have noted in other experiments we have performed that humans are less able to influence a tychoscope than imprinted chicks. Furthermore, we note that, in certain cases, we expected results which did *not* in fact transpire. For example, in the experiment with the 15 grouped chicks, we expected more hits in zone 4 immediately in front of the cage than in zone 1 on the opposite side whereas in fact the reverse was the case, so here at least, the tychoscope refused to oblige! We hope, soon, to be able to record all tychoscope movements automatically so that the results can be fed directly to a computer. In one experiment we carried out we were able to demonstrate that chickens can have a repulsive effect on the tychoscope if they have previously been conditioned to fear it. Indeed, this last experiment gave a highly significant result with p less than 10^{-3}.

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