were given to Mr West, who performed 360 control throws and noted the frequency with which each face turned up :—

	1	2	3	4	4	6
Observed score on different faces	182	177	158	170	204	218
Observed die face frequency in control	174	175	137	166	196	234

It will be seen that the bias was almost identical with the observed distribution on the record sheet, that is an excess of sixes and a deficit of threes. The only difference was that the actual bias appeared to be more extreme. This was probably due to the fact that in the control throws no baffle was used, so that bias in the dice would be able to show itself more quickly.

Further confirmation that this left to right score variation was spurious was obtained by choosing smaller units for computation and finding the variation in scoring rate from column to column in the three columns of each of the six subdivisions of the record sheet. There was no change of target face within these subdivisions, so that bias does not enter into the picture :—

Three run " decline "

	1	2	3
Observed score	368	355	386
Expected	360	360	360

Of course the result was perfectly consistent with the chance hypothesis ($Chi^2 = 2 \cdot 1$).

Since the vertical decline was insignificant, and the horizontal decline invalid, no further information could be obtained by computing the quarter distribution of the page.

Conclusion. The tests were all completely negative. No evidence of PK in any shape or form was obtained. This shows that positive PK results are not guaranteed by repetition of the published American technique.

EXPERIMENTS ON PK WITH INCLINED PLANE AND ROTATING CAGE

BY DENYS PARSONS

I. *Inclined Plane*

Rhine's first controlled experiments (*J. Parapsychol.*, 1943, vii, 30) were conducted with an inclined plane and semi-mechanical release. The first series of experiments described here were based on this method. Four subjects took part and six dice were used. A sloping board was fixed on

an arm-chair and covered with one sheet of corrugated cardboard. (Rhine used two sheets with the corrugations in different directions.) A ruler was fixed at the top of the slope by loops of string, to act as a retaining wall for the dice.

The six dice were placed on the ruler, and the subject, holding the extreme ends of the ruler, raised it to release all six dice simultaneously. The dice rolled down over the corrugated cardboard, bounced against the back of the chair, and landed on the seat. After recording the values of the faces, the dice were replaced on the ruler (following Rhine) with these same faces uppermost.

A run consisted of forty-eight throws of the six dice. No target face was specified ; the subject was asked to try for high scores or low scores and did two runs aiming high followed by two aiming low. Only one run was done with each subject on a given evening.

The results are shown in Table I. Fours, fives, and sixes when aiming high, and ones, twos, and threes when aiming low, are totalled and scored as successes. Similarly failures consist of ones, twos, and threes aiming high, and fours, fives, and sixes aiming low. The deviation from the mean is only 12, which is about half the Standard Deviation. The high-aiming QD patterns for each subject show no decline effects.

High throws predominate both in aiming high and in aiming low (C.R. = 2·25, 1·75). Taking the two together we get C.R. = 2·8, a significant result probably indicating biassed dice. It might be argued that this result is evidence of a tendency to score high psychokinetically even when aiming low, but this idiosyncracy is hardly likely to apply to four subjects, and in the absence here of independent evidence for PK, the hypothesis can safely be rejected.

Table I

INCLINED PLANE; SIX DICE; FOUR SUBJECTS

AIMING HIGH

SUBJECT	Ones	Twos	Threes	Fours	Fives	Sixes
M.G.	87	89	99	103	111	87
Z.R.	100	92	87	101	102	94
F.K.	97	92	83	109	97	98
D.P.	91	84	97	97	101	106
successes					1,206	
failures		1,098				

AIMING LOW

SUBJECT	Ones	Twos	Threes	Fours	Fives	Sixes
M.G.	82	95	101	96	108	94
Z.R.	89	93	108	102	99	85
F.K.	83	92	88	100	102	111
D.P.	98	84	97	90	118	89
successes		1,110				
failures					1,194	

Totals : successes 2,316 ; failures 2,292

II. *Rotating Cage*

A rotating cage was constructed similar to Rhine's. (*J. Parapsychol.*, 1943, vii, 208–9; 1944, 8, 97–98.) The cage was very slightly smaller (24″ × 3″ × 3″), and probably considerably lighter than Rhine's. Four tin-plate baffles were disposed along the interior of the cage which was covered with 0·3″ mesh cotton netting. The cage was pivoted on an axle running through its mid-point and centre of gravity, and was designed to be rotated by hand or by a slow-speed induction motor. Speed of rotation was altered by using three sizes of small pulleys. Since a slow-speed motor was used there was no need for the 2-ft. diameter pulley used by Rhine.

Two dice were used, dimensions about 0·42″ cube. One die was coloured red with grease-pencil. This was in case it was later desired to see if there was any preferential effect with one die with respect to the other. The face value of the red and white dice were recorded separately for the greater part of the cage experiments, but owing to the lack of positive results no analysis has been made of the difference between red and white.

The induction motor was only used for eight runs, four in each series, and these runs showed no special features. In all other runs the cage was turned clockwise by the subject at his own speed. Whereas subjects found the inclined plane experiments very tedious owing to the time spent in collecting and replacing the dice, they seemed to like using the rotating cage.

A run consisted of forty-eight throws of two dice. A run was always followed by a rest period and very often a subject did only one run on a given day. To avoid the possibility that the experimenter was influenced by precognition of the results, it was decided to keep rigidly to the rule of starting each subject with one high-aiming run followed by one low-aiming run, thence-forward alternating the two.

Cocked Dice. Rhine mentions (*J. Parapsychol.* 1944, 8, 98) that "if two dice came to rest on top of each other, such falls were rejected and the trial was repeated. This happened infrequently however." This by no means disposes completely of the problem of cocked dice. Quite frequently one die falls propped up against a wall or corner of the cage, or wedged between the wall and the other die, at an angle of from 0° to 45° to the horizontal. The only safe way is to reject all such falls.

Results. Two series of experiments were done with the cage, the conditions being the same in each. In the first series (Table III) the number of runs aiming high was more than the number aiming low; this was because only four subjects completed an even number of runs. The results were computed in a 2 × 2 Chi Square from which Chi^2 (one degree of freedom) = ca. 0·03 which is not significant.

In the second series equal numbers of high and low aiming throws were made. C.R. = 1·6 which is not significant.

No decline effects were observed in any part of the experiment although a watch was kept for them. No full analyses have been made but Table V shows the summation for the fifteen subjects who used the cage, of the first and last high-aiming quarter-runs (quarter-run = 1 dozen throws of 2 dice) ever done by each subject. Failures predominate even in the first quarters and the decline effect is negligible.

A single experiment with the rotating cage was carried out by Dr Soal and Mrs. Goldney with Basil Shackleton as subject (The Mr B. S. of Soal and Goldney's ESP experiments), and I have their kind permission to include it here. A target face was set for each dozen of twelve dozen throws, namely in order—6, 5, 4, 3, 2, 1, 6, 5, 4, 3, 2, 1. Fifty hits were scored against an expectation of forty-eight.

Conclusion. Four subjects were tested with the inclined plane and six dice, making 4,608 throws. Sixteen subjects were tested with the rotating cage and two dice, making 5,660 throws.

The results of these 10,268 throws are very close to chance expectation, and psychokinesis was not detected.

I am indebted to my friend J. P. Burman, a member of the Society, for help on statistical points.

Table II

NUMBERS OF DICE-THROWS BY EACH SUBJECT

A throw of six dice is counted as six throws and a throw of two dice as two throws.

Subject	FK	DP	ZR	MG	KP	KR	GH	AW
Inclined plane	1152	1152	1152	1152	—	—	—	—
Cage (1st Series)	—	286	288	96	288	192	96	192
Cage (2nd Series)	—	574	—	192	960	—	288	—
Cage Totals	—	860	288	288	1248	192	384	192

Subject	AA	PB	DW	KK	HS	AR	GW	IF	BS
Cage (1st Series)	96	192	192	—	—	—	—	—	—
Cage (2nd Series)	96	96	—	288	192	192	192	192	—
Cage Totals	192	288	192	288	192	192	192	192	—
Cage (extra expt.)									288

Grand Totals

Inclined Plane			4,608
Rotating Cage	1st series	2,112	
	2nd series	3,260	
	extra expt.	288	
			5,660
			10,268

Table III

ROTATING CAGE (FIRST SERIES); TWO DICE; TEN SUBJECTS

	Aiming High						Aiming Low						
Totals	Ones	Twos	Threes	Fours	Fives	Sixes	Ones	Twos	Threes	Fours	Fives	Sixes	
All subjects	238	252	263	235	225	227	103	100	145	96	132	96	Totals
Successes					687			348					1035
Failures		753									324		1077

Table IV

ROTATING CAGE (SECOND SERIES); TWO DICE; TWELVE SUBJECTS

	AIMING HIGH						AIMING LOW						
TOTALS	Ones	Twos	Threes	Fours	Fives	Sixes	Ones	Twos	Threes	Fours	Fives	Sixes	
All subjects	273	266	275	262	275	279	252	264	253	256	314	291	Totals
Successes					816			769					1585
Failures		814									861		1675

Table V

ROTATING CAGE; FIRST AND LAST HIGH-AIMING QUARTER-RUNS OF FIFTEEN SUBJECTS

	FIRST						LAST					
TOTALS	Ones	Twos	Threes	Fours	Fives	Sixes	Ones	Twos	Threes	Fours	Fives	Sixes
All subjects	67	68	54	69	48	54	81	57	55	48	72	45
Successes					171						165	
Failures		189						193				