A R K G N O S I S *

A laboratory study of human cognition not primarily dependent on the classical sensory systems, conducted under the special environmental conditions of a Faraday Cage enclosure.

1950-1956

by

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* ark - a chest or other close receptacle, enclosure.
gnosis - knowledge.
Hence ARKGNOSIS - Knowledge pertaining to enclosures.

FOREWORD

Although the author bears the sole responsibility for the conduct of the experiments reported herein, and the conclusions drawn therefrom, this work would not have been possible without the cooperation of many people. I am particularly grateful to Mrs. Eileen J. Garrett, and Dr. John Hays Hammond, Jr. for their vision and aid in initiating this work. The steadfastness and loyalty of Alice Bouverie, Joyce Borden Balokovic, and Walter Cabot Paine made it possible to see it through to completion.

Without the splendid cooperation of the subjects nothing could have been accomplished. For their devotion to the cause of parapsychology research I wish to thank Mrs. Eileen J. Garrett, Frederick Marion, Dr. D. G. Vinod, Miss Elinor Bond, Mr. Harry Stone, and Peter Hurkos.

Over the years the following staff members assisted in conducting the experiments: Dr. Karlo Marchesi, Karin Jaunch, Lorne Wedlock, Robert Baker, Henry X. Jackson, and Dr. Rupert Clark. I am particularly indebted to Mr. Carl Betz for his role in the laboratory and in the preparation of the manuscript. Miss Marianna Rockwell deserves the major credit for the preparation of the type-script.

The work might have suffered irreparably at the time when the author was recalled to military duty during the Korean conflict had it not been for Mr. Arthur Young. During this period, he, at his own expense, carried on the experiments by serving as Director of Research at the Round Table Foundation.

Mr. Young's imagination and wisdom fortified the progress of the work.

For ideas and advice the author is indebted to friends and scientists too numerous to individually mention. Their friendly and critical opinions are woven throughout the fabric of the experiment and the form of its presentation. It is hoped that the argument herein presented will be worthy of their high standards.

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SYNOPSIS

Over the past fifty years there has been built up a body of experimental data in the field of parapsychology, which suggests that a form of cognition exists in man which is not primarily dependent on the classical sensory systems. The best of the evidence is based on a statistical analysis of card readings with respect to chance-expectation. Critics of this evidence have been persistent in attributing better-than-chance scores to sensory clues, to hyperesthetic sensory faculties on the part of the subject,[1] and even to error and/or fraud[2] on the part of the investigator.

In view of this controversial background it has been considered highly desirable by serious workers in the field to devise some method of bringing such cognition under conscious control compatible with the standards of repeatability of results in other branches of science. The present experiments are an attempt in this direction.

First it is shown that a human being responded physiologically and psychologically to an electrical field from which he was completely shielded by a cubical metal enclosure called a screen Faraday Cage. Then it is shown that this primary response can be modulated by using multiple-nested Faraday Cages and different electrical fields; the innermost Faraday Cage being of sheet copper and the outer cages of copper screen. Then, from this complex of experimental phenomena, there was isolated for special study the

1. Rawcliffe, D. H., The Psychology of the Occult, Chap. 24, "ESP Experiments and the Problem of Sensory Clues." Derricke Ridgway, London, 1952

2. Price, G., Science and the Supernatural, SCIENCE, Vol. 122, No. 1365, August 27, 1955.

effect of the Faraday Cage Technique on scoring rates in tests for extra-sensory perception (ESP).

The Faraday Cage Technique is dependent on the maintenance of charged ions and electrical fields on and around the subject who is located inside the innermost Faraday Cage. To test for the presence of ESP in the subject, a test utilizing a Random Pulse Generator was devised. This test is called the Cosmic Ray Electrical Target Test. It embodied an electronic device, situated in another building, actuated by Cosmic Rays to generate electrical pulses in random sequence. The electrical pulses are recorded on a moving paper graph to give a permanent record of the electrical target (pulse) distribution with respect to time. The subject being tested, inside the Faraday Cage, was asked to indicate when he thought the electrical target appeared as a pulse recorded on the graph in the other building. The duration of each test was approximately one half hour.

From these tests it was evident that the use of the Faraday Cage Technique (FCT) did increase ESP-test scores significantly above control levels. Once this fact was established, the nature of the ESP cognition influenced by the FCT was defined and found to be telepathy. Thereafter, all experiments were conducted as tests for telepathy.

As the work progressed and the Faraday Cage Technique was improved, it became requisite that a more economical and efficient ESP-test be devised for measuring the changes in ESP-test scoring. With this in mind, the Matching Abacus Test (MAT) was designed. This test consisted of two sets of ten distinct printed symbols placed in two parallel rows. Each row of symbols is randomized

before each test. It is the object of the subject to correctly match the pairs of symbols. Such a test, of matching two sets of ten distinct symbols, has a chance-expectation of approximately one match per run (P = .3678) and, a score of ten matches per run would show statistical significance of anti-chance odds of a million to one or better, (P = .000001).

With this new test a control level of scores for telepathy in an ordinary room was established at approximately two matches per run (P = .1839) for teams composed of two subjects (receivers) and three investigators (senders). Tests conducted with these same teams, using the Ground Faraday Cage Technique, produced a significant increase in scoring of approximately five matches per run (P = .0030).

The Faraday Cage Technique was then further improved so that at least two telepathic teams were able to exceed their control level scoring by a significant ratio with a score of eight matches per run (P = .000012). The increase in ESP-test scores was attributed primarily to the use of controlled electrical environmental factors described as the Faraday Cage Technique (FCT).

CHAPTER I

EVOLUTION OF THE EXPERIMENT

1. Exploratory Phase

On March 23, 1950 Henry K. Puharich sent a memorandum to Mr. John Hays Hammond, Jr. of Gloucester, Massachusetts outlining the plan of an experimental technique. The proposal was as follows: To place an individual who was reputed to have psychic abilities inside a Faraday Cage,* charge the walls of the cage with an A-C field of 100 volts, and then observe and record the reactions of the subject. Mr. Hammond agreed to sponsor the proposal at his laboratory, and by March 1951 the apparatus and the subject, Mrs. Eileen J. Garrett, were ready for trial.

Quite by accident an important finding was made during these early trials. A crude roulette-wheel multiple-contact switch was built in order to charge the cage wall in random sequence. In spinning the switch it was discovered that an interrupted closed circuit resulted which charged the cage in make-and-break fashion. On analysis it was ascertained that of all the many electrical fields used to charge the cage the only one that the subject responded to was the rapidly interrupted make-and-break field. This was the first important clue that guided the development of the Faraday Cage Technique.

In July 1951 the equipment and research were transferred to the Round Table Foundation Laboratory in Maine and all the subsequent work was carried on there. By November 1951 enough ex-

* A Faraday Cage is a metal room, or enclosure usually made of copper. When well-constructed it will prevent transmission of electrical signals from the outside to the inside of the enclosure.

perience and data had been garnered from Project I to justify a more thorough study of the sensitivity of the human to an interrupted A-C field applied to the outer walls of a Faraday Cage.

1.1 In Project II, January 1952, a three-week study was made with Mrs. Eileen J. Garrett in a single copper screen Faraday cage. The target charge used for testing sensitivity to an electrical field was of a ten-second duration, 105 volts, 640 cycle current interrupted five times per second. The outer wall of the Faraday cage was charged by an automatic, unstable, multi-vibrator switch. (See fig. 1.) The final score for this series was 86 responses by Mrs. Garrett to 91 'random'* targets that appeared during the three week experimental period. (See Tables 1, 2 and 3.) At the time of these experiments it was believed that this high score was partially attributable to extra-sensory cognition. However, analysis of the sound recordings of the subject's voice revealed an inspiratory gasp when the Faraday cage was charged. This did not occur with a D-C field, or a steady A-C field, but only with an interrupted A-C field. (See fig. 2.) At this time there was no electrical or physiological explanation for this effect. It has been subsequently shown that this same effect occurs in non-sensitive individuals under the proper conditions.

1.11 These results were then presented by the author to other scientists for an independent criticism. These scientists then suggested that the technique employed be scrutinized for the following factors:

a. Eliminate the possibility of an olfactory, gustatory, or respiratory clue to the subject in the form of ionization that

* Since this was not a truly random switch in the mathematical sense, the word random is used in quotation marks as indicating the descriptive use. See Sec. 1.24.

might result from the electrical charging of the walls of a copper screen cage.

b. Eliminate the possibility of an auditory clue to the subject in the form of any vibration that might arise from the electrical charging of the walls of a copper screen cage.

c. Eliminate the possibility of a thermal clue to the subject in the form of any heat that might be generated by the electrical charging of a copper screen cage.

not likely at those power levels

1.12 In the light of this critique, and with the possibility of ruling out an ESP-component of the response, the following criteria were established for the conduct of the next experiment:

A. To present to the test subject (the sensitive) a target that:

1. Appears in a random sequence with respect to time, i.e., a stochastic process.[1]
2. Does not have a formed existence until the moment that it appears in its stochastic sequence in the target area.
3. Has a well-defined quantitative and qualitative nature but which, as far as the subject is concerned, is in physiological terms, sub-sensory in nature.
4. Is non-symbolic in nature.
5. As far as is known has never been experienced by any known human sensory faculty.
6. The criterion for a successful hit of the target lies in a precise correlation between the time of arrival of said target, and the time of the trial call by the subject.

1. Feller P. 337. Probability Theory and its Applications. Wiley, 1950. The terms "stochastic process" and "random process" are synonyms and cover practically all the theory of probability from coin tossing to harmonic analysis. In practice, the term "stochastic process" is used mostly when a time parameter is introduced.

B. To shield the subject from all possible secondary effects of the electrical target that might in themselves give rise to a sensory stimulation.

C. Separate the subject and the target within exclusive well-defined space and energy areas.

D. Attempt to provide optimal conditions for the exercise of the subject's reputed extra-sensory cognition.

Accordingly, in June 1952 a new experiment, Project III, was designed in order to eliminate all the above possibilities of sensory, or super-sensory clues. This was achieved by a constructional device. The primary Faraday Cage was built in dimensions six feet by six feet by six feet with a heavy frame of one-inch thick sheet plywood walls. On this plywood frame was firmly bonded, by an adhesive mastic, heavy sheets of copper plate all of whose joints were tightly double-rolled and soldered. This resulted in a hollow cube copper conductor that was airtight, light-tight, thermally insulated by the plywood, and provided near-perfect electrostatic attenuation. The door was made electrically tight, and sealed airtight by masking tape from the inside. Thus the last possibility of a secondary sensory clue was removed in regard to the electrical field. In spite of such careful shielding against electrical effects the response of the subject in this series of experiments was on a par with that of Project II.

1.2 Empirical Development of Apparatus and Method- For Project II ~~Project II.~~

1.21 Apparatus in Project II:

a. Faraday Cage A: The dimensions of the copper screen cage cube were seven feet by seven feet by seven feet. The cage was made of a wooden frame held together by iron nails and screws.

The floor was made of one-inch thick spruce boards, and the floor copper screen was laid under the boards. Over the wooden floor was laid a rubber mat to prevent any electrical contact between the subject and the field. All seams and joints of the copper screening were soldered. The door was sealed by galvanized iron spring stripping. The ground plate of the circuit was a large copper screen tightly framed in wood four feet by seven feet placed on the roof of the Faraday Cage, and raised to a height of three inches above it by glass insulators.

b. Power Supply.

The power supply for the Faraday Cage was a 640 cycle 0-150 volt oscillator operated from 110 volt A-C line. The output of the oscillator was interrupted at the rate of 5 interruptions per second. (See circuit diagram fig. 1.) The power supply and the random switching device were placed in an empty room one floor below the experimental laboratory so that they were completely out of the sensory range of the subject as well as the investigators.

c. "Random" switch. (See circuit diagram. Fig. 1.)

d. Recording Apparatus.

A microphone was placed outside of the Faraday Cage so that it would pick up the calls of the subject. These were impressed upon a Magnecord tape recorder. On the same tape was impressed the time of arrival of the electrical target on the Faraday Cage. This was done by means of a voltage divider placed across the power supply leads to the cage and plate. No one knew the order of target arrival times until the tape was played back at some time after the experiment.

e. Analysing Apparatus.

The magnetic tape recording of the experiment was played after

the experiment, and the speaker output was led into a Sanborn Industrial Recorder over an integrating circuit. The integrating circuit analysed the frequency and the volume of the speech output of the subject, and this was recorded on graph paper moving at a constant speed of 2.5 m.m. per second. The speech analysis was used as a psychomotor index of depression or stimulation of the subject. On the same graph paper was recorded the time of arrival of the electrical target. The calls as well as the target time were both on the same graph, and the only judgment exercised by the investigator in the process of scoring was to mark the speech output wave that corresponded to the call of the subject. Thus an accurate record of the time relation of the call to the target was obtained which could be measured later with a caliper. (See fig. 2.)

could introduce notion of what constituted a "call" be after "call" is noting target arrival time?

1.22 Method--Project II.

The Faraday Cage in this experiment was used as a target area on the theoretical and practical assumption that such a charged hollow conductor would have a zero electrical field intensity within it. However, this assumption holds true only where there is no charged body within the hollow charged conductor that carries a charge. In this experiment it was necessary to place a human being within the Faraday Cage in order to carry out the purpose of the experiment. Therefore, the assumption of a zero electric field intensity is invalidated, but it is evident that the weak field that does exist under the conditions of this experiment within the Faraday Cage is of a subsensory physiological threshold level. In electrical tests of the attenuation of the Faraday Cage one could not detect any field within the cage using as a detector a sensitive circuit tuned to the frequency of the power supply. For practical purposes we have made the assumption that as far as the sensory

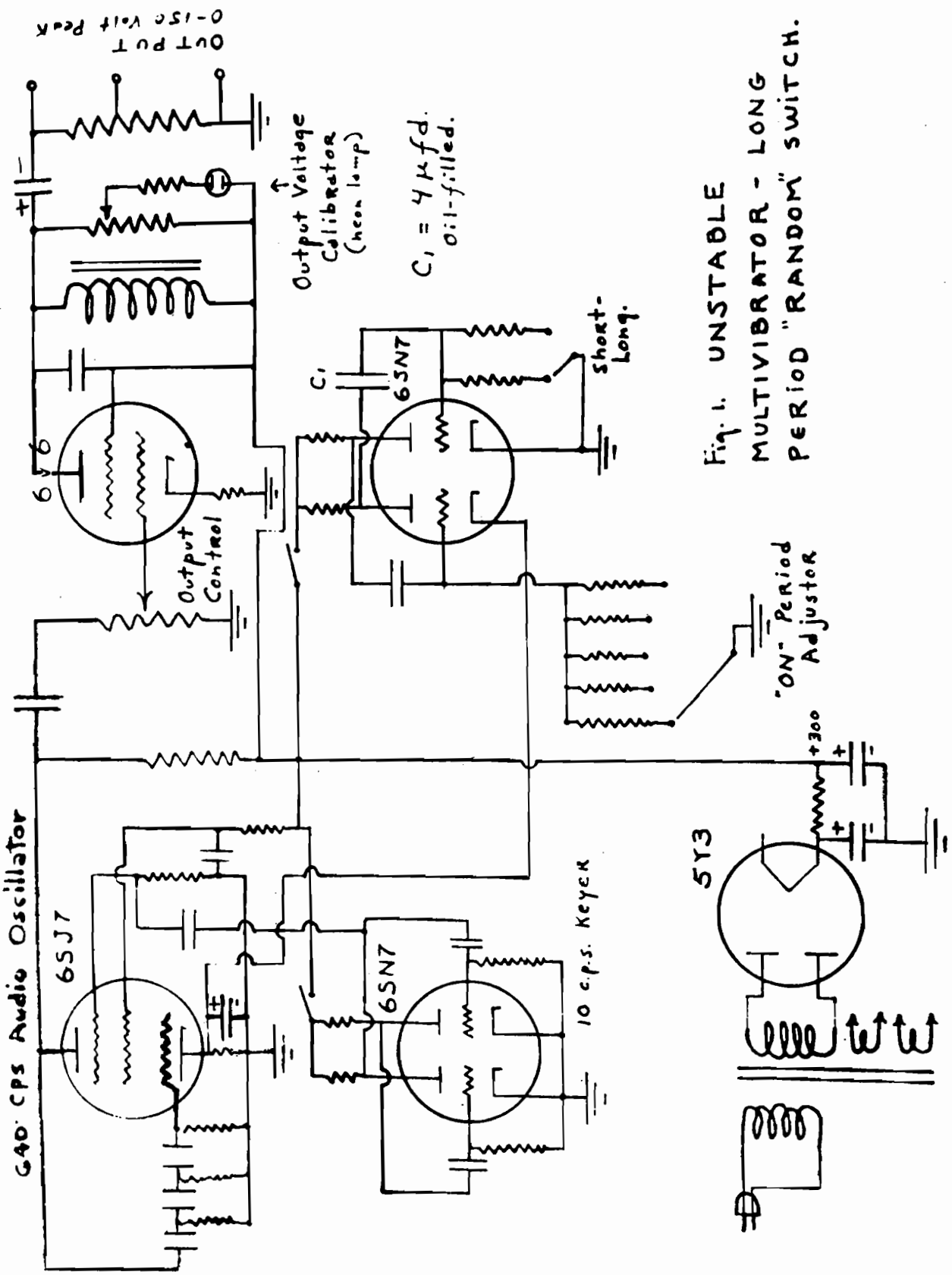


Fig. 1. UNSTABLE MULTIVIBRATOR - LONG PERIOD "RANDOM" SWITCH.

fig. 1. Circuit Diagram for Random Switch and Power Supply

apparatus of a human being is concerned the electric field intensity inside the Faraday Cage is zero, physiologically speaking, when the cage is charged.

The voltage, frequency, interruption, and duration characteristics of the power supply were arrived at in a purely empiric fashion as being the best target and/or source of stimulation for the unusual sensitivity of the subject. ?

The "random" switch device was introduced into the experiment for a number of reasons in addition to stochastic requirements. The most important reason arises from the fact that the subject is freed from all the strain of seeking content or meaning in a non-symbolic target, and can reduce his response to a minimal cognition process.

1.23 Procedure--Project II.

The power supply to the random switch and the Faraday Cage power supply was turned on about a half hour before the experiment was begun. The experimental subject, Mrs. Garrett, was then asked to enter the Faraday Cage and sit in a chair facing the microphone. One observer remained in the Faraday Cage with the subject. Neither the subject nor the observer was informed of the exact nature of the experiment to be performed. For example, a number of experiments were performed with no electric charge appearing on the cage in order to determine whether calls would be made in the absence of any target. were they?

Mrs. Garret then went into a self-induced trance state, and would speak along lines prompted by the observer in the cage. It was the latter's function to direct the attention of the subject periodically to the fact that this was an experiment, and request her to describe any changes that might appear in the surrounding atmosphere. As soon as the subject began to speak in the trance state the tape recorder was started by an investigator outside the cage, and there-

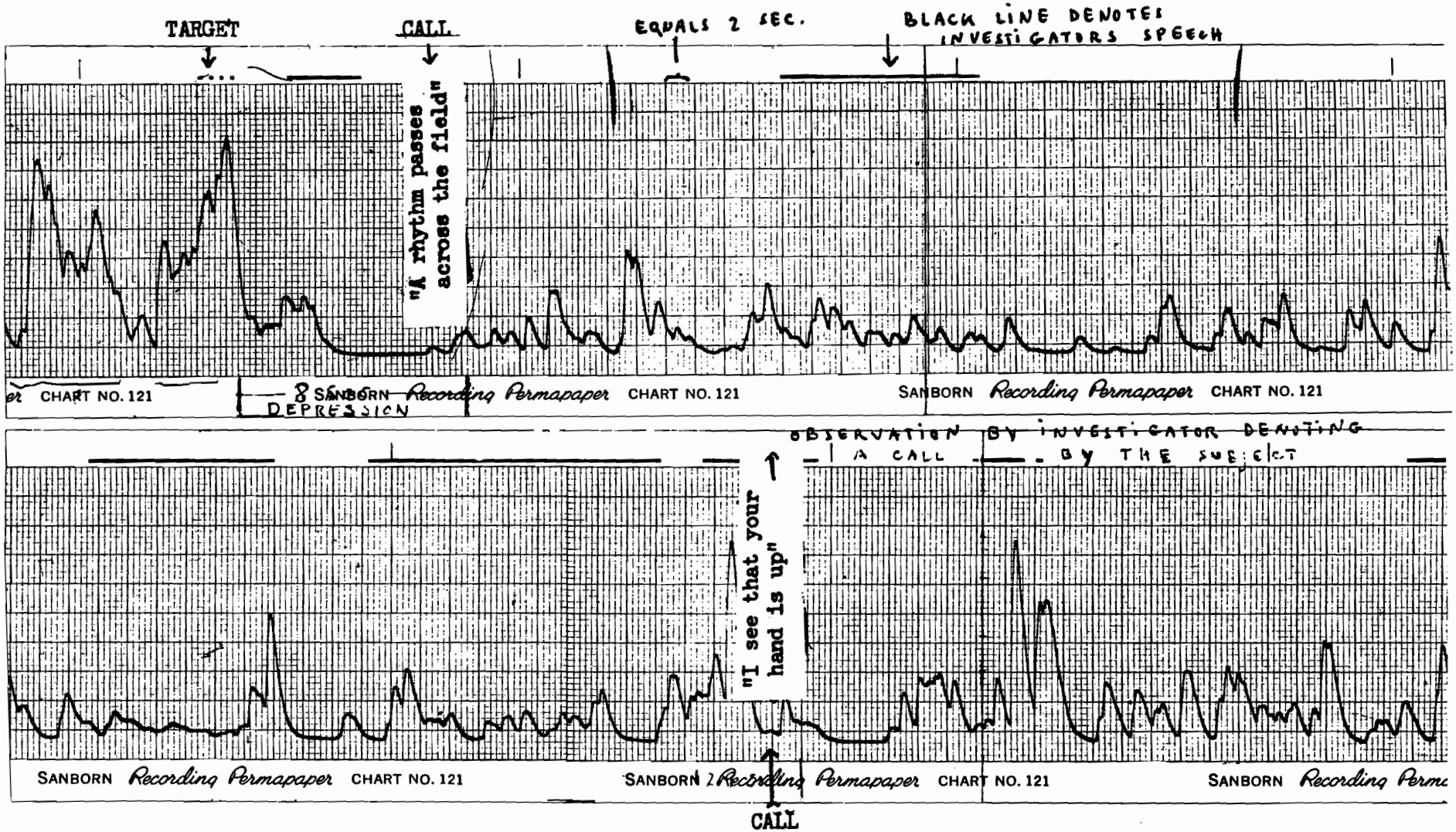


Fig. 2. Excerpt from Project II Experiment Number 18 showing the psychomotor depression following the appearance of the target, and the first and second calls in relation to one target.

see pages 6, 29-30

after the experiment ran to its conclusion with no further manipulation on the part of the investigators.

The subject remained in the trance state making calls and observations for variable periods ranging from thirty minutes to forty-five minutes. When she awoke the experiment was considered terminated. Then the subject was asked to leave the laboratory and the analysis of the results proceeded as described. The subject was never allowed during Project II to know the score nor to hear a recording of her performance. She was never told what to expect as a target in this experiment, but she quite easily and naturally began to give impressions as to the nature of the fields used, and was very quick to detect large changes in voltage or frequency when introduced without her previous knowledge. In fact, she was able to distinguish differences in the electrostatic field of the cage caused by household appliances, electric motors, or cars approaching from beyond hearing. She was so adept at distinguishing these extraneous disturbances from the experimental targets that this factor did not confuse our results as would be expected.

1.24 Results of Experiment - Project II.

In a series of twenty-one experiments the electrical target appeared a total of 98 times. A series of quick computations was carried out in order to ascertain the nature of the distribution present. It can be seen graphically in Table I how the targets were distributed when all runs were cut off to equal length of thirty-three minutes for each experiment. This would give 99 intervals of twenty seconds each, and that number of intervals made it possible to avoid a laborious computation by entering a table of the Poisson distribution directly and securing the expected frequencies. The column headed x represents the number of targets falling in any twenty second

interval.

x	observed f	fx	$\bar{x}$ = .99 Exp. f	Dev.	$(Dev.)^2$	$\frac{Dev.^2}{Exp.\ f}$
0	27	0	36.7	-9.7	94.09	2.563
1	50	50	36.7	+13.3	176.89	4.819
2	18	36	18.3	-0.3	.09	.004
3	4	12	6.1	-2.1	4.41	.722
4	0	0)	) 1.2	) -1.2	) 1.44	) 1.200
5	0	0)	)	)	)	)
	99	98	99.0	00.00		χ^2 = 9.308

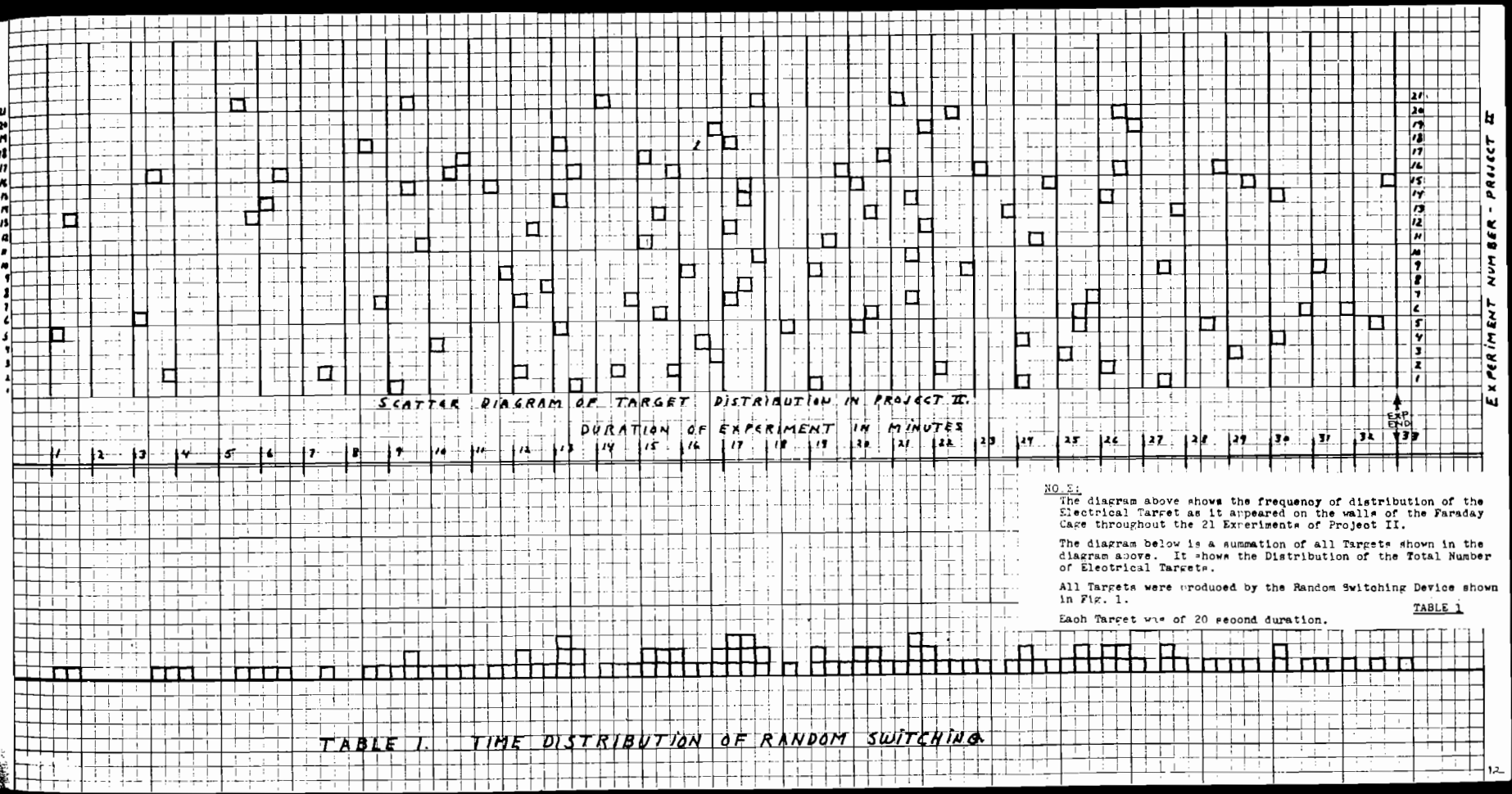
P for 3 d.f. = χ^2 = 7.815 = .05

χ^2 = 9.837 = .02

There is found to be a deviation of the observed frequency from a true Poisson distribution at the 2% level. Since the target distribution lacked homogeneity, it was apparent that fitting the calls to the targets by means of the chi-square method would lack statistical validity.

Therefore, the first attempt at analysis consisted of a simple percentage evaluation of the responses given by Mrs. Garrett. The twenty-one experiments were further cut off equally at 29 minutes and 20 seconds in order to have better homogeneity. In this truncated series the target appeared 91 times in intervals ranging from one minute to twenty minutes apart. A dual standard of scoring for response was employed. If the time interval between two successive targets was more than three minutes, then a period of ninety seconds was allowed in which to make a call that could be considered a response. If the time interval was less than three minutes between targets, then the call had to be made before the midway point between targets in order to be considered a response. If the subject made a call in the future tense this was recorded as a precognition trial, or as a conscious precognition of an electrical target. See Table 3

A total of 86 responses within this time interval were made to


EXPERIMENT NUMBER - PROJECT II
SCATTER DIAGRAM OF TARGET DISTRIBUTION IN PROJECT II.
DURATION OF EXPERIMENT IN MINUTES
EXP END
NO. 1:
The diagram above shows the frequency of distribution of the Electrical Target as it appeared on the walls of the Faraday Cage throughout the 21 Experiments of Project II.
The diagram below is a summation of all Targets shown in the diagram above. It shows the Distribution of the Total Number of Electrical Targets.
All Targets were produced by the Random Switching Device shown in Fig. 1.
TABLE 1
Each Target was of 20 second duration.
TABLE I. TIME DISTRIBUTION OF RANDOM SWITCHING

the 91 targets that appeared. Of the 86 responses 25 were called out as conscious precognitions in a period of 52 to four seconds before the target appeared, and the precognitions were all called out in the future tense. Fifteen of the 86 responses were made at the exact time of the presence of the target, and 37 of the 86 responses were made within fifteen seconds after the appearance of the target. Thus a total of 77 responses were made in a rather narrow time band before, during or after the appearance of the target. The remaining 9 calls fell within the 90 second time standard.

TABLE 2 - Project II

TARGETS	91
TOTAL TRIALS	159
less redundant calls	19
Net Trials	140
Responses Related to Target	86
% Responses to Targets	94%
% Responses to Net Trials	61%*
"PRECOGNITION" Responses	25
% of Responses as Precognitions	29%

* Score valid for evaluation

From this group of twenty-one experiments there was selected a sample of eight experiments in which it appeared to the investigators that the response of the subject had been unusually keen. It was decided to put these to a statistical analysis according to the method outlined in Sec. 2.3 B. The prime purpose of this analysis was to approximate the probability when a scoring standard of fifteen seconds was allowed for a response. With an excess in the leading diagonal

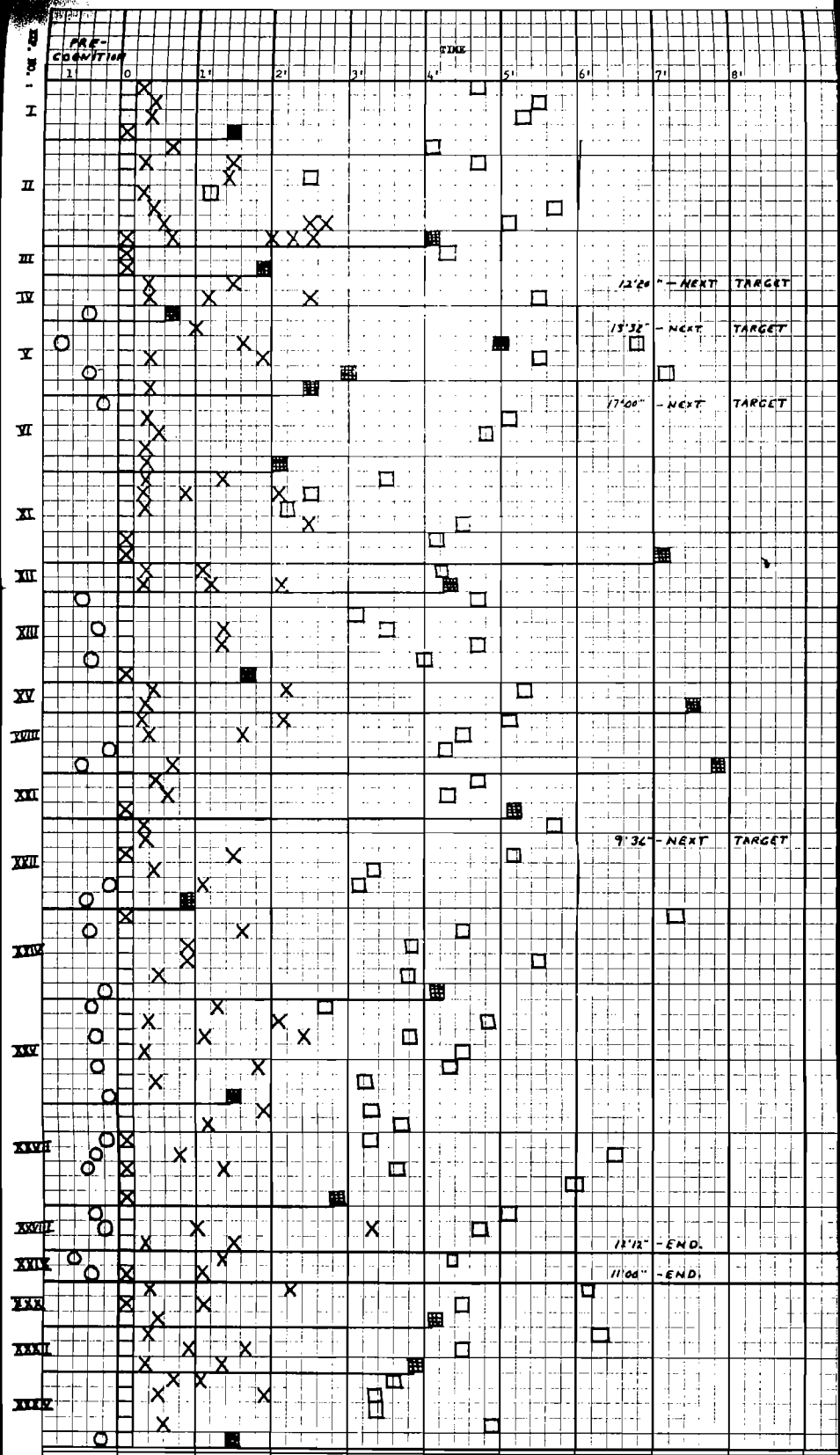
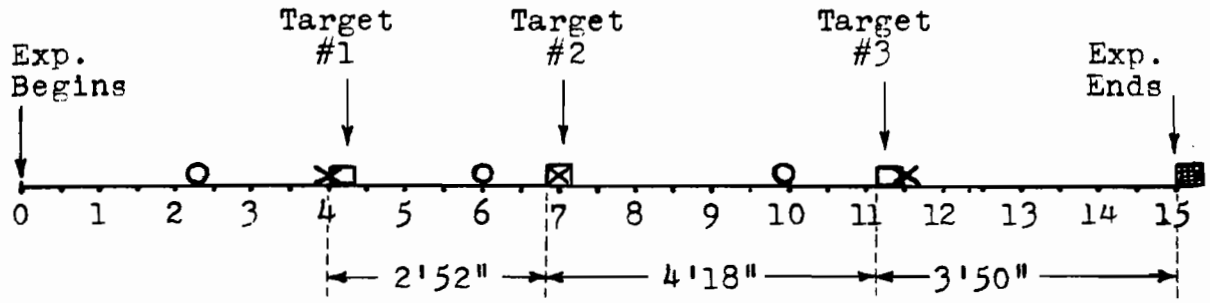


TABLE 3
4. PROJECT II. Graph showing time relation of call to each target, and time relation to next target. Each small grid equals twelve seconds.

Precognition See p.11

METHOD USED IN PLOTTING TABLES 3, 5, & 6

The following illustration shows a Sample Experiment of fifteen minutes duration; symbols used are defined below.



O CONSCIOUS PRECOGNITION

This is a trial call where the subject stated that a Target would appear in so many seconds of future time. Examples of such calls are: "There will be a Target in two minutes," or "A pulse will arrive in ninety seconds," etc.

□ RANDOM TARGET

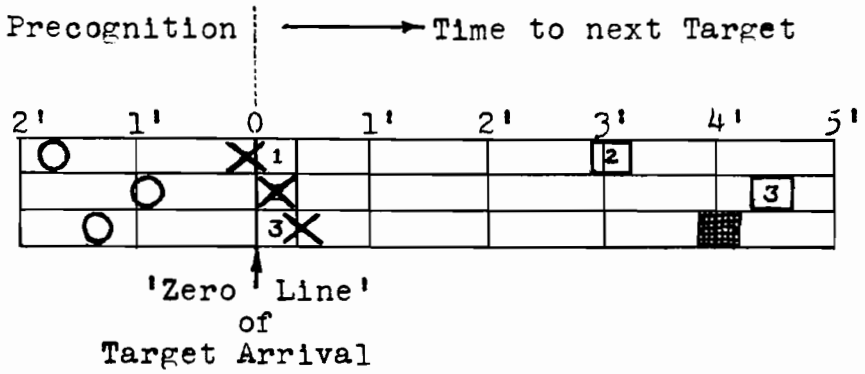
The electrical pulse or Target appearing at random which the subject is trying to detect or 'call'.

X TRIAL CALL RELATED TO TARGET

Calls made by the subject such as: "It is here now," or "Ah, a pulse has just arrived at this moment,"-- constitute Trial Calls Related to Target. Note that in the experiment illustrated above, only in the case of Target #2 did the subject's call coincide with the exact moment of time when the Target appeared.

GRAPH SHOWING THE TIME RELATION OF CALLS TO EACH TARGET AND THE TIME RELATION TO THE NEXT FOLLOWING TARGET

The above illustrated experiment can be reduced into a graph as shown below. This type of graph is used in Table #3 of the following page, and also in Tables 5 & 6.



for responses of 25 over chance-expected, and a Standard Deviation of 2.42, there was found a critical ratio of 10.33 or probability of -log Q(X) of 23.11805. Because of the inadequate design of the experiment and the arbitrary selection of the 8 experiments, no especial significance is attached to these figures. They merely served to indicate that some degree above chance-expectation of response was being observed, but one which could not yet be precisely evaluated.

1.3 Empirical development of apparatus and method--Project III.

1.31 Apparatus--Project III.

a. Faraday Cage.

There were combinations of three Faraday Cages used in Project III. The outer cage A was the same one as used in Project II. Inside of the outer cage A was nested on glass insulators the solid sheet copper Faraday Cage B described in section 1.12. It need only be pointed out that cage B had no metal in its inner wood construction, all the plywood sections being fastened with wood dowels. In Group 4 of the experiments done under Project III there was used a third Faraday Cage C. This one was made of copper screening of dimensions forty-six inches square and sixty inches high. It was portable and made to be moved in and out of cage B for special studies.

b. Circuit arrangements of the three Faraday Cages.

1. Circuit I - Cages A & B. See fig. 3.

2. Circuit II - Cages A & B. See fig. 4.

3. Circuit III - Cages A & B. See fig. 5.

4. Circuit I A - Cages A, B & C. See fig. 6.

c. Power supply.

This is the same as in Project II. See fig. 1.

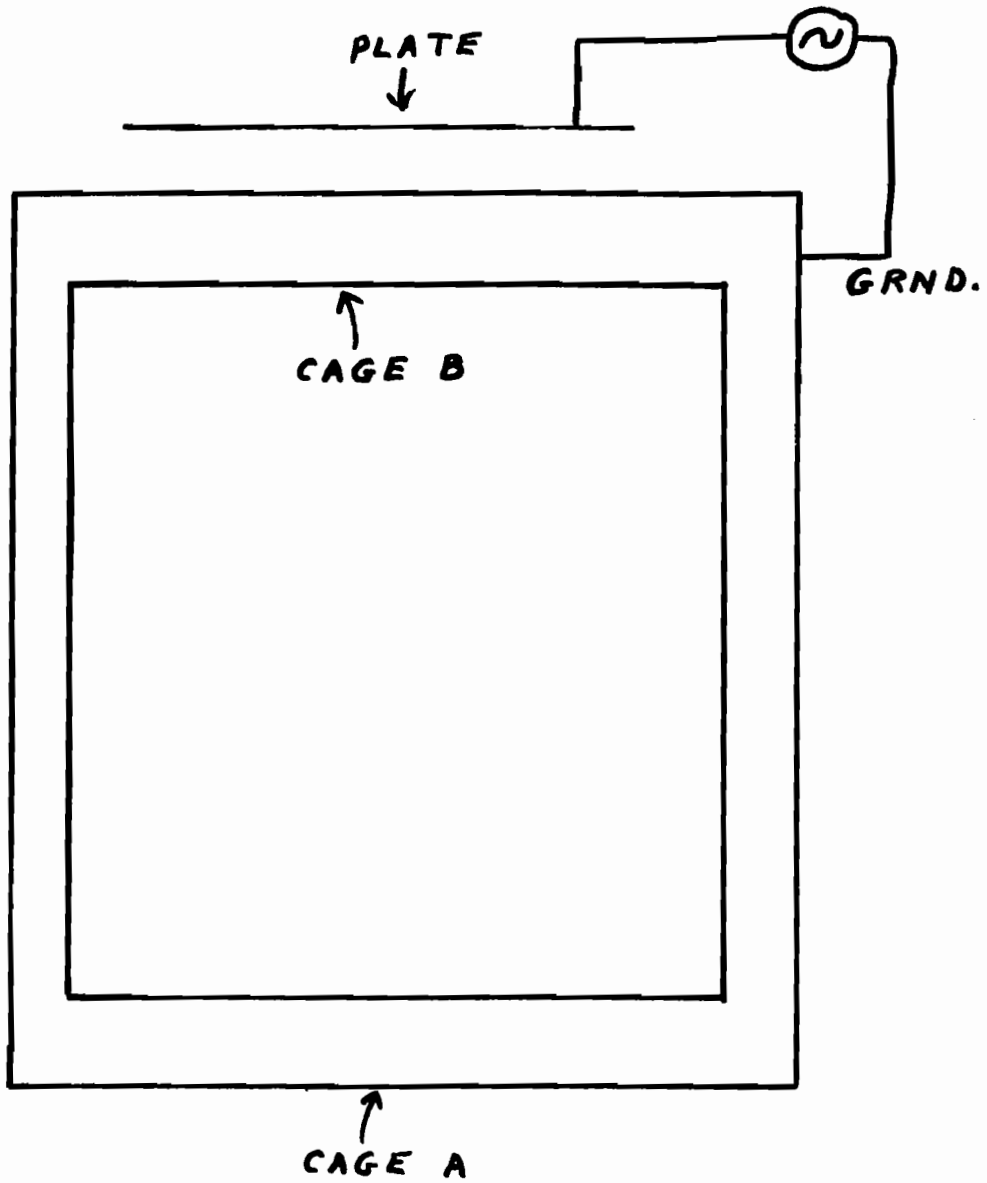


Fig. 3. Circuit I. Cage B completely shielded.

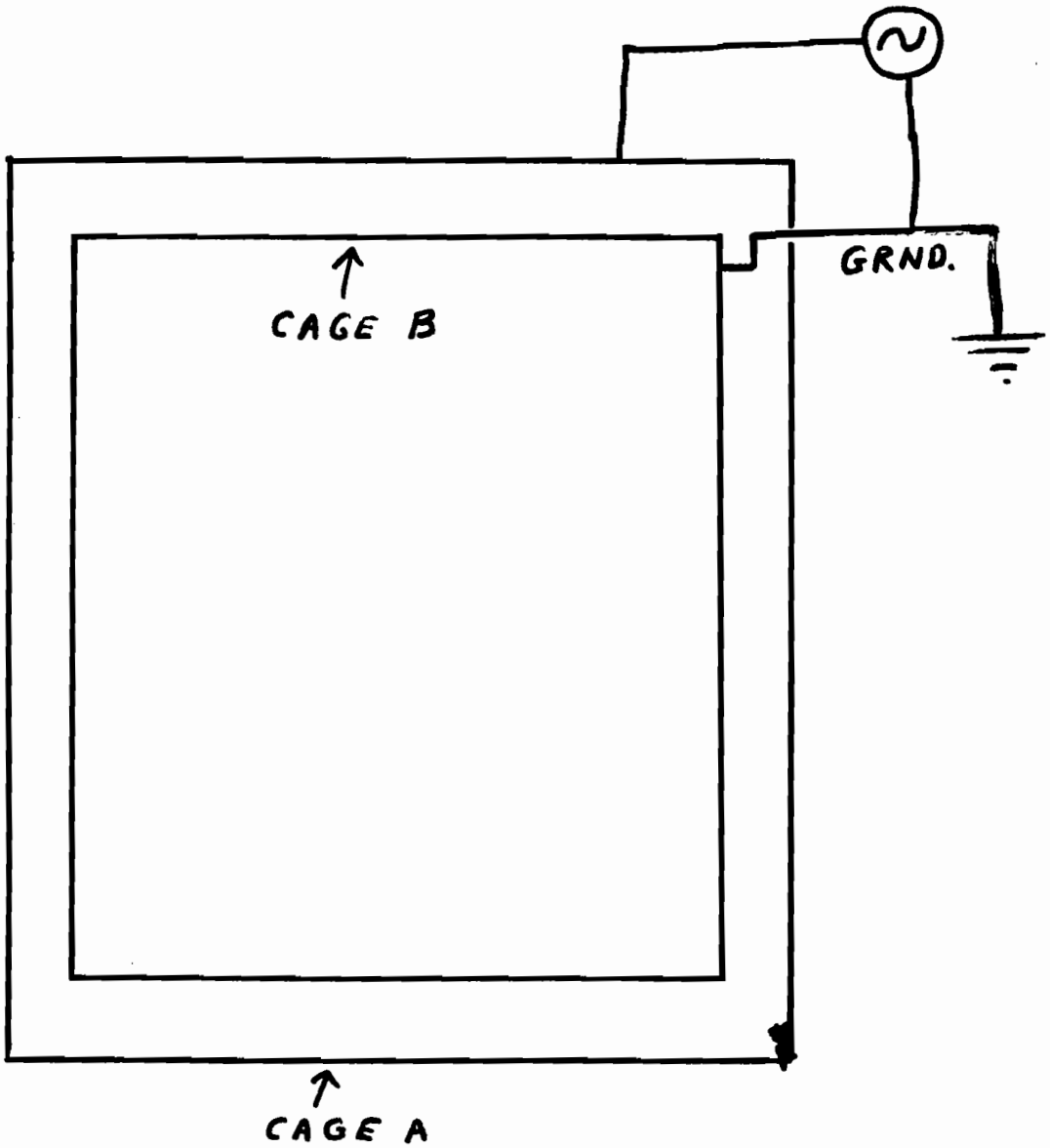


Fig. 4. Circuit II. Potential exists between the walls of Cages A and B.

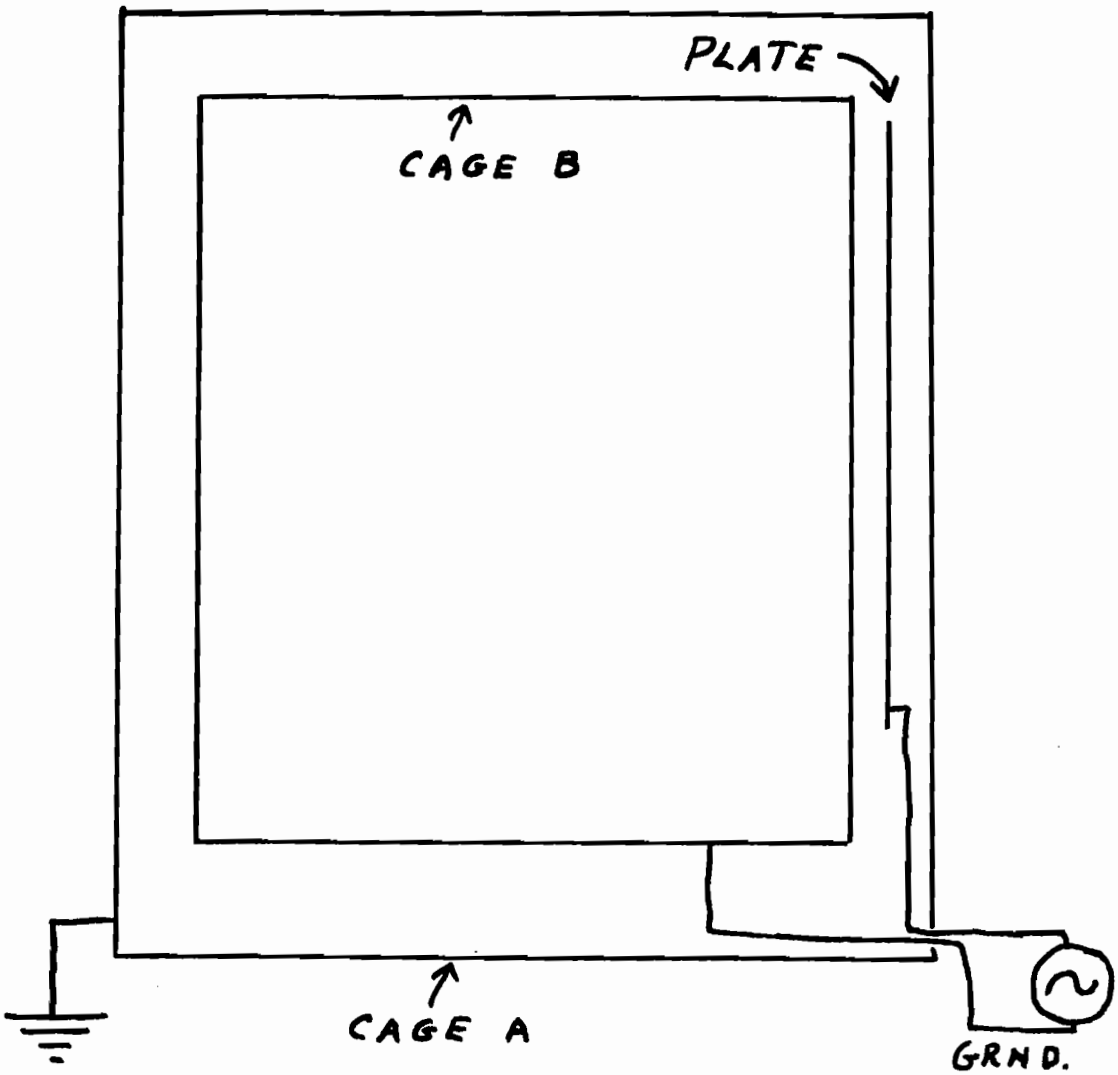


Fig. 5. Circuit III. Potential exists between the walls of Cage B and its plate. Cage A grounded.

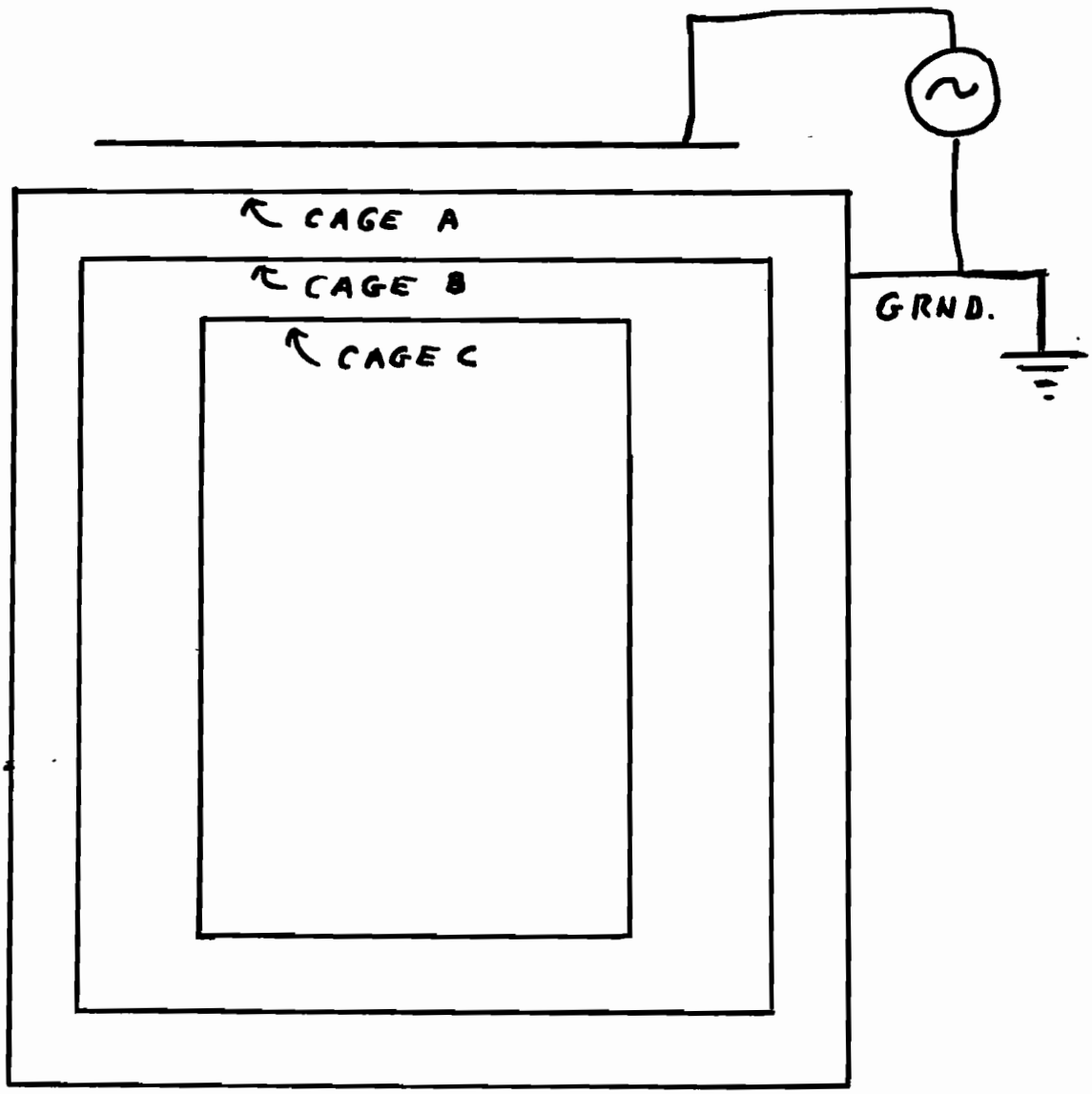


Fig. 6. Circuit I A Three Cages. The potential exists across the walls of Cage A and its plate thus providing triple electrical attenuation.

d. "Random" switch.

This is the same as in Project II. See fig. 1.

e. Recording apparatus.

The tape recorder outside of the cages used to record the time of arrival of the electrical target was a 3.75 inches per second speed Webcor Tape Recorder. Inside of cage B was placed a battery-powered Minitape Model #5A Tape Recorder whose speed synchronized with that of the Webcor Recorder. The Minitape Recorder was used to record the calls of the subject.

synchronization?

f. Analyzing apparatus.

The apparatus was the same as described for Project II. See 1.21

1.32 Method--Project III. See 1.22

The method of conducting the experiment was essentially the same as that for Project II. Cage B had to be sealed with masking tape from the inside of the door after the subject and the observer had entered it. Since there was no air supply from the outside the experiment was necessarily limited to about thirty minutes. Records were kept inside of cage B for temperature, humidity and barometric pressure. The temperature inside of cage B rose to an average of six degrees Fahrenheit during the experiment.

In addition, the starting time of the A-C and the D-C tape recorders were synchronized by a rap on the wall. The same was done at the end of the experiment, and the raps thus impressed on both tapes were used as time reference points.

1.33 Procedure--Project III.

The procedure was essentially the same as in Project II. See 1.23

1.34 Results - Project III.

TABLE 4

Results - Project III

A. Percentage Tabulation

	Circuit I Group 1	Circuit II Group 2	Circuit III Group 3	Circuit IA (3 cages) Group 4	Project III Totals
NUMBER OF TARGETS	38	30	49	45	162
TOTAL TRIAL CALLS	62	40	59	47	208
less redundant calls	8	9	12	3	32
NET TRIALS	54	31	47	44	176
NUMBER OF RESPONSE HITS	21	30	43	35	129
% OF HITS TO TARGETS	55%	100%	87%	77%	80%
% OF HITS TO NET TRIALS	38%	96%	91%	79%	73%
PRECOGNITION RESPONSES	11	26	34	13	84
% OF HITS AS PRECOGNITIONS	52%	86%	79%	37%	65%

B. 15 Second Standard Contingency Analysis

STANDARD DEVIATION	1.71	1.40	1.89	1.54
EXCESS HITS	-1.00	+6.00	+13.00	+11.00
CRITICAL RATIO (X)	0.58	4.3	6.86	7.1
PROBABILITY	P = CHANCE	P = .0000085	-log Q(X) 9.00586	-log Q(X) 11.89285

Table 4A shows the response to the target recorded in percentages.

For ease of computation the frequency distribution of the targets was analysed for all of the experiments equally to the 20th minute of each run. The number of targets falling into each twelve second interval were counted over one hundred such intervals.

x	observed f	$\bar{x}$ = 1.11 Exp. f	Dev.	$(Dev.)^2$	$\frac{(Dev.)^2}{Exp.\ f}$
0	31	33.2	-2.2	4.84	0.145
1	36	36.6	-0.6	.36	0.009
2	25	20.1	+4.9	24.01	1.194
3	7	7.3	-0.3	0.09	0.012
4	1	)	)	)	)
5	0	) 2.8	) -1.8	) 3.24	) 1.157
6	0	)	)	)	)
	100	100	00.00		χ^2 = 2.517

Total targets = 111

$\bar{x} = Sfx/Sf = \frac{111}{100} = 1.11$

χ^2 for 3 d.f. = 2.366 at P = 0.50

= 3.665 at P = 0.30

Hence the observed sample does not depart significantly from the Poisson distribution, and in fact evidences homogeneity. Therefore, the targets as distributed are valid for statistical analysis.[x]

The calls were counted for the same intervals and over the same time period as the targets. Remarkably enough they showed close correlation to the target distribution with a mean of 1.08 compared to the target mean of 1.11.

[x] George W. Snedecor, Statistical Methods, Sec. 16.5 p. 440 The Iowa State College Press, 4th Ed., 1955

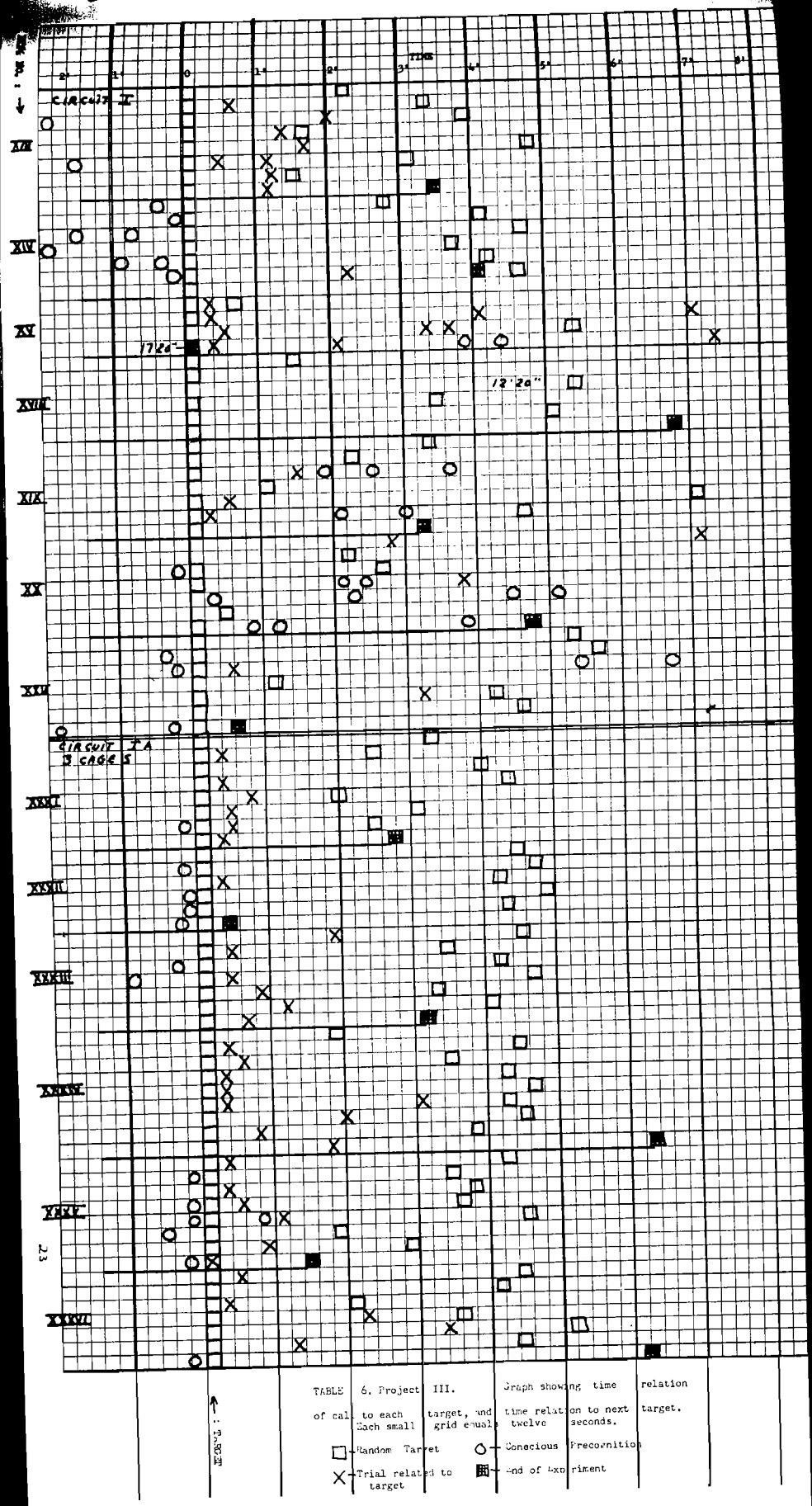


TABLE 6. Project III. Graph showing time relation of call to each target, and time relation to next target. Each small grid equals twelve seconds.

□—Random Target ○—Conscious Precognition

×—Trial related to target ▣—End of Experiment

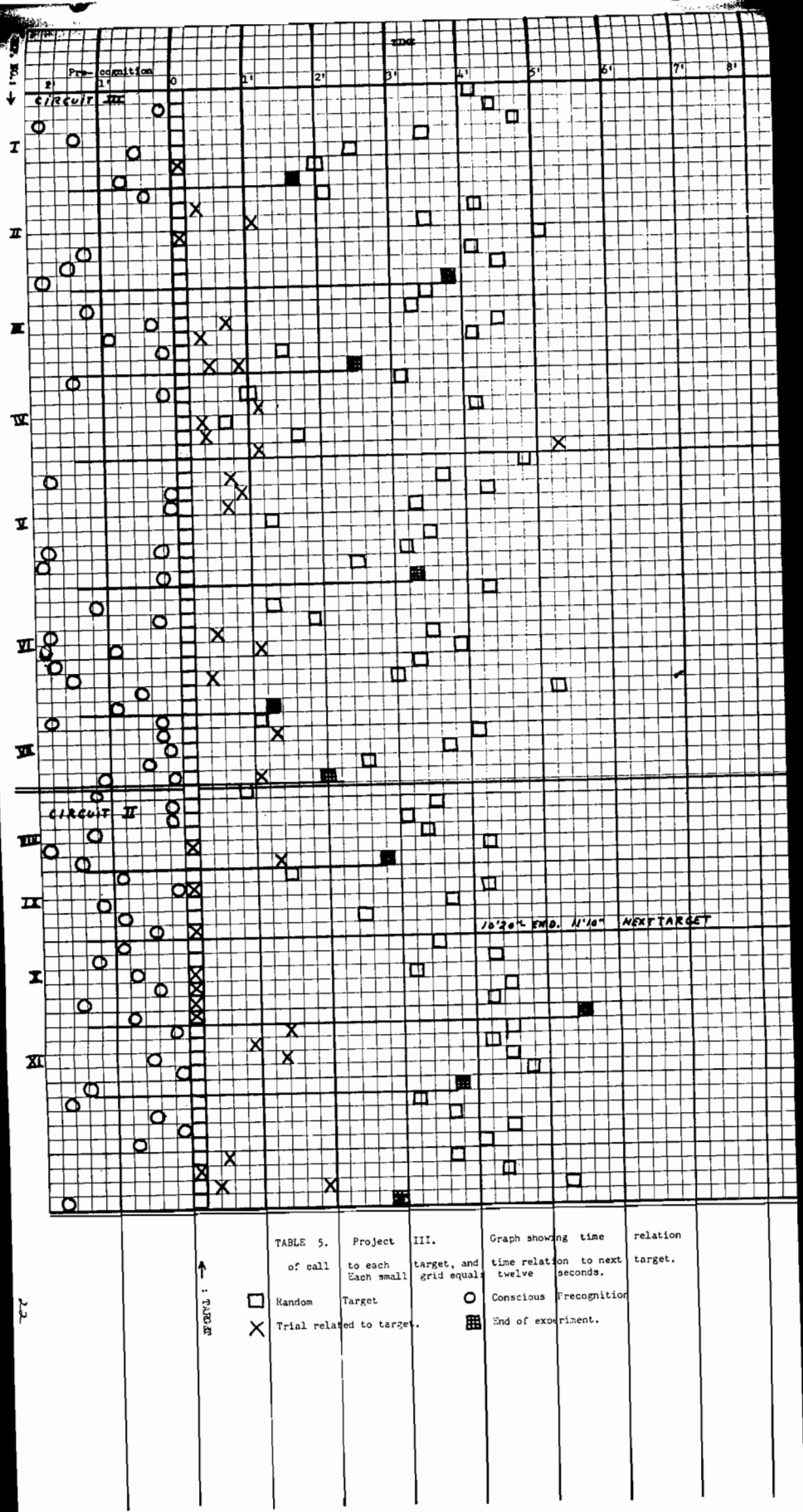


TABLE 5. Project III. Graph showing time relation of call to each target, and time relation to next target. Each small grid equals twelve seconds.

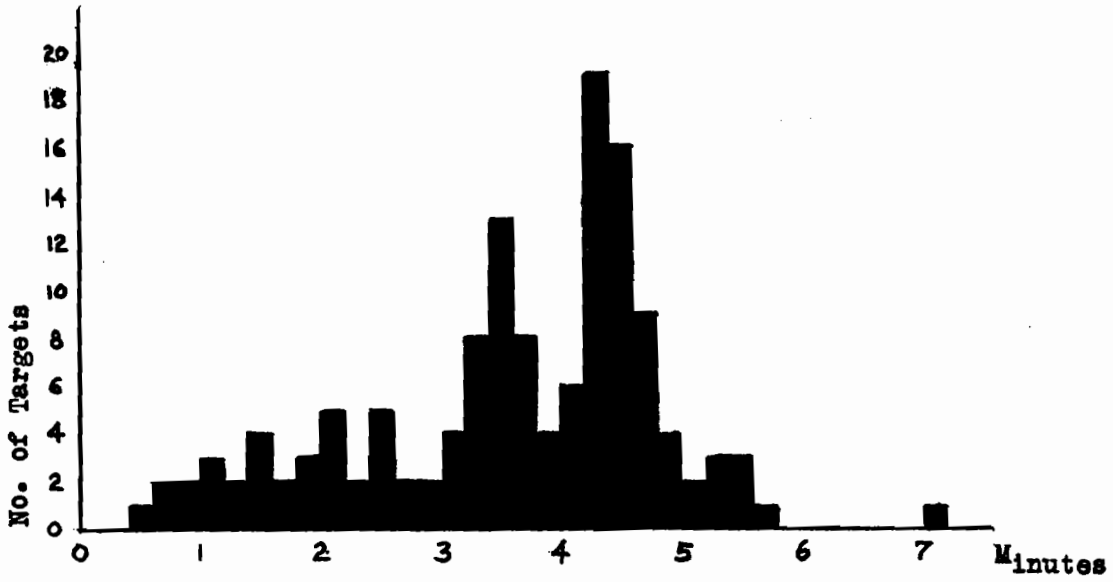


Fig. 8a. Graph of Target Frequency Distribution. Project III. Zero time in x-axis represents preceding target. Targets distributed by frequency according to time interval after preceding target.

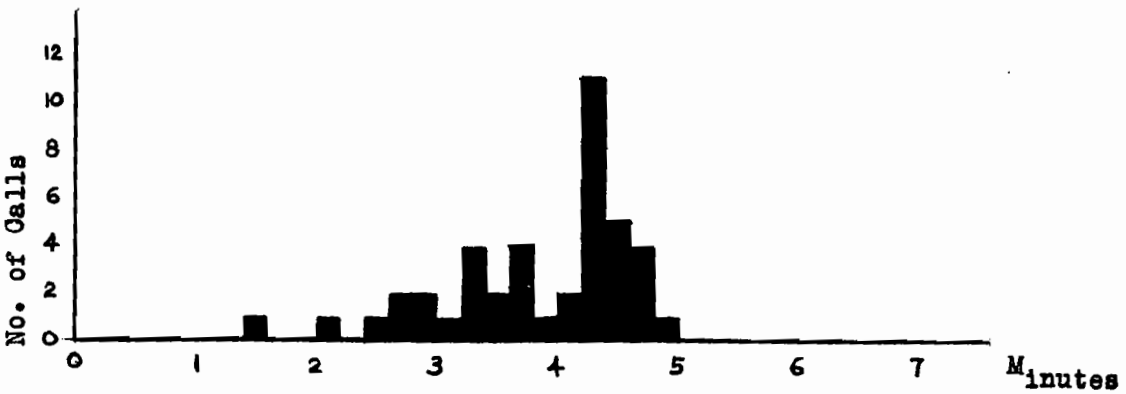


Fig. 8b. Graph of Hit Target Frequency Distribution. Project III. Standard for a hit is a call made within twelve seconds of a target. It can be seen by prima facie inspection that the frequency of hits corresponds to the target frequency distribution.

x	observed f	$\bar{x}$ = 1.08 Exp. f	Dev.	$(\text{Dev.})^2$	$\frac{(\text{Dev.})^2}{\text{Exp. f}}$
0	35	34.2	+0.8	0.64	0.018
1	30	36.0	-6.0	36.00	1.000
2	27	20.0	+7.0	49.00	2.450
3	8	7.3	+0.7	.49	0.067
4	0	)	)	)	)
5	0	) 2.5	) -2.5	) 6.25	) 2.500
6	0	)	)	)	)
	100.0	100.0	00.00		χ^2 = 6.035

Total calls 108 χ^2 for 3 d.f. = 4.642 with P = .20

= 6.251 with P = .10

Since the assumption is made that in the absence of ESP - cognition * both the calls and the targets are random events and independent series, such homogeneity argues for an interaction between the targets and the cognition of the subject.

In circuits II and III the field of the electrical target is limited to the space between cages A and B. The poorest scoring both for response hits and precognitions was obtained in Group I. In this arrangement the field was entirely outside of cage A and the subject was protected by a double envelope of electrostatic attenuation. In order to test whether the increased electrical attenuation had decreased the scoring in Group I, cage C was nested inside of cage B, thus providing triple electrostatic attenuation. The scoring in Group 4 is shown to be markedly elevated over that of Group I, thus ruling out the factor of attenuation of the target. A close study of Table 4A and 4B shows that the homogeneity of number of calls in relation to the number of targets is greatest in Group 4. Again no special significance is attached to these figures because of the inadequate experimental design.

1.4 DISCUSSION of Projects II and III

The prime question that arises in one's mind in reviewing the

* See p. 220 line 15

responses shown by Mrs. Garrett directs itself to a critique of the methods and techniques used in making these observations.

All reasonable precautions were exercised to prevent the experimental subject from gaining any information about the experiment that might be of aid in out-guessing the control procedures. For example, the subject was never allowed to view the "random" switch or the power supply which is the source of the target; nor was she ever shown the exact location of this instrument. She was never allowed to see or analyse a score of her performance during the tests. This was done to prevent her from gaining any idea as to the periodicity of the target arrival time, thus eliminating the factor of anticipation in her mind.

The prime function of the subject in the experiment was to enter the cage, go into trance, make the calls and then to leave the laboratory after the trance state was ended. The only hint ever given to Mrs. Garrett as to her scoring was a word of encouragement now and then as to when she had made an unusual observation with respect to the target.

Mrs. Garrett is an unusually well-disciplined research subject. Her thirty years of experience in psychic research laboratories over the world had inculcated her deeply with an attitude of neutrality toward both the method and the results of any experiment in which she was involved.

On the other hand, the investigators exercised every control measure which they could conceive in order to differentiate the various reactions of the subject in calling out targets. One of the procedures periodically employed during the course of the experiment was to run a 'dummy' experiment, that is, an experiment in which no targets appeared on the cage during the course of her sitting. Such

'dummy' experiments showed that the subject made no calls with respect to the usual target, but did at times make calls, while clearly stating that we had "changed" the target. Such calls were alleged by the subject to be due to electrical fields or charges that appeared extraneous to the method of the experiment. Now the nature of many such calls has been localized as to source by the investigators. For example, the subject would call out a target, state that we had changed the target, and further state that the target originated from an electrical motor, or a light switch being turned on, or from a motor car. This type of differentiation by the subject helped one to distinguish her calls in reference to the standard target, or to an extraneous target, but left a residue of calls with no localized reference.

In Project III Group 1, the calls of the subject in relation to the target showed poor correlation. During the course of this series in Experiment No. XV, the power supply to the cage was disconnected during the seventeenth minute of the experiment. The cage B was connected by a wire to ground. In spite of the absence of a target the subject went right on making calls. These calls came at rather regular three minute intervals, and the subject announced that we had changed "the current." Therefore in Experiment XVI and XVII we performed another 'dummy' experiment under the same conditions as Exp. XV. The subject went right on calling out the presence of targets at rather regular three minute intervals, and clearly stated that we had changed the nature of the target. As far as the investigators were concerned there was no electrical target. This was the only experiment in the entire series where the subject went right on calling out targets in the total absence of any known target. Therefore, we instituted the following procedure: The cage that had carried the charge

was grounded to earth for twenty-four hours. The subject was also given a twenty-four hour rest. Then two 'dummy' experiments were performed using a "floating cage," i.e., with no connection to ground. In these experiments the subject made no trial calls in the absence of a target, and further stated that there was no disturbance in her "atmosphere." The nature of this phenomenon is still under investigation. See Sec. 6.13. It may well be that the close correspondence between targets and calls in Project III Group 4 is due to the elimination of the response evoked by the ground cage B because of the floating cage C.

In order to come to some conclusion as to whether or not the subject was responding to some known property of an electrical field, the subject was placed outside of the Faraday Cage A while it was charged as usual with the "random" target. The subject was placed at a distance of twelve feet from Faraday Cage A at a point where it was known by means of a tuned coil that the field from the cage was strong. It was found that the subject was completely insensitive to the field itself, and had no distinct sense of the presence of any target, and in fact averred that no field was present in the sense in which she knew it inside of the Faraday Cage. There was no question as to the sincerity of her effort to seek the target.

Another type of experiment was performed in order to determine what property of the electrical target stimulated the subject: The subject was placed in the cage as usual and the doors sealed. Then a steady 150-volt potential of 640 cycles was placed on the cage. The subject in this group of five experiments reported that she did not detect the presence of any field. When the steady potential was switched on and off by manual control at irregular intervals, the

subject was able accurately to detect the process at the times when the silent switching occurred. Ignoring for the moment the role of telepathy, it was assumed therefore that it is the discontinuity in the field which stimulates the subject to note a disturbance which she associates with the target.

It was decided to do a qualitative test of the subject's sensitivity to sudden magnetic field fluctuations. An experiment was designed with the physical arrangement of three cages as in Group 4, Project III. The source of magnetic field fluctuation was a 180 turn twelve-inch diameter coil of number twelve copper wire, using as a power supply two six-volt storage batteries delivering thirty amperes of current. This source of magnetic flux when mounted outside of cage A produced a torque of forty-five degrees on a magnetic compass which was placed inside of cage C. The subject was not informed that any change in target had been instituted. The magnetic flux was turned on and off manually with a single pole throw switch. The subject did not detect this magnetic field fluctuation at all in the two experiments which were performed.

Many types of masking auditory disturbance were introduced into the experiment in order to see if auditory stimulation would be interpreted as a target. Noises from bells, animals, dropping heavy objects, telephone ringing and scratching on the cage did not in any way addle or confuse the subject, nor did it result in extraneous target calls.

One of the consistent effects observed in Project II in which the copper screen cage A was used was an inspiratory gasp on the part of the subject at the time that the electrical target appeared. The gasp was followed by a short period, lasting for 2 - 4 seconds, of

psychomotor stimulation, followed by a minute-long period of marked psychomotor depression. The index of psychomotor performance was the speech output of the subject as analysed on the Sanborn Recorder. (See. fig. 2.) In fact, the subject was painfully aware of this effect. So consistent was this effect that it was thought to be a surer index of the presence of the target than the subject's verbal calls. Curiously enough when the subject was placed in the air-tight copper cage B nested inside of cage A this gasping and depressive effect disappeared completely. The subject reported that cage B, not withstanding its lack of a fresh air supply, was a much more pleasant and conducive environment in which to work. We have no physiological explanation for this effect, but one must certainly suspect the influence of charged ions. (See Sec. 6.63). As the tabulated results show in Table 4 the scoring in cage B was of the same order as that in cage A under conditions of Project II.

In a series of three experiments where the subject did not go into trance, and tried to hit the target by conscious means the results were completely negative. Mrs. Garrett stated that no clear response to the standard target appeared.

One could be certain that a distinct physiological reaction had been found in a sensitive, i.e., gasping reaction, and psychomotor stimulation. At this stage of the study such a reaction was not found in normal human beings. Hence, the problem arose as to whether one was dealing with a marginal physiological reaction, remarkable in itself, or with a phenomenon that should properly be classed with parapsychological effects. It was decided to explore the relation of this physiological reaction to parapsychological effects by doing an experiment testing for the presence of cognition of an electric target when the role of the known human sensory receptors had been positively ruled out of the process.

CHAPTER 2

A STATISTICAL EVALUATION OF PERFORMANCE INSIDE THE TREATED FARADAY CAGE COMPARED TO OTHER ENVIRONMENTAL CONDITIONS

2. Project IV was carried out at this laboratory during the period August 2 to August 16, 1952 in order to clarify the positive findings, and to evaluate statistically the observations made in Projects I, II, and III. The design of the experiment was refined in order to include the following factors:

a. Pure randomisation of the target.
b. Critical test of Faraday cage attenuation (electric).
c. Optimum conditions for testing the subject's reputed extra-sensory perception, and to test for the presence of general ESP with respect to the observed target response.
d. A statistical method that is strictly valid for the evaluation of significance with respect to target response.

2.1 RANDOMISATION OF THE TARGET

Dr. Richard Wilson* of Christ Church, Oxford, England furnished a design for an electrical random generator and switch triggered by big cosmic ray pulses. It is an accepted fact that big cosmic ray pulses arrive in a random sequence. This design was perfected by John Hays Hammond, Jr. and E. S. Purington of the Hammond Research Corporation of Gloucester, Massachusetts. Mr. Purington built the switch that gave a random distribution of targets. The essential component of the switch was a naphthalene crystal observed by a 931A Photomultiplier tube. Cosmic ray pulses caused scintillation in the crystal which in turn activated the photomultiplier. See fig. 8.

In order to check the distribution of the targets as they had actually appeared during Project IV with respect to the Poisson distribution, an analysis was made for the first one hundred intervals of fifteen seconds each. The following table shows that the goodness of

* Now at Harvard University

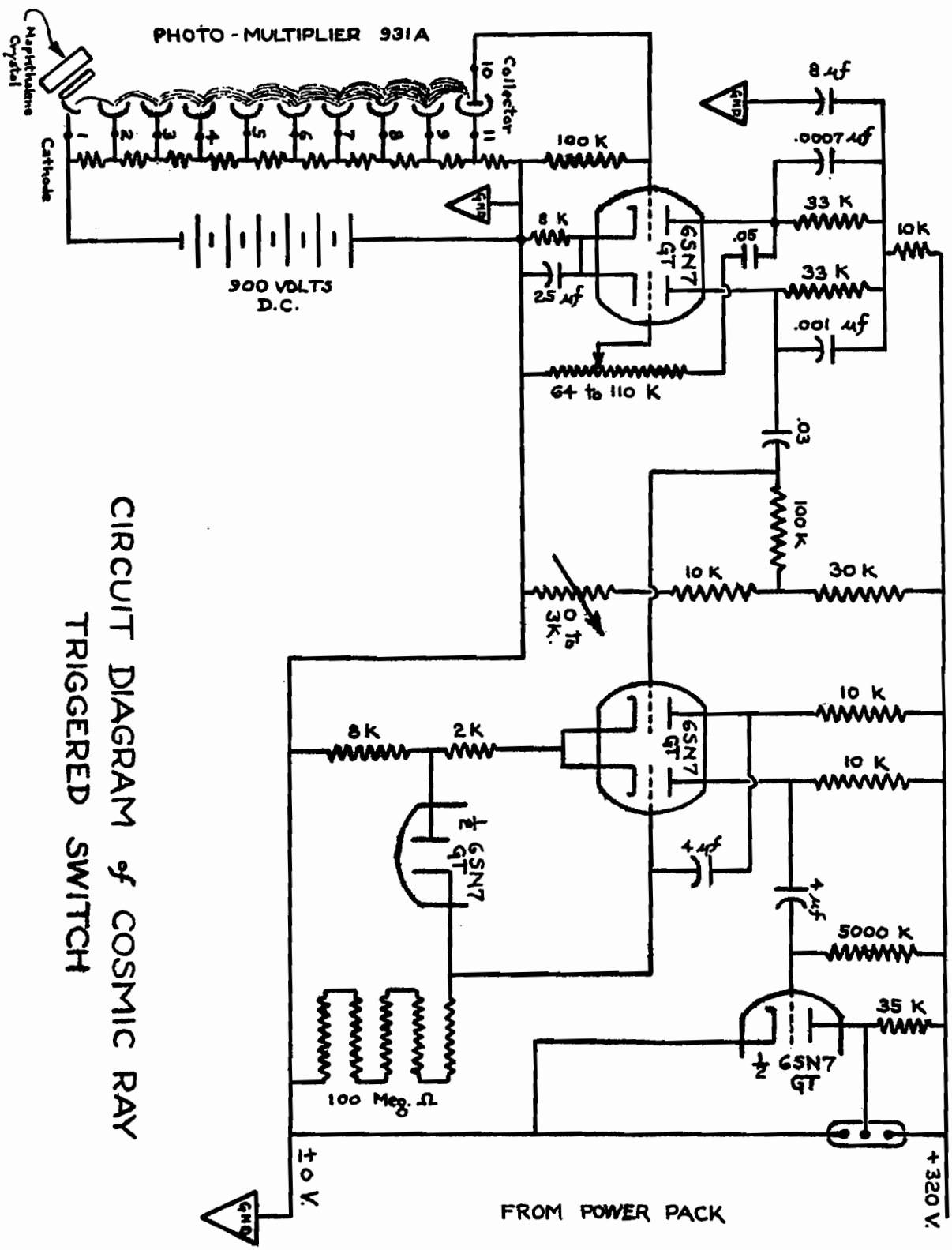
fit of the observed targets to a Poisson distribution does not exceed .05 level, and may therefore be considered homogeneous.

Targets. Project IV Sample from the first one hundred intervals of 15 seconds each.

x	observed f	fx	Exp. f	Dev.	$(\text{Dev.})^2$	$\frac{(\text{Dev.})^2}{\text{Exp. f}}$
0	15	0	18.2	-3.2	10.24	.562
1	27	27	31.0	-4.0	16.00	.516
2	38	76	26.3	+11.7	136.89	5.125
3	13	39	14.9	-1.9	3.61	.242
4	6	24	6.3	-0.3	0.09	.014
5	1	5	)	)	)	)
6	0		) 3.3	) -2.3	) 5.29	) 1.603
7	0		)	)	)	)
	100	169	100	00.00	172.12	χ^2 = 8.062

$\bar{x} = \frac{169}{100} = 1.69$ χ^2 for 4 d.f. = 7.779 = P .10

9.488 = P .05



CIRCUIT DIAGRAM of COSMIC RAY TRIGGERED SWITCH

Fig. 7. 8.

2.11 CRITICAL TEST OF FARADAY CAGE ATTENUATION

There are two possible ways to proceed with this problem: The first is to measure the cage attenuation for a given signal, and then to perfect the cage to a safety factor above and beyond that required for the experiment. This was accomplished when cage B was built as described in Project III. The second method is to place the electrical target at such a distance from the cage that the operation of the inverse square law would provide the primary attenuation, and the cage itself would become a virtually perfect attenuator for the order of signal in question. To be on the safe side both procedures were carried out.

The maximum strength of the target as used in the experiment was 150 volts potential at 2 - 4 milliamperes. The test static generator was a 15,000 volts A-C transformer spark sprayed in short bursts upon the outside walls of cage B. A Keithley Model 200 Electrostatic Electrometer did not detect any electric field changes within the cage, in ~~spirt~~ spite of the fact that it will qualitatively detect the static charge on a pocket comb at a distance of ten feet. The Faraday Cage thus provided, by this test, good attenuation against a 15,000 volt static effect. A more sensitive electromagnetic tester for use inside the cage was a Zenith All-Wave Portable battery-powered radio receiver. This detector was able to pick up a barely audible static crackling in certain wave bands when the 15,000 volt spark was directed at the door jamb of cage B. However, when the door of cage A was also locked the static could no longer be detected inside of the cage B. It was thus established that the Faraday cages as used in Projects II and III provided high-order electrostatic and electromagnetic attenuation for the order of signal used as a target

in Project III, and near-perfect attenuation for the target as used in Project IV. This latter effect was achieved by placing the subject in the cages in Laboratory 1 while the target was placed in Laboratory 2 at a distance of 0.3 mile away. (See fig. 9). O.K.

2.12 OPTIMUM CONDITIONS

It was desirable to find out why the empirically designed conditions of the Faraday Cage Technique, an electrophysical apparatus, was so favorable to the exercise of the sensitive subject's power of cognition as compared to normals who lacked such cognition. Experience and insight led one to believe that there were three important factors in the electrophysical technique which created an optimum condition for the sensitive subject. Each of these factors will be treated in greater detail in Chapter 6. These three factors were combined in what will henceforth be described as the Treated Faraday Cage. The present series of experiments were designed to test the null hypothesis that the Treated Faraday Cage was not one of the optimum conditions provided by this experiment tested at the 1 per cent level of significance.

The three factors that in combination form the electrophysical apparatus called the Treated Faraday Cage are:

a. A double Faraday Cage, outer one labelled A, and the inner one B.

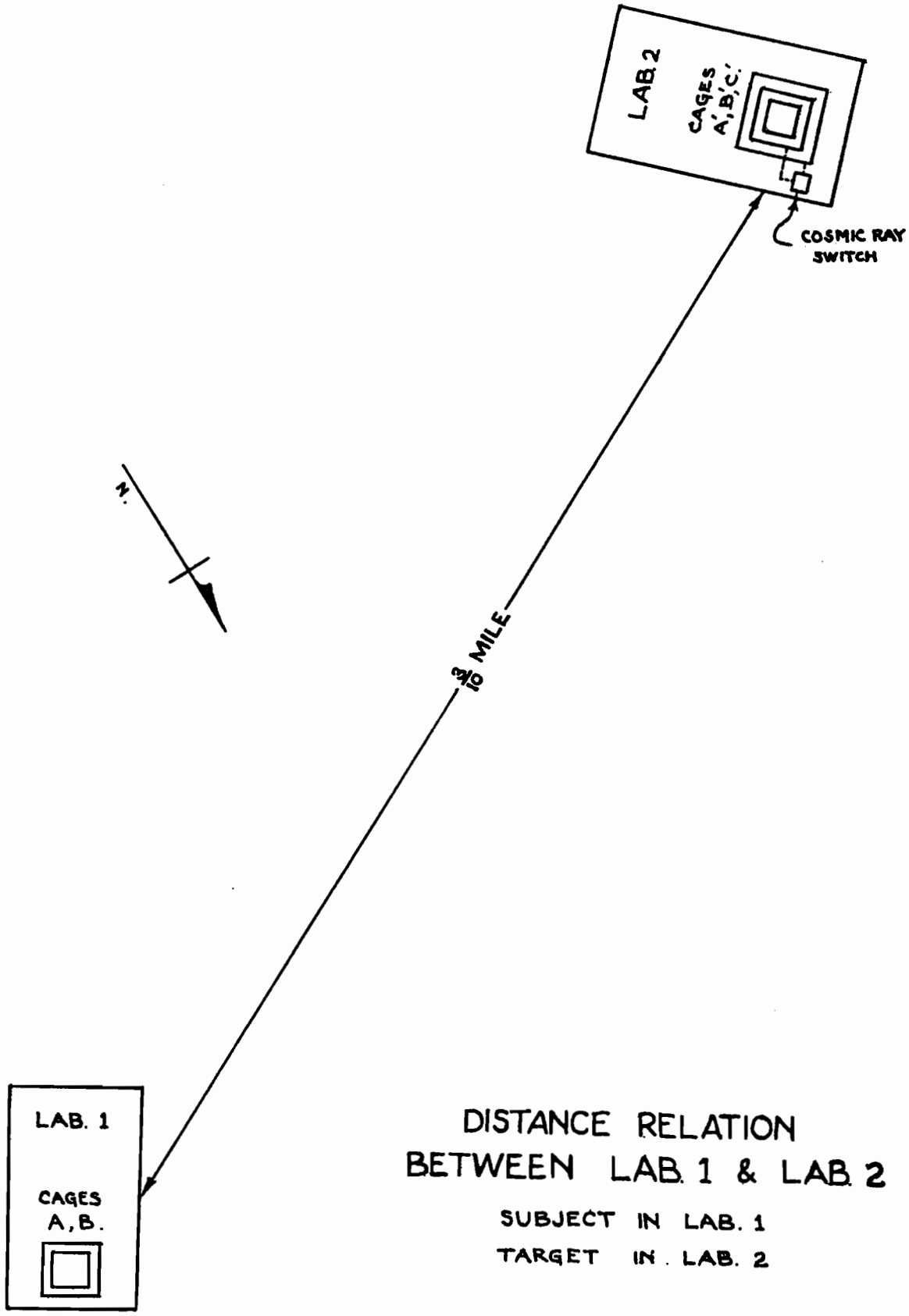
b. An electrical field placed across cage A and a plate outside of it.

c. Cage B grounded from one point to earth.

The untreated cage refers to the physical arrangements as described above, but lacking the electrical connections and electric charge. (See fig. 10).

2.13 VALID STATISTICAL METHOD

It is recognized that the scores given for Projects II and III do



DISTANCE RELATION
BETWEEN LAB. 1 & LAB. 2

SUBJECT IN LAB. 1

TARGET IN LAB. 2

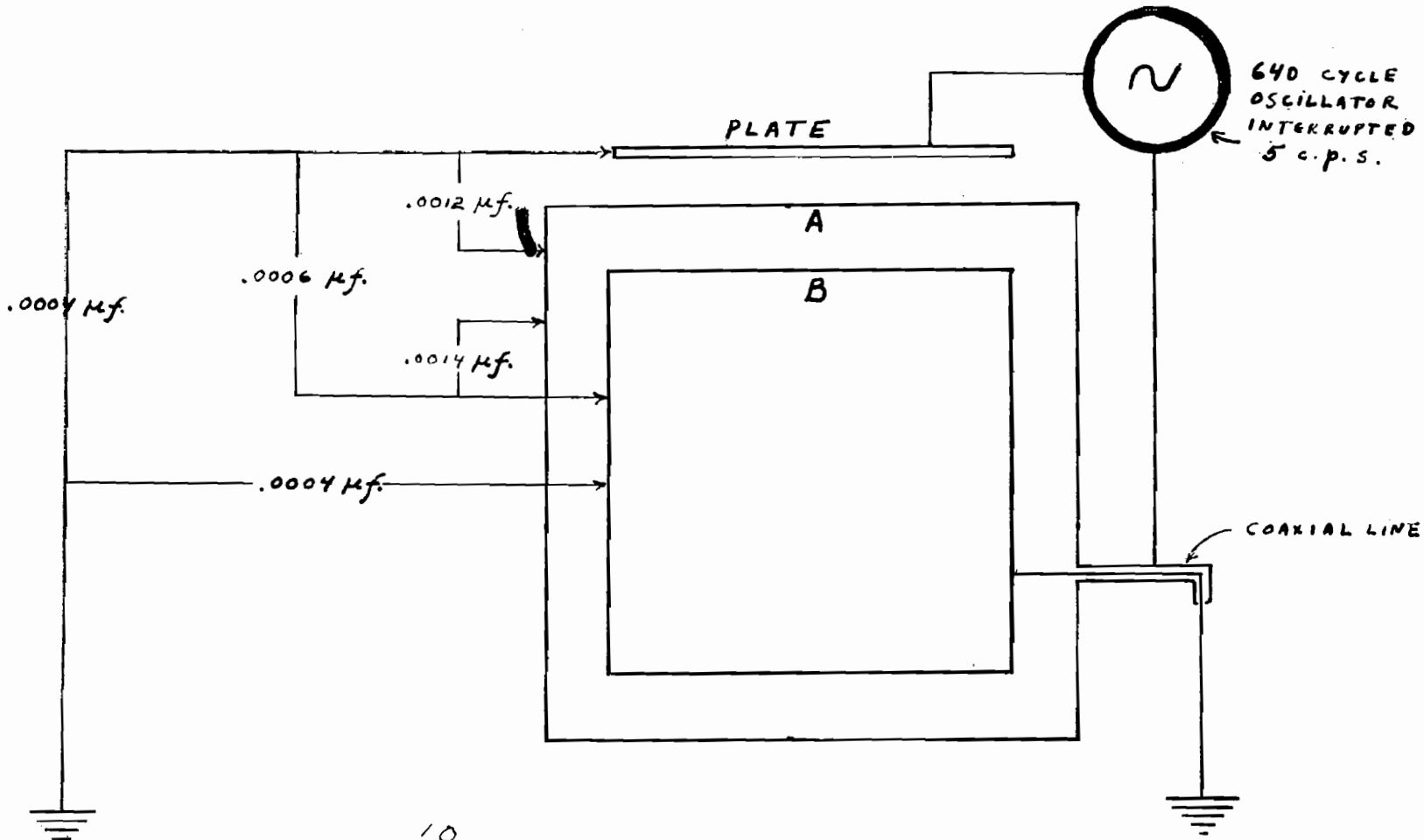


FIG. ~~7~~ 10 TREATED FARADAY CAGE.

not give any precise evaluation of significance, nor do they provide a true correlation function for the relation of the calls to the targets. Dr. Richard Wilson was very helpful in selecting a statistical method for the evaluation of significance. After a careful on-the-spot survey of our method and technique he advised that a systematic square method of analysis was the most suitable test of the results. This has proved to be a rather sensitive method of analysing the small series of tests which arise out of the laborious experimental technique. This method will be described in greater detail under the section entitled Analysis of Results.

It can be argued that the time-dependent stochastic design of Project IV could be more precisely evaluated by the method outlined by W. Feller, "On the Theory of Stochastic Process with Particular Reference to Applications," Proceedings of the Berkeley Symposium on Mathematical Statistics and Probability, 1949, pp. 403-432. This method was not used because of the large amount of labor involved, and in the absence of a high-speed calculator might lead to inaccurate results.

2.2 PROCEDURE - PROJECT IV

Group 5. Test Experiment: Treated Faraday Cage.

Subject: Eileen J. Garrett

Two different experiment control designs were used:

A. Distance Control

Group 6. Control Experiment: Subject in untreated Faraday Cage seeking same target as Group 5 subject.

Subject: Dr. Karlo Marchesi.

Group 7. Control Experiment: Repeat of Group 5, but using untreated Faraday Cage.

Subject: Eileen J. Garrett.

B. Proximity Control

Group 8. Control Experiment: Subject in untreated Faraday Cage whose walls carry target.

Subject: Eileen J. Garrett.

Group 9. Control Experiment: Subject not in cage.

Subject: Dr. Karlo Marchesi.

2.21 Group 5

The subject was placed in the same two cages in Laboratory 1 as already described for Project III. Two important changes were made in the procedure: (1) The cages in which the subject performed did not carry the target as in Project III. The cosmic ray triggered target was placed in Laboratory 2 at a distance of 0.3 miles from Laboratory 1 (where the subject sat). (2) The cages in which the subject performed were treated. See fig. 10.

This group of twelve experiments provided: (1) Pure randomisation of the target. (2) A Faraday Cage that attenuated the target perfectly. (3) Provided the optimum conditions for the test of the subject's reputed extra-sensory perception by the use of a Treated Faraday Cage.

2.22 Group 6

This experiment was designed as a concurrent control against Group 5. During the course of the experiments in Group 5 and Group 7, the subject, Dr. Karlo Marchesi, had the opportunity to test his performance against that of Mrs. Garrett. The Faraday Cage in Laboratory 2 was an untreated cage.

A word about Dr. Marchesi. He is best known for his clairvoyant work with Duke University. I quote from page 530 of the AMERICANA ANNUAL for 1951: "The year 1950's most outstanding event in para-

psychology, a field of unusual happenings, was the completion of the United States - Yugoslavia long-distance ESP experiments. These experiments have been carried out by the Parapsychology Laboratory at Duke University with the cooperation of the Yugoslav physician, Dr. Karlo Marchesi. ESP, which stands for extra-sensory perception (telepathy, clairvoyance, and precognition), is the capacity to perceive beyond the range of the recognized senses. In the aforementioned test, the packs of cards were shuffled and put in a given place daily in the laboratory at Duke; and Dr. Marchesi in Yugoslavia, attempted to identify the cards. In this experiment the checkup showed that there were enough hits above the number expected from chance alone to warrant the conclusion that some knowledge of the card order was shown by Dr. Marchesi. The odds were 300 to 1 that such a result or better would not be produced by chance alone."

Because of his distinguished record as a subject in the field of parapsychology, it was felt that Dr. Marchesi had a chance comparable to that of Mrs. Garrett in attaining a significant score in this test. He had the further advantage, which she did not possess at all, of being thoroughly familiar with every phase of the research technique being used. He was present at the Round Table Laboratory on a visiting fellowship and had worked during the four months preceding this experiment as an investigator in the research program.

2.23 Group 7

The procedure of Group 7 was identical to that in Group 5 with the exception that the cages of Laboratory 1 in which Mrs. Garrett performed, were untreated. Thus this group of experiments served as a control on Mrs. Garrett's own performance. She, of course, was not aware of any difference between the two groups since the experiments were done as one continuous series with random selection as to the

order in which the cage should be Treated or Untreated.

2.24 Group 8

In this group of experiments the subject, Mrs. Garrett, sat in the cages in Laboratory 2 on the outside walls of which appeared the electrical target. The cages were untreated this time (with the exception of one experiment, (See 2.3C) as they had been for Dr. Marchesi in Group 6. The target was the same as described for Project III.

2.25 Group 9

This experiment served as a control for Group 8 in that it was carried out concurrently with it. Dr. Marchesi was the subject, sitting in his home three miles from the site of the target. He was presented with the challenge of hitting the same target that Mrs. Garrett was striving to hit. Dr. Marchesi's experiments were of twenty minutes duration while those of Mrs. Garrett were thirty-one or more minutes in duration. Time synchronization between the two experiments was carried out by starting both experiments every hour on the hour by the station identification signal of a pre-arranged series of radio programs.

RESULTS - PROJECT IV

2.3 A Scoring Standard.

In Project III, a call made within ninety seconds of a target was considered to be indicative of a response. It was decided in Project IV that a fifteen-second allowance before or after a target would be a more acceptable standard for statistical purposes. Mrs. Garrett made a total of 196 calls in Project IV; 150 of the 196 calls were made within 120 seconds before or after a target. In other words, 76.5% of the total calls fell within this time limit. This relationship can be illustrated in another way. In fig. 11, it can be seen

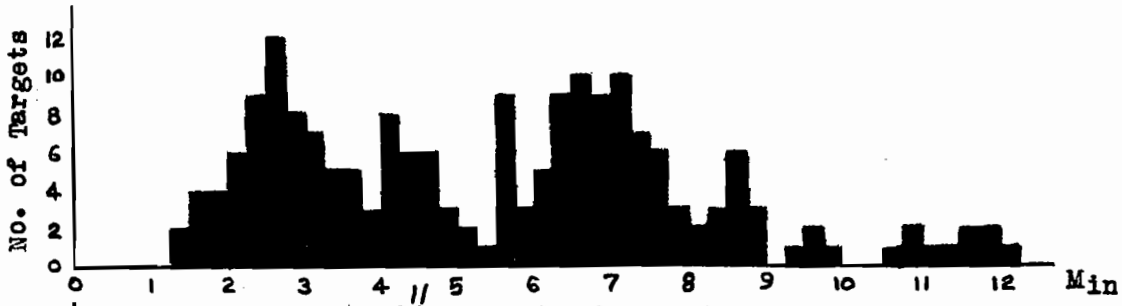


Fig. 10a. Graph of Target Frequency Distribution. Project IV, Groups 5, 7, 8. Zero time in x-axis represents preceding target.

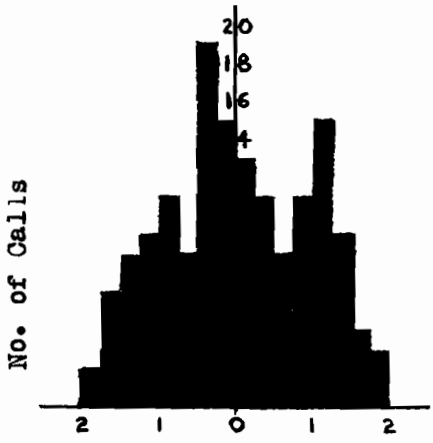


Fig. 10b. Graph showing calls made in relation to above targets within two minutes of a target, and their distribution around target axis 0. This represents 76.5% of the calls made in Group 5, 7, 8 of Project IV.

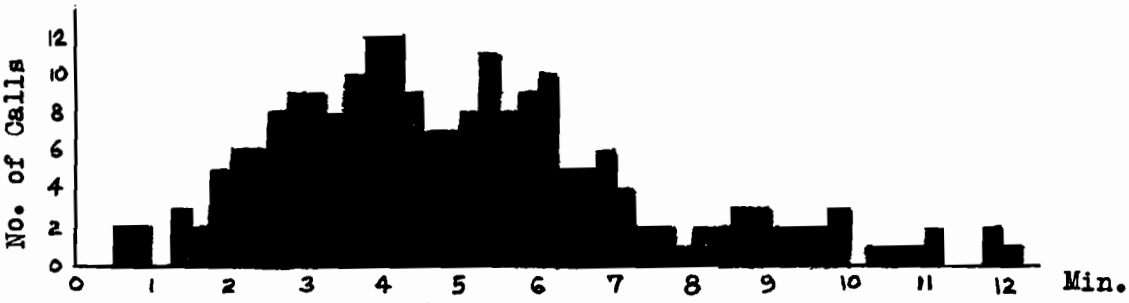


Fig. 10c. Graph of Call Frequency Distribution. Project IV, Groups 5, 7, 8. Zero time in x-axis represents preceding call.

A. Test in Library	B. Test in Treated Faraday Cage
Subject A: 268	Subject A: 254
Subject B: 258	Subject B: 250
Subject C: 264	Subject C: 260

It can be seen by inspection that none of the three subjects was able to exceed the standard deviation by one sigma. Hence, we must conclude that all of the scores fall into a chance-expectation.

3.12 Group II - Control

Mr. Marion was the subject, and the experiments were performed in the library of the laboratory.

Score: 390 Hits

390 - 260 = 130 equals actual deviation from chance.

X = Ratio of actual deviation to standard deviation is 11.5

P = -log Q(X) 27.7182.

3.13 Group III - Test

Mr. Marion was the subject, and the experiments were performed in the Faraday cage in Laboratory 1. In this group of experiments the Faraday Cage was untreated, but grounded.

Score: 413 Hits.

Deviation from chance equals 153.

X equals 13.3. P = -log Q(X) 38.21345

3.14 Group IV - Test

Mr. Marion was the subject and the experiments were performed in the Treated Faraday Cage in Laboratory 1. The purpose of this experiment was to test the null hypothesis that the Treated Faraday Cage had no effect on influencing the subject's scores as achieved under other conditions.

Score: 455 Hits.

Deviation from chance equals 195.

X equals 16.9. P = -log Q(X) 64.38658.

Table 8

Condition	TRIALS	CHANCE SCORE	ACTUAL SCORE (hits)	ACTUAL DEV.	STAND. DEV. σ	ACTUAL DEV. / STAND. DEV. X	- log Q(X) P
In Library							
Subject A	520	260	268	+ 8	11.5	----	Chance
Subject B	520	260	258	- 2	11.5	----	Chance
Subject C	520	260	264	+ 4	11.5	----	Chance
Mr. Marion	520	260	390	+130	11.5	11.5	27.71882
In Treated Cage							
Subject A	520	260	254	- 6	11.5	----	Chance
Subject B	520	260	250	- 10	11.5	----	Chance
Subject C	520	260	260	---	11.5	----	Chance
Mr. Marion	520	260	455	+ 195	11.5	16.9	64.38658
In Untreated Cage Ground							
Mr. Marion	520	260	413	+ 153	11.5	13.3	38.21345

3.15 The statistical problem at hand is to reject the null hypothesis that the Treated Faraday Cage does not increase the general ESP-test scores of Mr. Marion. One takes 390 as the average or mean score attained by Mr. Marion for a series of ten runs performed outside the cage, and the standard deviation as 11.5, since the formula by which it is reached remains the same:

$$\sqrt{520 \times .50 \times .50}$$

$$z = \frac{\text{observed score - mean score}}{\text{Standard Deviation}}$$

$$= \frac{455 - 390}{11.5}$$

$$= 5.65$$

As 99% of the z values can be expected to lie between -2.58 and 2.58, one can reject the null hypothesis at a level of significance of

less than .01 since the z value of 5.65 exceeds the critical value of 2.58.

Thus the null hypothesis is falsified. The results show that the Treated Faraday Cage, as in the case of Mrs. Garrett, increases the general ESP-test scores of Mr. Marion. No special tests were conducted with Mr. Marion to further define the type of ESP (telepathy or clairvoyance) that was presumably operative. The main purpose of this experiment was to determine if the effect on scoring, noted with Mrs. Garrett using an electric target, was repeatable using a non-electrical target. It also appeared that his scoring in an Untreated Faraday Cage, (but one which was grounded to earth) exceeded the room control at the one percent probability level. This was a new finding, and attention turned to studying the effect of an untreated, but grounded Faraday Cage on ESP-test scores.

3.2 Project VII B March 24, 1953 to April 8, 1953.

This series of experiments with Mr. Marion is an extension of those done in Project VIIA. However, in these tests Mr. Marion was not allowed to touch the cards at all. The objective and the procedure remain the same but applied to a comparative study of different cage conditions. The nomenclature used for the various cage conditions is:

OUTSIDE - Subject outside of the cage in Laboratory 1.

GROUND - Subject inside the cage. Copper Cage B grounded to earth, Screen Cage A and Plate open.

STANDARD - Subject inside the cage. Charged by 640 cycles, 75 volts, interrupted 5 c.p.s. Screen Cage A hot, Cage B grounded, Plate positive.

VINOD 1 - Subject inside the cage. 1100 cycles, 21 volts

Sine. Screen Cage A grounded and negative, Cage B hot, plate open.

VINOD 2 - Same as Vinod 1 except 2100 cycles, 49 volts.

TABLE 9 - Compares the results from 15 runs (780 trials) under EACH OF THE FOLLOWING CONDITIONS: OUTSIDE, GROUND, STANDARD, AND VINOD 1.

CONDITION	TRIALS	CHANCE SCORE	ACTUAL SCORE (Hits)	ACTUAL DEV'N	ACTUAL DEV'N / STAND. DEV'N	P -log Q(X)
OUTSIDE	780	390	624	-234	16.7	57.19458
GROUND	780	390	695	-305	21.8	97.48422
STANDARD	780	390	714	-324	23.1	116.6325
VINOD 1	780	390	658	-268	19.1	80.06919

Standard Deviation for each group of experiments is 14.0

done at TFC

The main purpose of these experiments was once again to test the null hypothesis cited. The results show in Tables 9 and 10 that the use of the Treated Faraday Cage is associated with increased scores of Mr. Marion in card-tests. In distinguishing between the relative effectiveness of the various combinations used, it is quite clear that the STANDARD circuit is the most effective. However, it is closely rivalled by the GROUND circuit.

TABLE 10 - Compares the results from 6 runs (312 trials) under each of the following conditions: OUTSIDE, GROUND, STANDARD, VINOD 1 AND VINOD 2.

CONDITION	TRIALS	CHANCE SCORE	ACTUAL SCORE (Hits)	ACTUAL DEV'N	STAND. DEV'N.	ACTUAL DEV'N / STAND. DEV.	P - log Q(X)
OUTSIDE	312	156	248	92	8.8	10.5	23.1180
GROUND	312	156	277	121	8.8	13.7	38.2134
STANDARD	312	156	286	130	8.8	14.8	50.4352
VINOD 1	312	156	249	93	8.8	10.6	23.1180
VINOD 2	312	156	257	101	8.8	11.5	27.7188

3.3 Project VIIC June 16, 1953, Blindfold Test

The fundamental criticism that can be made of the card-tests up to this juncture is that in reference to the test cards Mr. Marion may have had the assistance of two sensory modes, i.e., touch and vision. Touch as a source of sensory intelligence was eliminated in Project VIIB. In Project VIIC vision was eliminated by a secure blindfold.

It can be seen from Table 11 when compared to Table 8 that the scoring performance was somewhat lowered by this control procedure. However, a significant difference in scoring as between the inside and the outside of the cage was obtained as in the previous experiments.

TABLE 11

CONDITION	TRIALS	CHANCE EXP.	ACTUAL SCORE	ACTUAL DEV.	STAND. DEV.	ACTUAL DEV. / STAND. DEV.	P - log Q(X)
OUTSIDE	260	130	208	78	8.3	9.3	18.94746
STANDARD	260	130	240	110	8.3	13.2	38.21345

One must reserve judgment as to the classification of this type of manifestation, i.e., telepathy or clairvoyance. A great deal of elaborate experimentation would be required in the case of Mr. Marion in order to settle this question. However, we at this laboratory were convinced that we were most likely dealing with general ESP in the case of Mr. Marion, but could not afford the time to further define it, and he has not been available to us since then to settle this question.

CHAPTER 4

DEFINITION OF THE TYPE OF EXTRA-SENSORY COGNITION INFLUENCED BY THE GROUND FARADAY CAGE TECHNIQUE

4.1 The research work up to the year 1953 had been concerned primarily with observations of the physiological, psychological and parapsychological effects exhibited by humans in the Treated Faraday Cage. Little doubt remained that we were dealing with an extra-sensory form of cognition on the evidence of exclusion. But no rigid attempt had been made to define the type of extra-sensory cognition exhibited by the subjects studied.

It became apparent that it was necessary to define the type of extra-sensory cognition being influenced by the Treated Faraday Cage Technique as reflected in significant increases in ESP-test scores. At this stage the work was interrupted when the author was recalled to active military service. There was some interest in the problem of extra-sensory perception at the time by the U. S. Department of Defense which provided the author with an opportunity to give lectures on the subject to heterogeneous groups of military and civilian scientists. These audiences were far from being receptive to the idea of ESP, and this attitude made it necessary for the author to re-examine under fire many of his ideas about extra-sensory perception. When he returned to the laboratory in 1955 the research problem was resumed in the light of this experience.

In order to minimize the variables in the experiment it was decided to define the type of ESP most amenable to the Treated Faraday Cage Technique by using only the GROUND Treated Cage. This eliminated most of the electrical variables, and still provided a relatively stable environment for the subject.

Mrs. Garrett, Mr. Marion and others who had been subjects in the program had never been able to give more than a few weeks at a time to the experiments. It appeared desirable to have subjects in residence at the laboratory who could work for a short stint each day over a long period of time. Hence, two subjects of promise, Mr. Harry Stone, and Miss Elinor Bond, took up residence at the Glen Cove Laboratory.

4.11 It appeared desirable to use a test for extra-sensory cognition that would have the following features:

a) Designed to have a large probability for 0-1 hits, and very small probability for (n) hits greater than 0-1 in a small number of trials which could be performed in a short time.

b) Permitted the study of the dynamics of orientation to the target on the part of the subject.

c) Designed to bring out marginal differences in performance under varying environmental conditions in subjects of great ESP-test scoring ability, and therefore suitable for sequential analysis.

4.2 The general test most useful for meeting these requirements has long been formulated under the concept of the matching problem.

The question that faces the investigator concerned with conserving the subject's energy and talent in a long exhaustive series of experiments is: what is an efficient size of the matching test? Suppose one has a target deck of n <u>different</u> cards and a second identical deck that is well-shuffled. When they are laid out for matching, what is the probability of exactly 0, 1, 2..., n agreeing pairs?

For a target deck of size 1, one is certain to get exactly one match. For two-card decks one has [where P(h)] means probability of exactly h hits or agreements:

For two-card decks:

Target Deck n=2

	1	2	Hits	P(h)
Orders of matching deck	1	2	2	0.5
	2	1	0	0.5

P(0)=1/2, P(1)=0, P(2)=1/2

For three card decks:

Target Deck n=3

	1	2	3	Hits
	1	2	3	3
	1	3	2	1
Orders of	2	1	3	1
matching deck	2	3	1	0
	3	1	2	0
	3	2	1	1

Here P(0)=2/6, P(1)=3/6, P(2)=0, P(3)=1/6

For four-card decks:

Target Deck				n=4 Hits	Target Deck				n=4 Hits
1	2	3	4		1	2	3	4	
1	2	3	4	4	3	1	2	4	1
1	2	4	3	2	3	1	4	2	0
1	3	2	4	2	3	2	1	4	2
1	3	4	2	1	3	2	4	1	1
1	4	2	3	1	3	4	1	2	0
1	4	3	2	2	3	4	2	1	0
2	1	3	4	2	4	1	2	3	0
2	1	4	3	0	4	1	3	2	1
2	3	1	4	1	4	2	1	3	1
2	3	4	1	0	4	2	3	1	2
2	4	1	3	0	4	3	1	2	0
2	4	3	1	1	4	3	2	1	0

P(0)=9/24, P(1)=8/24, P(2)=6/24, P(3)=0/24, P(4)=1/24
.375 .333 .250 .0416

One notices that for n=2 there were 2!=2 x 1=2 orders, while for n=3 there were 3!=3 x 2 x 1=6 orders, and for n=4, there were 4!=4 x 3 x 2 x 1=24 orders. There will be 5!=5 x 4 x 3 x 2 x 1=120 orders for n=5, and 8!=40,320 orders required by n = 8, and by the time one gets to 10! = 3,628,800 orders required by n = 10.

If one has n distinct cards in the duplicate decks, the approximate probability of exactly h hits is given by

$$P(h) = \frac{1}{h!}\left\{\frac{1}{0!} - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} + \cdots \pm \frac{1}{(n-h)!}\right\}$$

(see, An Introduction to Probability and its Applications. Vol. 1, W. Feller, Wiley & Sons, 1950, pp. 66-69;)

One recalls that:

$$r! = r(r-1)(r-2)\ldots 3.2.1$$
$$3! = 3 \times 2 \times 1 = 6$$
$$2! = 2 \times 1 = 2$$
$$1! = 1$$
$$0! = 1$$

and therefore the total number of ways to arrange the second deck is n!. In only one of these ways does one get hits on every card. Thus the probability of n hits is 1/n! The formula can be checked by substituting n for h. This means one cuts off the series in curly brackets when the denominator is 0!, because n - n = 0.

Therefore $$P(n) = \frac{1}{n!}\left\{\frac{1}{0!}\right\} = \frac{1}{n!}\left\{\frac{1}{1}\right\} = \frac{1}{n!}$$

One never can have exactly all matches but one. If one had all but one pair matched there would be a unique left-over card from each deck and they would have to match. (We saw that there could not be 3 matches in the deck with 4 cards.) So P(n - 1) = 0. Let us apply the formula noticing n - h = n - (n - 1) = n - n + 1 = 1:

$$P(n-1) = \frac{1}{(n-1)!}\left\{\frac{1}{0!} - \frac{1}{1!}\right\} = \frac{1}{(n-1)!}\left\{1 - 1\right\} = 0$$

Again one has a check. Let us check one of our computed values, say the probability of no hits for n = 4. Here n - h = 4 - 0 = 4.

$$P(0) = \frac{1}{0!}\left\{\frac{1}{0!} - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!}\right\}$$

and this gives

$$P(0) = 1\left[-1 + 1/2 - 1/6 + 1/24\right]$$
$$= 1/2 - 1/6 + 1/24$$
$$= \frac{12 - 4 + 1}{24}$$
$$= \frac{9}{}$$

a result that agrees with the previous computation. If one wants to know the probability of h or more hits rather than the probability of exact h hits, one adds up the individual probabilities for the cases of interest, i.e.,

$$P(h) + P(h+1) + P(h+2) + \ldots + P(n) = \sum_{1=h}^{n} P(i).$$

It turns out that when the size of the deck is 10 or more the probabilities of hits do not depend much on the actual number of cards in the deck. This happens partly because terms like 1/n! are so small that they contribute very little to the total probability. This gives us the answer as to an efficient size of deck desirable for the type of experiments planned. Consequently, the following table can be used with decks of 10 or greater.

TABLE 12. Approximate probabilities P(h) of exactly h hits with a deck of n = 10 cards, and $\sum P(h)$, the probability of h or more hits, in the matching of two decks each composed of the same n distinct cards.

Number of hits h	P(h)	$\sum P(h)$
0	.367879	1.000000
1	.367879	.632120
2	.183940	.264241
3	.061313	.080301
4	.015328	.018988
5	.003066	.003660
6	.000511	.000594
7	.000073	.000083
8	.000009	.000010
9	.000001	.000001
10 or more	.000000	.000000

If it is desired to test whether a subject is poorer than chance, this is not a good experimental design, because the probability of no hits is so large by chance.

4.3 Two identical decks with s cards for each of t kinds.

The total number of arrangements possible is no longer n! = (st)!

as was the case when all cards were distinct. They are now fewer because permutations among the cards of the same kind no longer count. For example, if we have 3 identical a's they can only be arranged in one distinguishable order aaa, instead of the 3! = 6 ways they could have been arranged had they all been different. The number of arrangements turns out to be $\frac{(st)!}{[s!]^t}$

For example, suppose one has s = 2, t = 2, i.e., a 4-card deck with two cards of each of two kinds. Let one be a's, and the other b's. By the formula the number of arrangements is

$$\frac{(2 \times 2)!}{2! \times 2!} = \frac{4!}{2 \times 2} = \frac{24}{2} = 6$$

and we observe

Target Deck	a a b b
Matching arrangements	a a b b
	a b a b
	b a a b
	a b b a
	b b a a

giving 6 in all.

There are tables giving the exact distribution of the number of hits for decks of the following compositions:

s = 3, t = 3
s = 4, t = 4
s = 5, t = 5

This last can represent Rhine's deck of 5 waves, 5 crosses, 5 circles, 5 stars, and 5 squares which is the current standard ESP-test.

It is apparent that in the interest of economizing the time and effort of the subject a deck composed of 10 distinct t kinds of symbols is desirable. By comparison, if one were to use a deck of s = 2 and t = 5 there would be a loss in the number of orders of the matching deck, i.e., 113,400 orders as against 3,628,800 (where s = 1 and t = 10). Furthermore, when s = 2 and t = 5 one can

expect 2 correct matches by chance alone, as against 0-1 matches by chance when s = 1 and t = 10, and this represents a further loss of economy. If a comparable series of trials were performed, say 50, comparing 5 experiments using a deck of s = 1 and t = 10, with two experiments using a deck of s = 5 and t = 5, the loss in economy is further magnified, i.e., 5.4 vs. 10 chance matches, respectively.

4.4 The Matching Abacus Test (MAT)

This is a fundamental probability set made up of two sets each of ten distinct symbols. Each symbol is mounted on a 2" x 2" square block of wood. The wood blocks fit in grooves so that in the matching of the two sets of symbols there is no accidental loss of the order of arranging by the subject. The order of each row of 10 symbols is shuffled before each experiment for randomisation. The symbols or pictures on each block can be changed ad lib to suit the taste of the subject.

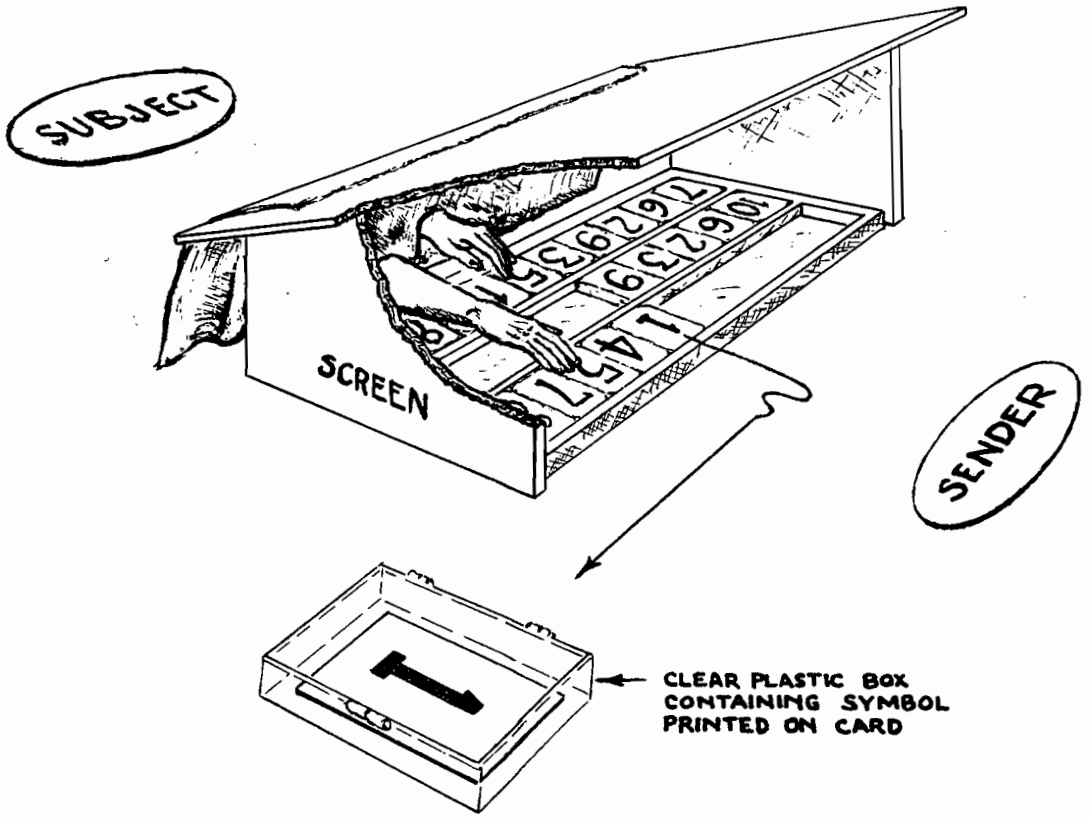
Using this fundamental probability set one can make the null hypothesis that the observed distribution of matches in one experiment by the subject will not deviate significantly from the Poisson probability distribution where the mean is 1. Or in other words, if extrasensory perception is not operative the Poisson distribution for $\bar{x} = 1$ will be satisfied. Let us make a preliminary examination of the statistics appropriate to this test of the null hypothesis.

In the binomial distribution, if the probability of an event occurring is p, and the probability of it not occurring is $q = (1 - p)$, then if a random sample of n trials were taken, the frequencies with which the event occurred 0, 1, 2,....n times is given by the expansion of the binomial $(q+p)^n$.

Like the binomial, the Poisson is the distribution of a discrete variable arising from enumeration of integers. It may be shown

MATCHING ABACUS TEST

FUNDAMENTAL PROBABILITY SET OF TEN



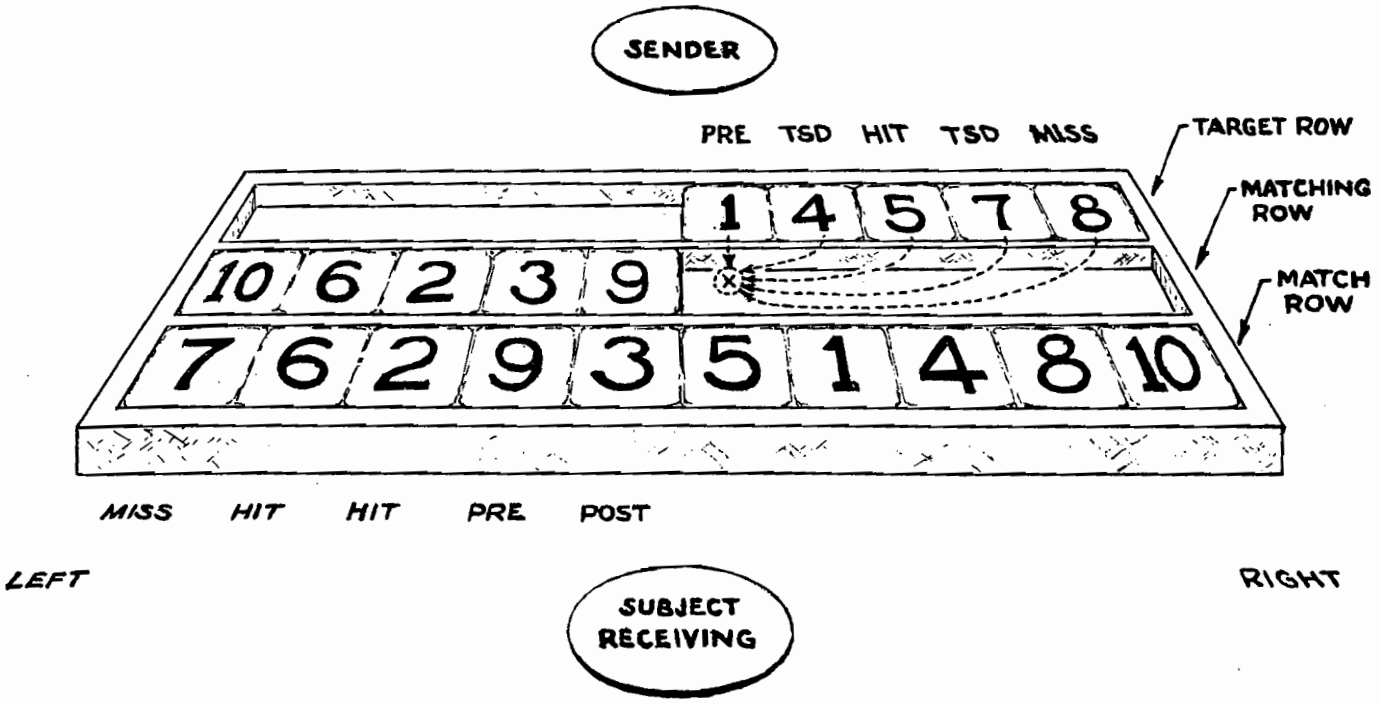
The MATCHING ABACUS TEST consists of 20 identical transparent plastic boxes which contain printed SYMBOLS (numbers, pictures, or playing cards, etc..) The plastic boxes are arranged in 2 Rows; each Row contains an identical set of 10 SYMBOLS. Before each run, each Row of SYMBOLS is randomized.

Sensory clues that might arise due to irregularities in the Plastic Boxes are eliminated by inter-changing SYMBOLS from one box to another before each test run.

The SUBJECT attempts to match up the randomized SYMBOLS without the help of any sensory clues. The illustration above shows the SUBJECT (who is blindfolded) sitting behind a Screen which covers the Matching Abacus Test. Directly opposite the SUBJECT sits the SENDER who visually observes the location of the correct matching SYMBOL or 'TARGET'. The SENDER then concentrates on the correct matching SYMBOL and tries to transmit this information to the SUBJECT telepathically.

NOTE:
Clear plastic boxes were not used until Project XIII, p. 200. For additional discussion of MAT see Sec. 8.7 pp. 170-71.

DETAILS of MATCHING ABACUS TEST



HIT is a Correct Match

MISS is an Incorrect Match

PRE stands for PRE-Positional Displacement

POST stands for POST-Positional Displacement

TSD stands for Target Selection Displacement

The Matching Abacus Test Run illustrated above has been half completed. The Subject began Matching Symbols (numbers) from the left and is working toward the right. Note that the next Symbol to be matched in the MATCH ROW is #5, while the TARGET ROW shows a selection of five possible choices available for movement into position (x) in the MATCHING ROW.

The SENDER visually observes and concentrates on #5 in the TARGET ROW while the SUBJECT (blindfolded by a mask moulded to the face) attempts to receive the location of #5 in the TARGET ROW telepathically. If the SUBJECT selects the Symbol on either side of the correct TARGET in the TARGET ROW, namely #4 or #7, the choice is significant and recorded as a TSD (Target Selection Displacement.) If #1 in the TARGET ROW is moved into position (x) as a match for #5, the choice would be recorded as a PRE (PRE-Positional Displacement) --- and NOT as a MISS. However, if #8 were selected and moved into position (x), the choice would constitute a MISS and be recorded as such.

NOTE:
For additional discussion of (TSD) (PRE) and (POST) see Sec. 5.4 pp. 105-06.

theoretically that if the probability of an event is exceedingly small, and a sufficiently large number of independent cases are taken to obtain a number of occurrences, then this number will be distributed in the Poisson series.

In contrast with both the binomial and the normal, the Poisson distribution is defined by a single parameter, the mean. The variance is equal to the mean. This is illustrated by the following statistics of the Poisson ($\bar{x} = m$)

$$\bar{x} = np$$

$$\sigma = \sqrt{\bar{x}}$$

$$\alpha^3 = \frac{1}{\sqrt{\bar{x}}} = \frac{1}{\sigma}$$

$$\alpha^4 = 3 + \frac{1}{\bar{x}}$$

4.5 If the experiments were to be conducted and evaluated on the basis of single runs of the MAT, the statistics of the Poisson distribution would be sufficient. However, in ESP-testing one deals with so many variables that it is necessary to conduct experiments with sufficient replication to smooth out the curve of performance. Hence, it was necessary to conduct each experiment as a block of five independent runs of the MAT. When one has to calculate the exact probability distribution for a block of five runs of the MAT one can no longer get precise probabilities from the mean "hits" or "matches" as in the case of one run, or by the use of the Multiplication Theorem. The exact probability distribution must now be calculated from a polynomial equation where the F.P.S. is ten, and n = 50. (c.f. Feller, Op. Cit. pp. 212-214).

The probabilities so derived are coefficients of a polynomial called a probability generating function.

Denoting this polynomial by P(s), we have

$$P(s) = \sum_{i=o}^{n} p_i \; s^i$$

where p_i is the probability of the i^{th} event (i matches).

Of course,

$$\sum_{o}^{n} p_i = 1 = P(1)$$

Now, $P'(1) = \sum_{i=1}^{n} i p_i \; s^{i-1}$ = expected value of the random variable, say X, which has p_i's as probabilities. It can be shown that

$$\text{var}(X) = P''(1) + P'(1) - \left[P'(1)\right]^2$$

(see Feller P. 214)

Higher moments may be obtained similarly. Since the amount of labor involved in calculating the coefficients of such polynomials is enormous, and this F.P.S. would be used a great deal, it was decided to derive a probability distribution table using a high-speed calculator. Tables were prepared by the Numerical Analysis Laboratory of the University of Wisconsin. Mr. Reginald Martin carried out the calculations and programmed the IBM calculator. Table 13 shows the probability distribution for a block of experiments comprising 5 independent runs, or a total of 50 trials, using the MAT as a fundamental probability set of ten.

The probabilities are in the following form: the first 8 digits are the mantissa and the last 2 represent a particular power of 10. In order to find a power of 10, subtract 50 from the last 2 digits.

For example,

1234567849 = .12345678

or 1.2345678×10^{-1}

This table has been calculated for the exact probabilities obtaining

TABLE 13

not cumulative

Five Runs

X	P(X)										
00	6	7	3	7	9	4	8	9	4	7	.0067
01	3	3	6	8	9	7	2	0	4	8	.0536
02	8	4	2	2	4	3	7	5	4	8	.0842
03	1	4	0	3	7	3	8	5	4	9	.1403
04	1	7	5	4	6	7	3	7	4	9	
05	1	7	5	4	6	7	4	1	4	9	
06	1	4	6	2	2	2	7	9	4	9	
07	1	0	4	4	4	4	8	5	4	9	
08	6	5	2	7	8	0	4	5	4	8	
09	3	6	2	6	5	5	8	7	4	8	
10	1	8	1	3	2	7	8	8	4	8	= .01
11	8	2	4	2	1	7	2	9	4	7	= .008
12	3	4	3	4	2	3	9	4	4	7	= .003
13	1	3	2	0	8	6	2	3	4	7	
14	4	7	1	7	3	6	8	9	4	6	
15	1	5	7	2	4	5	5	1	4	6	
16	4	9	1	3	9	0	8	6	4	5	
17	1	4	4	5	2	6	2	7	4	5	
18	4	0	1	4	6	2	1	5	4	4	
19	1	0	5	6	4	9	0	2	4	4	
20	2	6	4	1	2	8	5	0	4	3	
21	6	2	8	8	9	4	5	4	4	2	
22	1	4	2	9	3	1	1	9	4	2	
23	3	1	0	6	9	5	5	5	4	1	
24	6	4	7	1	0	9	5	4	4	0	
25	1	2	9	3	4	1	8	4	4	0	
26	2	4	8	4	3	5	2	6	3	9	
27	4	5	9	1	0	1	5	4	3	8	
28	8	1	7	0	5	4	6	2	3	7	
29	1	4	0	1	4	7	7	8	3	7	
30	2	3	1	8	3	7	4	9	3	6	
31	3	7	0	0	3	1	0	7	3	5	
32	5	6	9	9	9	5	8	5	3	4	
33	8	4	7	4	7	9	9	5	3	3	
34	1	2	1	6	1	3	3	3	3	3	
35	1	6	8	3	8	8	0	0	3	2	
36	2	2	4	8	6	3	7	9	3	1	
37	2	8	9	3	9	6	9	7	3	0	
38	3	5	8	6	5	2	6	5	2	9	
39	4	2	7	3	0	5	1	8	2	8	
40	4	8	9	3	3	1	1	3	2	7	
41	5	3	5	1	0	8	7	0	2	6	
42	5	6	4	8	8	3	6	2	2	5	
43	5	5	2	1	5	3	2	5	2	4	
44	5	5	0	9	0	4	1	0	2	3	
45	4	3	1	3	7	8	6	5	2	2	
46	4	7	1	9	9	9	1	9	2	1	
47	1	9	0	7	0	6	7	5	2	0	
48	3	5	7	5	7	5	1	6	1	9	
49	0	0	0	0	0	0	0	0	0	0	
50	1	5	8	9	2	2	2	9	1	7	

for Project IV that when the target frequency distribution, and the call frequency distribution are plotted on the same axis there is evidenced a close clustering of the calls around each target. Fig. 11b illustrates the clustering of 76.5% of the total calls within two minutes plus or minus of the target. Of the total of 196 calls in Project IV, 29 calls, or 14.8% of the total fell within a fifteen-second period before or after the target in question.

The problem of a scoring standard was evaluated in yet another way. Both the calls of Dr. Marchesi and Mrs. Garrett were lumped together in the same frequency distribution. From this distribution the first one hundred intervals of fifteen seconds each were counted for the number of calls in each interval. The following table shows the goodness of fit of the calls to a Poisson distribution. However, there is a wide difference in the means as between the targets, 1.6, (see Sec. 2.1), and the calls, 2.25. Since both the targets and the calls approximate a normal Poisson distribution, the total targets and calls can be used as sample means from a large population.

Calls. Project IV Sample from first 100 intervals of 15 seconds each.

x	call f	fx	Exp. f	Dev.	$(\text{Dev.})^2$	$\frac{(\text{Dev.})^2}{\text{Exp. f}}$
0	17	0	10.0	+7.0	49.0	4.900
1	22	22	23.0	-1.0	1.0	.042
2	21	42	26.5	-5.5	30.25	1.518
3	19	57	20.3	-1.3	1.69	.083
4	10	40	11.6	-1.6	2.56	.220
5	7	35	5.4	+1.6	2.56	.474
6	2	12	)	)	)	)
7	1	7	)	)	)	)
8	0	0	) 3.2	)+0.8	) .64	) .200
9	0	0	)	)	)	)
10	1	10	)	)	)	)
	100	225	100	00.00		χ^2 = 7.437

$\bar{x} = \frac{225}{100} = 2.25$ χ^2 for 5 d.f. = 7.289 = P .20

= 9.236 = P .10

Hence, for the targets, the mean which is the variance, equals 169. The standard deviation is 13.0. For the calls, the mean which is the variance, equals 225. The critical ratio of difference is 225 - 169 = 56, and this divided by the S. D. of 13.0 = X = 4.30. There is a significant departure from homogeneity between the targets and the lumped calls of Dr. Marchesi and Mrs. Garrett. However, further analysis reveals that the targets and calls of Mrs. Garrett in Group 5 are indeed homogenous, while those in the other groups are not. This goodness of fit is further confirmed by the systematic square analysis of the all groups by a fifteen second scoring standard.

Targets - Group 5. Project IV Targets in each 15 second interval to 31 minutes.

x	f	Exp. f	Dev.	$(\text{Dev.})^2$	$\frac{(\text{Dev.})^2}{\text{Exp.}}$
0	77	77.11	-0.11	0.0121	.0001
1	36	36.60	-0.60	0.3600	.0090
2	10	8.70	-1.30	1.6900	.1940
3	1	)	)	)	)
4	0	) 1.59	) - .59	) 0.3481	) .2180
5	0	)	)	)	)
	124	124.00	00.00		χ^2 = 0.4171

Total Targets = fx = 59.

$\bar{x}$ = 0.475

For 2 d.f. χ^2 = .211 = P = .90

χ^2 = .446 = P = .80

Calls. Group 5. Project IV Calls in each 15 second interval to 31 minutes.

x	f	Exp. f	Dev.	$(Dev.)^2$	$\frac{(Dev.)^2}{Exp.}$
0	75	75.89	-0.89	.792	.010
1	38	37.26	-0.74	.547	.014
2	10	9.15	-0.85	.722	.080
3	1	)	)	)	)
4	0	) 1.70	) -70.00	) .490	) .288
5	0	)	)	)	)
	124	124.00	0.00		χ^2 = .392

Total calls = 61

$\bar{x}$ = 0.491

For 2 d.f. χ^2 = 0.211 = P = .90

χ^2 = 0.446 = P = .80

In view of the general grouping of the calls around the target, the allowance of a hit for a call made fifteen seconds before or after a target was believed to be an adequate standard. This is not as arbitrary as it appears in that the same time allowance is made for "chance-expected" hits. On this basis any reasonable time allowance yields approximately the same probabilities.

As in Project III, a precognition was granted in scoring only if that call were made in the future tense, i.e., "A target will come," and if a target followed within fifteen seconds of the call.

2.3 B Statistical Analysis

Each experiment was transferred from the two recording tapes (one for the calls, and one for the targets) to a sheet of graph paper. In this manner all the graphs were laid side by side and the cross-matching for "hits" carried out with a T-square and triangle. See Fig. 12 It would be well to describe at this point what is meant by cross-

FIG. 12

SUBJECT GARRETT
EXPERIMENT No. 43
PROJECT No. IV

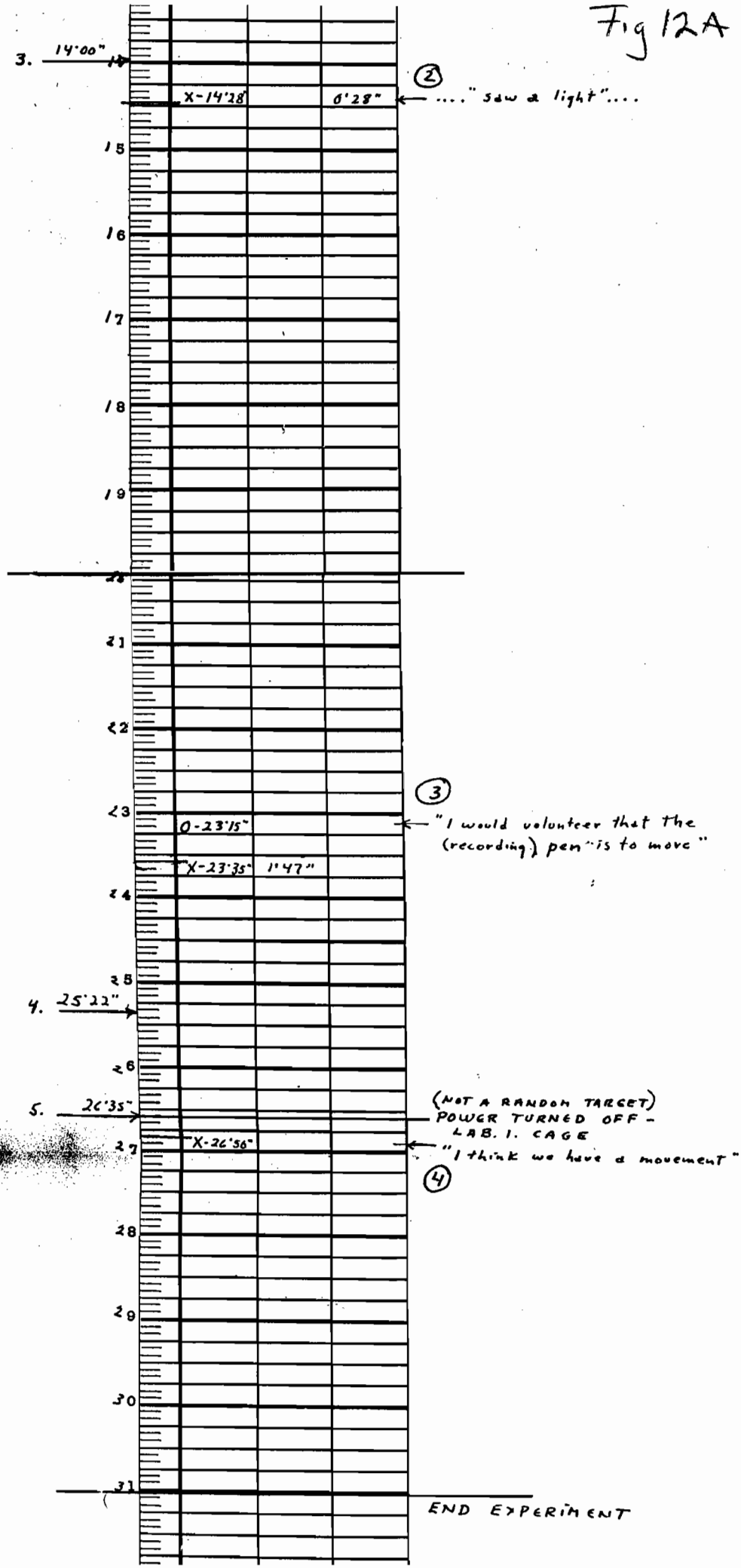
DATE 8-12-52
TIME

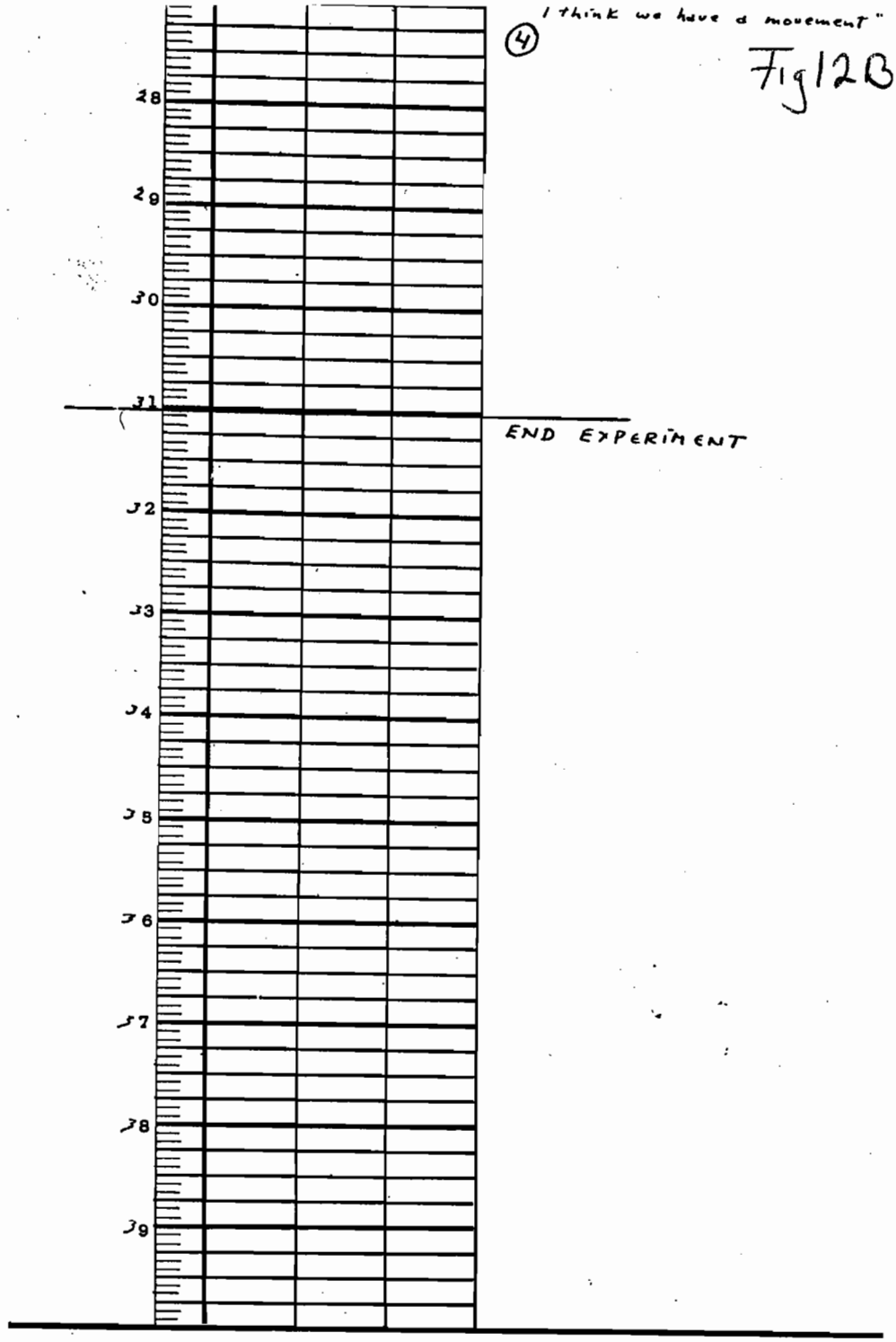
SYMBOLS { O PRECOGNITION (COMING)
X COGNITION (HERE NOW)

TARGET	CALL	TIME BEFORE TARGET	TIME AFTER TARGET	STATEMENTS OF SUBJECT
				PREDICTIONS BY SUBJECT MADE AT 2'30" – 3'00" "I predict that there will be three flashes (targets) one at: 9 minutes one at: 14 minutes one at: 27 minutes."
1. 1'25" →				
2. 8'30" →	X-8'25"	0'05"		(1) ← ...." movement outside of cage".....

1 2 3 4 5 6 7 8 9 10 11 12 13

Fig 12A


3. 14'00"
X-14'28"
0'28"
(2) ...." saw a light"....
15
16
17
18
19
21
22
23
0-23'15"
X-23'35"
1'47"
(3) "I would volunteer that the (recording) pen is to move"
24
25
4. 25'22"
26
5. 26'35"
X-26'56"
(NOT A RANDOM TARGET)
POWER TURNED OFF - LAB. I. CAGE
"I think we have a movement"
(4)
28
29
30
31
END EXPERIMENT


"I think we have a movement"
④
Fig 12B
28
29
30
31
END EXPERIMENT
32
33
34
35
36
37
38
39

Copies of work sheets for exps. 43 & 49. PROJECT IV.

SUBJECT GARRETT
EXPERIMENT No. 49
PROJECT No. IV

DATE 8-13-52
TIME 5:00 P.M.
SYMBOLS { O PRECOGNITION (COMING) / X COGNITION (HERE NOW)

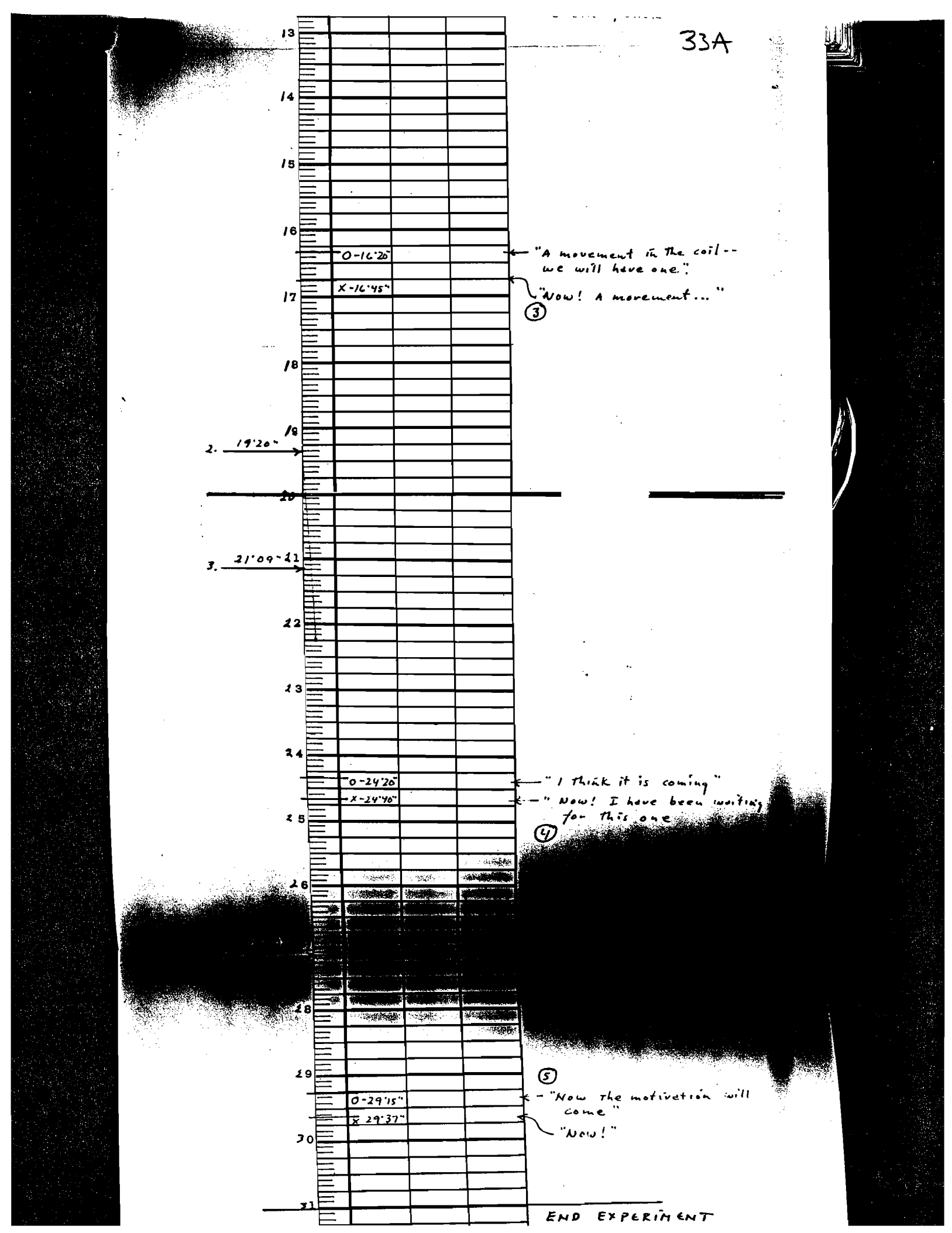
TARGET	CALL	TIME BEFORE TARGET	TIME AFTER TARGET	STATEMENTS OF SUBJECT
1				
2				
3	X			
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

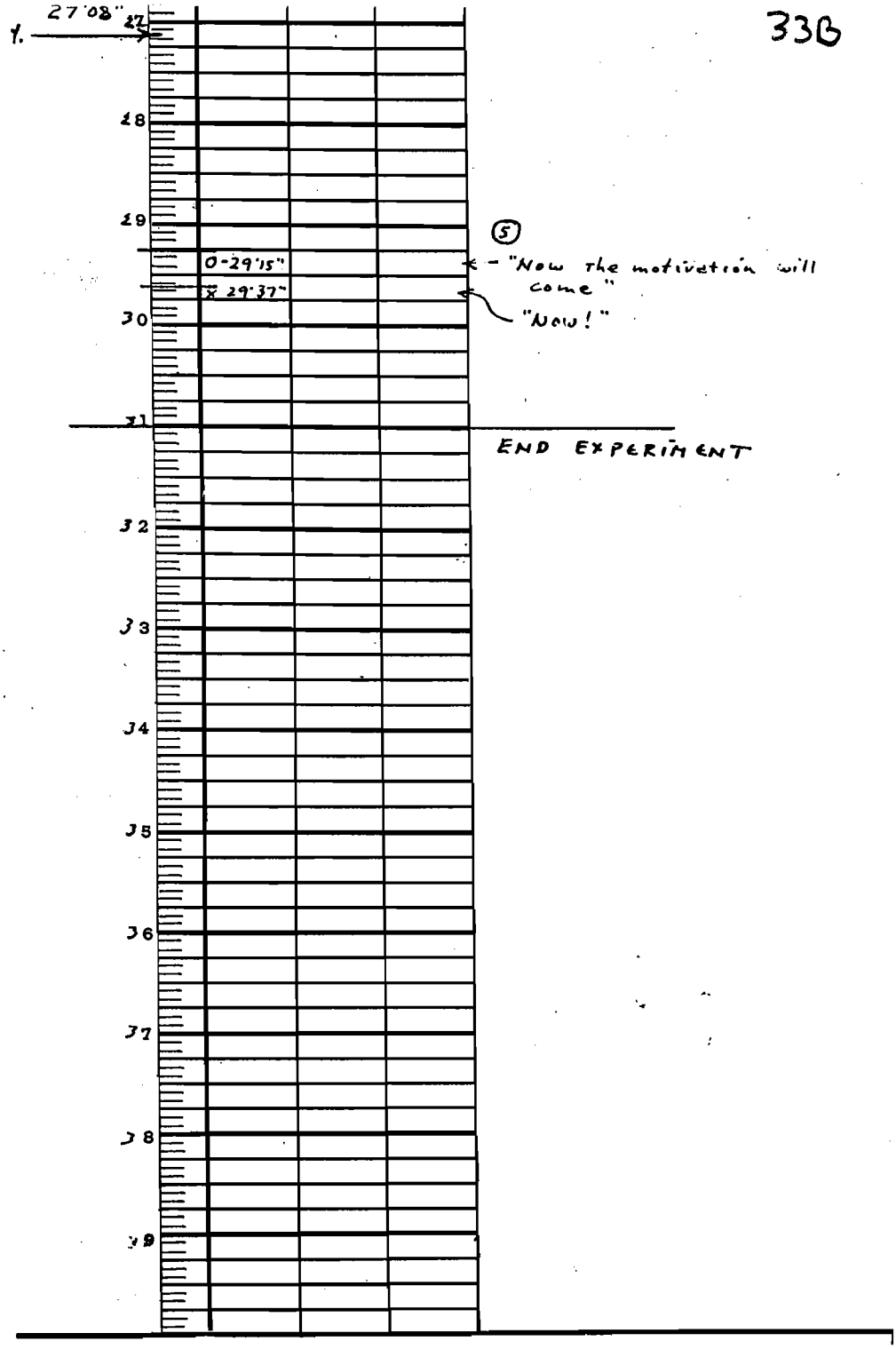
(1) 5'41" "There has been one three minutes ago- a shadow"

PREDICTIONS BY SUBJECT MADE AT 8'15" - 8'43" OF TARGETS THAT WILL ARRIVE:
" one at 13-14 minutes
one at 22 minutes
one at 28 minutes "

1. 12'13" 12

X-12'30" 0'17" (2) "Now I see something - a click, click"


13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
O-16'26"
X-16'45"
"A movement in the coil -- we will have one."
"Now! A movement..."
3
2. 19'20"
3. 21'09"-11
O-24'20"
X-24'40"
"I think it is coming"
"Now! I have been waiting for this one"
4
5
O-29'15"
X 29'37"
"Now the motivation will come"
"Now!"
END EXPERIMENT


1.
27'08"
27
28
29
0-29'15"
x̄ 29'37"
30
31
32
33
34
35
36
37
38
39
⑤
← "Now the motivation will come"
"Now!"
END EXPERIMENT

matching for "chance-expected" hits. Experiment No. 43 has 5 targets and 4 calls. An actual hit was allowed for targets 2 and 5, making a total of two hits to be placed in the leading diagonal. Experiment 49 has 4 targets and 5 calls. No hits are allowed in this experiment. In Experiment 49 the call for target 1 is two seconds over the fifteen second allowance thus disqualifying it as a hit. The leading diagonal is thus credited with a zero. In cross-matching the calls of Experiment 43 against the targets of Experiment 49, and the calls of 49 against targets of 43, we find no cross-match chance-expected "hits" in this case, and zero values are placed in the appropriate cells.

As an illustration of the statistical procedure the complete work sheets of Group 5 have been included in figs. 8 to 12. In the contingency table, fig. 13, it can be seen that the actual hits made by the subject during and experiment are to be found in the leading diagonal. All other cells contain the chance-expected "hits" made by cross-matching. In order for this latter procedure to be valid all experiments must be of the same length. In order to satisfy this condition all experiments were analysed equally to the 31st minute.

2.3 C Statistical Results.

This is an admittedly small series upon which to base any firm conclusions as to ESP-test cognition. It must be pointed out, however, that with the goodness of fit between targets and calls in Group 5, and the critical ratio of 4.87, the significance P = .000001 becomes weighty in spite of the small number of experiments performed.

In Experiment 3 of Group 8, as a spot test, the cage was treated. This resulted in four hits in this one experiment. Had this experiment been dropped from the series (as it should have been) this would have reduced the excess from 6 to 2, and with a standard deviation of 2.39 the significance (P = .01) of Group 8 would have dropped to chance

NUMBER OF TARGETS

		5	5	5	7	6	5	5	4	3	4	4	6	(59) TOTAL TARGETS	
	Exp. No.	43	44	46	47	51	52	54	59	45	49	50	55		
4	43	2	0	2	0	1	0	0	0	0	0	0	0		5
5	44	0	2	0	1	0	1	0	0	1	1	0	0		6
6	46	0	1	2	0	0	1	0	0	1	1	1	0		7
7	47	0	0	0	2	1	0	0	1	2	2	1	0		9
6	51	0	0	0	0	0	0	1	0	1	2	0	0		4
5	52	0	0	0	2	1	0	1	0	1	1	1	0		7
4	54	1	1	0	0	2	0	1	0	0	0	0	2		7
6	59	0	0	0	0	0	0	0	2	1	0	0	0		3
5	45	0	0	0	0	0	0	0	0	1	0	0	0		1
5	49	0	0	0	2	0	0	0	0	1	0	0	0		3
5	50	0	0	1	0	0	1	1	0	1	0	2	1		7
3	55	2	1	0	0	0	0	1	0	0	2	1	2		9
(61)														16	
TOTAL CALLS		5	5	5	7	5	3	5	3	10	9	6	5		(68)

NUMBER OF CALLS

Fig. 13. Contingency Table. Project IV. Group 5
Showing actual hits in leading diagonal.

N = Total Hits in contingency table.
= 68

N_D = Total hits in Leading Diagonal.
= 16

$N - N_D = 68-16 = 52$

N_{ex} = Number of hits in contingency table expected by chance
= 12/11 X 52
= 57

Excess equals $N - N_{ex}$

= 68-57
= 11

Exp. No.	43	44	46	47	51	52	54	59	45	49	50	55	
43	.0056	.0056	.0056	.0078	.0067	.0056	.0056	.0044	.0033	.0044	.0044	.0067	.0657
44	.0069	.0069	.0069	.0097	.0083	.0069	.0069	.0056	.0042	.0056	.0056	.0083	.0818
46	.0083	.0083	.0083	.0117	.0100	.0083	.0083	.0067	.0050	.0067	.0067	.0100	.0983
47	.0097	.0097	.0097	.0136	.0117	.0097	.0097	.0078	.0058	.0078	.0078	.0117	.1147
51	.0083	.0083	.0083	.0117	.0100	.0083	.0083	.0067	.0050	.0067	.0067	.0100	.0983
52	.0069	.0069	.0069	.0097	.0083	.0069	.0069	.0056	.0042	.0056	.0056	.0083	.0818
54	.0056	.0056	.0056	.0078	.0067	.0056	.0056	.0044	.0033	.0044	.0044	.0067	.0657
59	.0083	.0083	.0083	.0117	.0100	.0083	.0083	.0067	.0056	.0067	.0067	.0100	.0983
45	.0069	.0069	.0069	.0097	.0083	.0069	.0069	.0056	.0042	.0056	.0056	.0083	.0818
49	.0069	.0069	.0069	.0097	.0083	.0069	.0069	.0056	.0042	.0056	.0056	.0083	.0818
50	.0069	.0069	.0069	.0097	.0083	.0069	.0069	.0056	.0042	.0056	.0056	.0083	.0818
55	.0042	.0042	.0042	.0058	.0050	.0042	.0042	.0033	.0025	.0033	.0033	.0050	.0492
													↓
													$\Sigma_{P_i} = .9992$

Fig. 14 Probability Table based on the contingency table for Group 5, Project IV.

P_i equals probability for each cell and is expressed by:

$$P_i = \frac{\text{No. of calls for each cell X No. of targets for each cell}}{\text{Total calls in Group 5 X Total targets in Group 5}}$$

$$= \frac{\text{Calls per cell X Targets per cell}}{61 \text{ X } 59}$$

As a check: the sum of the P_i values for each cell should equal unity.

$$\sum P_i = 0.9992$$

Exp. No.	43	44	46	47	51	52	54	59	45	49	50	55		
43	.32	.32	.32	.45	.38	.32	.32	.25	.19	.25	.25	.38		
44	.39	.39	.39	.55	.47	.39	.39	.32	.24	.32	.32	.47		
46	.47	.47	.47	.67	.57	.47	.47	.38	.29	.38	.39	.57		
47	.55	.55	.55	.78	.67	.55	.55	.45	.33	.45	.45	.67		
51	.47	.47	.47	.67	.57	.47	.47	.38	.29	.38	.38	.57		
52	.39	.39	.39	.55	.47	.39	.39	.32	.24	.32	.32	.47		
54	.32	.32	.32	.45	.38	.32	.32	.25	.19	.25	.25	.38		
59	.47	.47	.47	.67	.57	.47	.47	.38	.29	.38	.38	.57		
45	.39	.39	.39	.55	.47	.39	.39	.32	.24	.32	.32	.47		
49	.39	.39	.39	.55	.47	.39	.39	.32	.24	.32	.32	.47		
50	.39	.39	.39	.55	.47	.39	.39	.32	.24	.32	.32	.47		
55	.24	.24	.24	.33	.29	.24	.24	.19	.14	.19	.19	.29		
												$\Sigma N_{e_i}' = 56.85$		

Fig. 15 Chance expected hits in each cell.
Group 5, Project IV.

$(N - N_D)\ 12/11\ P_i$ equals chance expected hits in each cell.

$= 57 \times P_i$

As a check: The sum of chance expected hits in each cell should equal 57.

~~116~~

Exp. No.	43	44	46	47	51	52	54	59	45	49	50	55	
43	+1.68	-.32	+1.68	-.45	+.62	-.32	-.32	-.25	-.19	-.25	-.25	-.38	
44	-.39	+1.61	-.39	+.45	-.47	+.61	-.39	-.32	+.76	+.68	-.32	-.47	
46	-.47	+.53	+1.53	-.67	-.57	+.53	-.47	-.38	+.71	+.62	+.62	-.57	
47	-.55	-.55	-.55	+1.22	+.33	-.55	-.55	+.55	+1.67	+1.55	+.55	-.67	
51	-.47	-.47	-.47	-.67	-.57	-.47	+.53	-.38	+.71	+1.62	-.38	-.57	
52	-.39	-.39	-.39	+1.45	+.53	-.39	+.61	-.32	+.76	+.68	+.68	-.47	
54	+.68	+.68	-.32	-.45	+1.62	-.32	+.68	-.25	-.19	-.25	-.25	+1.62	
59	-.47	-.47	-.47	-.67	-.57	-.47	-.47	+1.62	+.71	-.38	-.38	-.57	
45	-.39	-.39	-.39	-.55	-.47	-.39	-.39	-.39	+.76	-.32	-.32	-.47	
49	-.39	-.39	-.39	+1.45	-.47	-.39	-.39	-.32	+.76	-.32	-.32	-.47	
50	-.39	-.39	+.61	-.55	-.47	+.61	+.61	-.32	+.76	-.32	+1.63	+.53	
55	+1.76	+.76	-.24	-.33	-.29	-.24	+.76	-.19	-.14	+1.81	+.81	+1.71	
												$\Sigma x_i = 0.041$	

Fig. 16. Deviation from chance expected - x.
Group 5, Project IV.

$x_i = f_i - 12/11\ (N - N_{ex}i)\ P_i$ Expresses the deviation from chance expected.

As a check: The sum of the deviations x_i, excluding those of the leading diagonal, should equal zero.

Exp. No.	43	44	46	47	51	52	54	59	45	49	50	55	
43	2.822	.102	2.822	.203	.384	.102	.102	.063	.036	.063	.063	.144	4.084
44	.152	2.592	.152	.203	.221	.372	.152	.102	.578	.462	.102	.221	2.717
46	.221	.285	2.341	.449	.325	.281	.221	.144	.504	.384	.384	.449	3.647
47	.303	.303	.303	1.488	.109	.303	.303	.303	2.789	2.403	.303	.449	7.871
51	.221	.221	.221	.449	.325	.221	.285	.144	.504	2.624	.144	.325	5.359
52	.152	.152	.152	2.103	.285	.152	.372	.102	.578	.462	.462	.221	5.041
54	.462	.462	.102	.203	2.624	.102	.462	.063	.036	.063	.063	2.624	6.804
59	.221	.221	.221	.449	.325	.221	.221	2.624	.504	.144	.144	.325	2.996
45	.152	.152	.152	.303	.221	.152	.152	.152	.578	.102	.102	.221	1.861
49	.152	.152	.152	2.103	.221	.152	.152	.102	.578	.102	.102	.221	4.087
50	.152	.152	.372	.303	.221	.372	.372	.102	.578	.102	2.822	.281	3.007
55	3.098	.578	.058	.109	.084	.058	.578	.036	.020	3.276	.656	2.924	8.551
									Excluding $ND\bar{x}^2 - \sum x_i^2$ =				56.025

Fig. 17 Square of Deviation from chance expected, x_1^2
Group 5, Project IV.

Mean Square Deviation is found by adding the x_1^2 values for each cell, excluding those of the leading diagonal, and dividing by the total number of cells minus those in the leading diagonal minus one.

$$= \frac{56.025}{144-12-1} = \frac{56.025}{131}$$

$$= .4277$$

Standard Deviation^2 = Number of Experiments X ,4277
= 12 X .4277
= 5.1324

Standard Deviation = Square root of 5.1324

S.D. = 2.26

x = The deviation in the normal distribution in terms of the standard deviation.

= Actual deviation divided by the standard deviation
= 11/2.26
x = 4.87

P value for 4.87 is .000,001, or odds that such a result will occur by chance alone once in a million times.

	Group 5	Group 6	Group 7	Group 8	Group 9
Subject	Garrett	Marchesi	Garrett	Garrett	Marchesi
Position of Subject. Cage --	Lab. 1 Treated	Lab. 2 Untreat.	Lab.1 Untreat.	Lab. 2 Untreat.	At Home No Cage
Position of Target	Lab. 2	Lab. 2	Lab. 2	Lab. 2	Lab. 2
Length of Experiments	31 min.	31 min.	31 min.	31 min.	20 min.
Number of Targets	59	58	55	66	33
Number of Calls	61	92	51	84	48
N - Nexp.	11	1	-2	6	0
Standard Deviation	2.26	2.20	1.86	2.39	
Critical Ratio - x	4.87	0.46	1.08	2.51	
Significance - P *	.000,001	.64	.28	.01	
Critical Ratio of Difference	4.43 3.17				

* R. A. Fisher, STATISTICAL METHODS FOR RESEARCH WORKERS Hafner, New York, 1950 p. 77, Tables I and II.

TABLE 7. Summary of the Statistical Analyses of the various Groups in Project IV.

expectation (less than one sigma).

Inspection of Table 7 clearly shows the high order of significance (P = .000001) of the critical ratio of 4.87 achieved by Mrs. Garrett in Group 5 as compared with those of the four control groups. Since the experimental design ruled out any sensory basis of cognition, the argument must be advanced that there was operative a mode of cognition not dependent on the classical sensory systems which is generally called ESP. The most unexpected finding, however, was the critical ratio of difference between Groups 5 and 7 with a value of 4.45, or P = .000047 or better. The implication to be drawn from this statistic is that the physical conditions of the Treated Faraday Cage might be responsible for the difference in scoring between Group 5 and 7.

2.4 DISCUSSION

The experiments as conducted suggested that there might be a physical technique that can be used to increase at will the ESP-test scoring of a subject in what may be presumed to be an unusual form of cognition. This report would not be complete if mention were not made of some of the incidental psychological and physiological observations made during the course of the experiments. It was quite common for the subjects at times to give accurate descriptions of written material, of an individual's actions and feelings, of the changes going on in mechanical or electronic apparatus, and of other events going on completely out of the sensory range of the subject. Most of the descriptions given by the subject were later objectively verified by the investigators. A typical example may be given of one of these descriptions. In the 24th minute of experiment 48, the control personality of Mrs. Garrett noted that the engineer, Robert Baker, in charge of Laboratory 2 was at this moment placing "a cylinder into the side of a box-like machine." Further interrogation of the subject

revealed a rather accurate description of the Sanborn Recorder used to record the target arrival time in Laboratory 2. The point that the subject emphasized especially was that the engineer was carrying out this act at this moment and in great haste. It must be stated that the subject, Mrs. Garrett, had never been allowed to see the inside of this particular control room. After the experiment was over, the author checked with the engineer to see whether this given description tallied with any such event that had been going on at Laboratory 2 (the subject being in Laboratory 1 during the experiment). The engineer immediately handed over his notes which had duly recorded the fact that he had gone through this act as described. The temporal discrepancy, however, was that it had occurred 25 minutes before the description had been given.

There have been other cases where the reverse situation has occurred. For example, in Experiment 4, at twenty minutes and fifteen seconds the subject announced that the engineer in the control room in Laboratory 2 was at this moment writing down the figures 0, 2, 3, and 5, in that order. After the experiment was over it was found that the engineer had actually written down the time 23:50 (or 23'50") recording a target arrival time. This had been written down on the experiment note sheet three minutes and thirty-five seconds after the description had been given by the subject. This phenomenon of time-displacement and order-displacement of symbols has often been described in parapsychology research. The puzzling feature of this observation is that Mr. Baker had recorded the random arrival time of a cosmic ray pulse, and therefore could not have anticipated such a written statement three minutes and thirty-five seconds before the act. If this had been a routine recording event he could well have had the idea to write this statement contemporaneously with Mrs. Garrett's cognition of it, and written it down later.

Most subjects report a sense of well-being or frankly exhibited euphoria after being in a treated cage for periods of fifteen to thirty minutes. However, subjects placed between the walls of two charged cages develop an extreme fatigue within twenty minutes, and some have reported headaches, nausea, or vomiting. The physiological effects that occur inside a treated cage, where apparently no electrical effects can penetrate, are of considerable magnitude and of several varieties, and appear to be a fruitful field for investigation, and will be taken up in some detail later. See Chapter 6.

An experimental technique has been devised that statistically yields significant probabilities, thus falsifying the null hypothesis that has been postulated. Furthermore, evidence was obtained of significant scoring in an ESP-test thus arguing for the presence of general-ESP. Because the engineer was present in the control room observing the random generator recorder, it is believed that telepathy was operative. It was desirable in the next stage of experimentation to determine if the unusual mode of cognition observed was due to the use of an electrical target, or whether the results obtained were independent of an electrical target. To this end a card-matching test was used to evaluate the effect of the Treated Faraday Cage on ESP-test scoring rates.

CHAPTER 3

STATISTICAL EXPERIMENTS BASED ON A BINARY SYSTEM

3. Project VIIA December 26, 1952 to January 2, 1953

The results of Project IV present statistical evidence indicating the presence of general extra-sensory perception obtained under the environmental conditions of a Treated Faraday Cage. A number of critics pointed out that the evidence for this type of effect on ESP-test cognition would be more acceptable if presented in simple statistical language, and if the call system of the subject were limited to a "yes" or "no" call. Chapter 3 is a report on the results of 6500 trials with playing cards. The subject chosen for this study was the well-known "telepathist" and "psychometrist," Mr. Frederick Marion[1].

It was desirable to establish whether or not Mr. Marion's reputed telepathic skill was affected in any way by the Treated Faraday Cage enclosure in comparison with performance under normal room conditions in a test amenable to the simplest statistical analysis. The test material chosen was an ordinary deck of 52 playing cards. In the early tests Mr. Marion had to decide whether a card was red or black when it was offered to him face down by the experimenter. In a deck of 52 playing cards there are 26 red, and 26 black cards. By chance alone it is expected that one can get approximately 13 red cards separated into the red pile, and approximately 13 black cards separated into the black pile. This would leave approximately 13 wrong cards in each of the two piles. Such a score would be a chance-expectation result.

The first experimental procedure as a general ESP-test was as follows: The experimenter and the subject sat across a card table

1. Marion, Frederick, In My Mind's Eye, E. P. Dutton, N. Y., 1950

whose surface was covered with a black cloth. A new deck of cards was well-shuffled by the investigator and held face down in his hands so that neither he nor the subject knew the order or could see the face of the card. Then the investigator drew the top card off the deck and held it toward the subject face down at the table level.* The subject usually kept his eyes closed (largely for concentration's sake), and then made a call as to whether the card was red or black. The investigator then placed the called 'red' cards into one pile, and the called 'black' cards into another pile. The call of each card by the subject is designated as a trial. Calling through a deck of 52 cards is designated as a run. When a run had been completed the investigator counted the number of hits and of misses in each pile and recorded the score. The subject was not allowed at any time to have the cards in his possession.

The experiments were performed in groups of ten runs; thus each group comprised 520 trials. The chance-expected score for 520 trials is 260 hits (counting both the red and the black hits). The standard deviation (sigma) from chance is 11.5 hits, and in order for a score to reach the minimum acceptable level for significance it must exceed the standard deviation by at least twice. Thus a score of 283 or better would have to be achieved before one could be impressed that an extra-chance factor was operating.

3.1 Group I - Control

As a control measure three 'non-sensitive' subjects performed this experiment in order to see how their scores would compare to that of the test subject, Mr. Marion, under identical conditions. See Table 8

* On the basis of methodology the Duke Parapsychology group would call this the Broken Technique test for clairvoyance.

in 1 to 15 runs. In order to calculate the significance of any particular score with respect to chance, the means and variances for each distribution were obtained by differentiating the polynomial. From these can be derived the entire Poisson statistics for evaluation of significance.

The method of Sequential Analysis can be applied to these experiments by converting the numbers of the probabilities in Table 13 to logarithms.

4.6 PROJECT VIII. EXTRA-SENSORY COGNITION DEFINITION

The first problem was to find out if the subjects showed evidence for clairvoyance. The MAT is not a good design for pure clairvoyance since someone had to select the pictures to be mounted on the blocks before the test; As to the order of the 2 sets of ten no one knew it, since this procedure was carried out blindfolded. Had we found indications of clairvoyance, the MAT would have had to be replaced by the random generator design of the Cosmic Ray-Trigger Test used as a pure clairvoyance test. Since evidence for clairvoyance was not found in these subjects the use of the MAT was continued.

Since someone had to shuffle (blindfolded) the order of the MAT before each test and score the results after the test the factor of precognitive telepathy was not ruled out of the test design. Since no evidence was found in these subjects for precognitive telepathy the MAT was used in further testing. The best definition that can be given of the Proj. VIIIA experiment is to call it a NO TELEPATHY TEST on the basis of making every effort to exclude telepathy.

4.61 The sealed MAT was given by a third party to the investigator in the darkness of the cage. He opened it in the dark, gave it to the subject to arrange, and sealed it in the dark. At the end of the test the MAT was handed to a third person for scoring.

S	I	CONDITIONS
X	X	CAGE - Ground
X	X	- No Light
		- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
X	X	- No Blindfold
		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
X	X	TEST - Content Unknown
		- Content Known
X↘	X↘	- Order Known
		- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE
	7/100	8/100	6/100
	0.7	0.8	0.6
	.15003	.17546	.14037
X =	-.81		
	8/100	8/100	8/100
	0.8	0.8	0.8
	.17546	.17546	.17546
X =	-.60		

SCORE

I - Puharich Correction Factor: $\frac{SCORE}{2}$
S - Stone
Scorer - Jackson
Total Hits $\frac{7}{2}$ = 3.5 matches
Av. Hits per run
Probability for 50 trials P for 3.5/50
Significance - P = .79102

I - Puharich Correction Factor: $\frac{SCORE}{2}$
S - Bond
Total Hits $\frac{8}{2}$ = 4.0 matches
Av. Hits per run
Probability for 50 trials P for 4/50
Significance - P = .72574

I -
S -

Total Hits
Av. Hits per run
Probability
Significance - P =

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 14
PROJECT VIIIA
Exp. No. 1 - 20

ESP DEFINITION
No Telepathy - Dark

27 June - 3 July 55

The subject was told that the MAT contained 2 sets of 10 matching pieces of printed material, and that he was to arrange in order the blocks that matched. This was the entire statement of the problem to the subject. Because the outcome of this first experiment could not be predicted, a correction factor was used. This consisted of dividing the total matches by 2, and calculating the probabilities on the basis of an experiment of 5 runs, instead of 10 runs. ?

It can be seen in Table 14, Project VIIIA that neither subject showed evidence for precognitive telepathy or clairvoyance. The theoretical mean for 50 trials is 5.4 matches. Required hits for .01 significance is 10.812 matches.

4.62 Proj. VIIIB. This experiment differed from Proj. VIIIA in that the investigator and the subject both wore rubber blindfolds molded to the face during the test, and no other person saw the MAT during the run.

It can be seen in Table 15 that the addition of light to the MAT made no difference in the results, i.e., neither subject showed evidence for clairvoyance, or precognitive telepathy.

It was decided to conduct experiments in which the following order of knowledge of the test would be added to the mind of the investigator:

Exp. c) Knowledge of the printed material present on blocks but test conducted in darkness as in Proj. VIIIA.

Proj. VIII C Table 16

Exp. d) Content and order of blocks known to investigator in the light during the experiment but the subject not to be told that this is a telepathy test.

Proj. VIII D Table 17

Exp. e) Same as (c) except that subject told to focus attention on the mind of the investigator for telepathic impressions.

Proj. VIII E Table 18

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
		- No Blindfold
X	X	- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
X	X	TEST - Content Unknown
		- Content Known
		- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich**
				S - **Stone**
				Scorer - Jackson
	4/50	4/50	3/50	Total Hits
	0.8	0.8	0.6	Av. Hits per run
	.17546	.17546	.14037	Probability
X =	-.60			Significance - P = .72574
				I - **Puharich**
				S - **Bond**
	2/50	3/50	3/50	Total Hits
	0.4	0.6	0.6	Av. Hits per run
	.08422	.14037	.14037	Probability
X =	-1.46			Significance - P = .92785
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =
				Combined Scores
				Total Hits
				Av. Hits per run
				Probability
				Significance
				P =

TABLE 15
PROJECT **VIIIB**
Exp. No. 1, 2

ESP DEFINITION
No Telepathy - Light

9-10 July 55

4.63 Proj. VIIIC. In this test the investigator was allowed to see the printed material on the MAT blocks for the first time. He memorized the pictures before the test but had no idea of the order in which they appeared during the test. Apparently the knowledge of the pictures on the part of the investigator did not aid the subject to exceed chance-expectation in the matching of the pictures. See Table 16, Project VIIIC.

Neither of the subjects gave any impression at all as to the nature of the printed material on the blocks from the knowledge of the investigator. The reason for this lack of telepathic communication as to content became apparent in Proj. VIIID and E. As long as the subjects tried to get impressions from the MAT directly they were unable to demonstrate telepathy. However, as soon as they were made aware of the introduction of the possibility of telepathy, and shifted their attention from the MAT to the person of the investigator, both of them simultaneously and independently achieved extra-chance scores.

4.64 Proj. VIIID. In this experiment all the conditions for possible telepathy, except one, were present. The exception was that the subjects were not informed that this was a telepathy test. They were still concentrating on trying to get impressions directly from the printed material on the MAT blocks.

The investigator made a devoted effort to send the appropriate "telepathic" signals by concentration to the subjects. It is interesting that under this condition both subjects reported independently that for the first time during the tests of Proj. VIII they felt they were getting some "content" or feeling of "impression" from the MAT. They both mistakenly identified the impressions they were getting from the investigator as originating from the printed material of the MAT. It has been often found that this sense of identification between the

S	I	CONDITIONS
X	X	CAGE - Ground
X	X	- No Light
		- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
X	X	- No Blindfold
		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
		- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich**
				S - **Stone**
				Scorer - Jackson
	4/50	4/50	3/50	Total Hits
	0.8	0.8	0.8	Av. Hits per run
	.17546	.17546	.14037	Probability
X =	-.60			Significance - P = .72574
				I - **Puharich**
				S - **Bond**
	2/50	4/50	2/50	Total Hits
	0.4	0.8	0.4	Av. Hits per run
	.08422	.17546	.08422	Probability
X =	-1.46			Significance - P = .92785
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =
				Combined Scores
				Total Hits
				Av. Hits per run
				Probability
				Significance
				P =

TABLE 16
PROJECT VIIIC
Exp. No. 1, 2

ESP DEFINITION
Content known only to I.

15 July 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X	X	- Contact with MAT
		- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - Puharich
				S - Stone
				Scorer - Jackson
	3/50	5/50	3/50	Total Hits
	0.6	1.0	0.6	Av. Hits per run
	.14037	.17546	.14037	Probability
X =	-1.03			Significance - P = .84849
				I - Puharich
				S - Bond
	2/50	4/50	3/50	Total Hits
	0.4	0.8	0.6	Av. Hits per run
	.08422	.17546	.14037	Probability
X =	-1.46			Significance - P = .92785
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =
				Combined Scores
				Total Hits
				Av. Hits per run
				Probability
				Significance
				P =

TABLE 17
PROJECT VIIID
Exp. No.1, 2

ESP DEFINITION
Order known to I.
Subject not aware of Telepathy.

16 July 55

subject and the investigator is mistakenly related to the type of test being used.

The results in Table 17 clearly show that there was no extra-chance matching of the pictures under the conditions cited. Therefore, in the next test it was decided to inform the subjects beforehand that a telepathy test was being attempted.

4.65 Proj. VIIIE. This experiment differed from Proj. VIIID only in that the subject was informed before the test that this was to be a telepathy experiment. This one factor was associated with the dramatic appearance of significant extra-chance scores in both subjects. See Tables 18A and 18B. This experiment showed that when the optimum conditions were provided both subjects ~~showed~~ evidenced extra-sensory cognition that could be defined as telepathy.

The conditions associated with significant scoring and which will henceforth be termed CONTROL LEVEL TEST FOR TELEPATHY are as follows:

1. The test is carried out in the GROUND FARADAY CAGE.
2. The MAT is illuminated by an electric light powered by a 6 volt battery.
3. The subject and the investigator are both sitting in the GROUND FC facing each other across a wood table. See Fig. 29
4. The investigator has full visual observation of the MAT, and the hand movements of the subject over the MAT. The investigator handles the blocks of the MAT after each test during shuffling.
5. The subject wears a rubber mask molded to his face. The subject handles the blocks of the MAT under a masonite screen interposed between the MAT and all possible lines of vision between it and his eyes. Thus there is a double check against his being able to see the MAT blocks during the test. See p. 70A

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X	X	- Contact with MAT
		- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - Puharich S - Stone
	27/50	4/50	2/50	Total Hits
	5.4	0.8	0.4	Av. Hits per run
	$.45910 \times 10^{-11}$	.17546	.08422	Probability
	X = 9.29			Significance - P = -log Q(X) = 18.94746
				I - Puharich S - Bond
	28/50	3/50	3/50	Total Hits
	5.6	0.6	0.6	Av. Hits per run
	$.81705 \times 10^{-12}$	.14037	.14037	Probability
	X = 9.72			Significance - P = -log Q(X) = 18.94746
				I - Jackson or greater S - Stone
	74/150	8/150	14/150	Total Hits
	4.9	0.53	0.93	Av. Hits per run
	9.6646×10^{-28}			Probability
				Significance - P =

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 18A
PROJECT VIIIE
Exp. No. 1 - 6

ESP DEFINITION
Order known to I.
Subject made aware of Telepathy.

19 July 55
22 July 55
31 Aug. 55
12 Sept. 55
28 Sept. 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X	X	- Contact with MAT
		- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Jackson**
				S - **Bond**
	42/100	6/100	5/100	Total Hits
	4.2	0.6	1.0	Av. Hits per run
3.2280x10^{-14}				Probability
				Significance - P =
				I - **Narodny**
				S - **Stone**
	85/150	6/150	11/150	Total Hits
	5.66	0.4	0.73	Av. Hits per run
7.7209x10^{-36}				Probability
				Significance - P =
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =
				Combined Scores
				Total Hits
				Av. Hits per run
				Probability
				Significance
				P =

TABLE 18B
PROJECT VIIIE
Exp. No. 7 - 11

ESP DEFINITION
Order known to I.
Subject made aware of telepathy.

9 Sept. 55
26-29 Sept. 55
31 Aug. 55

6. The symbolic content of the blocks of the MAT is unknown to the subject. The content, and order is always known to the investigator.

7. Both the subject and the investigator are consciously aware that a telepathic interaction is being attempted during the test.

8. Both the subject and investigator wear ordinary street shoes (in this case they happened to have rubber soles) which are in contact with the wood floor of cage B.

9. Telepathic interaction on the part of the investigator with the subject is attempted only when the subject's hands are on the correctly matching pair of blocks. At this moment the investigator concentrates intently with a view to "willing" the subject to pick up that matching block that corresponds to the target block and placing them together as a trial. ~~call~~. Such sampling is carried out without replacement.

When investigators other than Puharich acted as senders it was found that for conditions identical to those of Proj. VIIIE comparable scores were achieved. Hence, in assessing the telepathic performance of any investigator/subject team in the future it was decided to use this test to assess the CONTROL level of scoring.

Now that we had settled on this form of extra-sensory cognition as the most sensitive feedback with which to guide the development of the Faraday Cage Technique, it became necessary to evaluate the most efficient method of utilizing the MAT as the quantitative index of human response.

4.7 PROJECT IX. MATCHING ABACUS TEST UTILIZATION

In the tests of Proj. VIII the subject handled both the matching block and the target block in order to arrange a match.

It appeared desirable to find out if the subject could call the match in the absence of handling both the matching block and target block. Hence, the essential new feature in Proj. IX that was to be isolated for study was the problem of calling vs. arranging in the Matching Abacus Test.

4.71 In Proj. IXA where the subject and the investigator were outside the cage, and the investigator passed his hand over the target row while the subject was to call when the correct match had been reached, it can be seen (Table 19) that the scores do not attain significance for telepathy. In other words, "calling" produces scores significantly below the control level found for "arranging" outside the cage where P = .00778. (See 4.74).

4.72 The same result is obtained inside the cage for "calling" vs. "arranging" in Proj. IXB. See Table 20.

4.73 When the MAT is split so that the investigator handles the target row, while the subject is supposed to duplicate the order of the target row in the matching row in his possession, the scores drop to a chance-expectation. This can be seen under the differing conditions of Proj. IXC, D, E. Tables 21, 22 and 23.

Hence, it became apparent that our study of telepathy as affected by the environmental factors of the FCT could not be carried out at all if we used the MAT as a "calling" test. In order to recover the most sensitive index of response one had to use the "arranging" method of utilizing the MAT, even though this method is subject to criticism if used to offer proof for the existence of telepathy. O.K.

The remarkable difference between "calling" and "arranging" in the matching problem can be seen in the comparative scores for each subject in Tables 24A and 24B.

S	I	CONDITIONS
		CAGE - Ground
		- No Light
		- Light
		PERSONNEL - In Cage
X	X	- Out of Cage
	X	- No Blindfold
X		- Blindfold
	X	- Contact with MAT
X		- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
	X	- Order Known
		- MAT Inside Cage
X	X	- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich**
				S - **Stone**
	9/50	8/50	5/50	Total Hits
	1.8	1.6	1.0	Av. Hits per run
	.03626	.06527	.17546	Probability
X =	1.54			Significance - P = .93821
				I - **Puharich**
				S - **Bond**
	7/50	6/50	4/50	Total Hits
	1.4	1.2	0.8	Av. Hits per run
	.10444	.14622	.17546	Probability
X =	.68			Significance - P = .75174
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =
				Combined Scores
				Total Hits
				Av. Hits per run
				Probability
				Significance
				P =

TABLE 19
PROJECT IXA
Exp. No. 1, 2

MAT UTILIZATION
Telepathy - Calling
I & S - Outside Cage

25 July 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
	X	- Contact with MAT
X		- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich**
				S - **Stone**
	7/50	9/50	2/50	Total Hits
	1.4	1.8	0.4	Av. Hits per run
	.10444	.03626	.08422	Probability
X =	.68			Significance - P = .75174
				I - **Puharich**
				S - **Bond**
	10/50	5/50	5/50	Total Hits
	2.0	1.0	1.0	Av. Hits per run
	.01813	.17546	.17546	Probability
X =	1.98			Significance - P = .97614
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 20
PROJECT IXB
Exp. No. 1, 2

MAT UTILIZATION
Telepathy - Calling
S & I - Inside Cage

26 July 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
1/2	1/2	- Contact with MAT
		- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich**
				S - **Stone**
	6/50	4/50	3/50	Total Hits
	1.2	0.8	0.6	Av. Hits per run
	.14622	.17546	.14037	Probability
X =	.25			Significance - P = .59870
				I - **Puharich**
				S - **Bond**
	9/50	6/50	4/50	Total Hits
	1.8	1.2	0.8	Av. Hits per run
	.03626	.14622	.17546	Probability
X =	1.54			Significance - P = .93821
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =
				Combined Scores
				Total Hits
				Av. Hits per run
				Probability
				Significance
				P =

TABLE 21
PROJECT IXC
Exp. No. 1, 2

MAT UTILIZATION
Telepathy - Calling
S & I - In Cage
S has Matching Row
I has Target Row

28 July 55

S	I	CONDITIONS
X		CAGE - Ground
		- No Light
X		- Light
X		PERSONNEL - In Cage
	X	- Out of Cage
	X	- No Blindfold
X		- Blindfold
	X	- Contact with MAT
X		- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
1/2		- MAT Inside Cage
	1/2	- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - Puharich
				S - Stone
	4/50	4/50	3/50	Total Hits
	0.8	0.8	0.6	Av. Hits per run
	.17546	.17546	.14037	Probability
X =	-.60			Significance - P = .72574
				I - Puharich
				S - Bond
	6/50	7/50	5/50	Total Hits
	1.2	1.4	1.0	Av. Hits per run
	.14622	.10444	.17546	Probability
X =	.25			Significance - P = .59870
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =
				Combined Scores
				Total Hits
				Av. Hits per run
				Probability
				Significance
				P =

TABLE 22
PROJECT IXD
Exp. No. 1, 2

MAT UTILIZATION
Telepathy - Calling
I - Outside Cage
Target Row
S - Inside Cage
Matching Row

2 Aug. 55

S	I	CONDITIONS
	X	CAGE - Ground
		- No Light
	X	- Light
	X	PERSONNEL - In Cage
X		- Out of Cage
	X	- No Blindfold
X		- Blindfold
1/2	1/2	- Contact with MAT
		- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
	1/2	- MAT Inside Cage
1/2		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich**
				S - **Stone**
	6/50	3/50	12/50	Total Hits
	1.2	0.6	2.4	Av. Hits per run
	.14622	.14037	.00343	Probability
X =	.25			Significance - P = .59870
				I - **Puharich**
				S - **Bond**
	7/50	5/50	6/50	Total Hits
	1.4	1.0	1.2	Av. Hits per run
	.10444	.17546	.14622	Probability
X =	.68			Significance - P = .75174
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 23
PROJECT **IXE**
Exp. No. 1, 2

MAT UTILIZATION
Telepathy - Calling
I - Inside Cage
Target Row
S - Outside Cage
Matching Row

2 - 3 Aug. 55

TABLE 24 A

SUMMARY OF RESULTS IN PROJECTS VIII AND IX

CODE:

N.T.(-) Conducted as test for clairvoyance. (No Telepathy).

W.T.(+) Subject informed that this is a telepathy test.

W.T.(-) Subject NOT informed that this is a telepathy test.

MAT (+) Subject has digital contact with test (arranging).

MAT (-) Subject has NO digital contact with test (calling).

A. HARRY STONE

TEST CONDITIONS	On Score Total	On Score Av.	On Hits P(X)
ARRANGING			
N.T.(-)MAT(+)Darkness - in cage	7/100	0.7	.79102
N.T.(-)MAT(+)light - in cage	4/50	0.8	.72574
W.T.(-)MAT(+)dark - in cage ord. unknown	4/50	0.8	.72574
W.T.(-)MAT(+)dark - in cage ord. known	3/50	0.6	.84849
W.T.(+)MAT+light in cage ord. known	27/50	5.4	4.591×10^{-12} or -log Q(X) 18.94746
CALLING			
W.T.(+)MAT (-) not in cage ord. known	9/50	1.8	.93821
W.T.(+)MAT (-) in cage - light ord. known	7/50	1.4	.75174
W.T.(+)MAT (-) S - in, I - out of cage	2/30	0.6	.92785
W.T.(+)MAT (-) S - out, I - in cage	6/50	1.2	.59870

TABLE 24 B

B. ELINOR BOND

TEST CONDITIONS		On Score Total	On Score Av.	On Hits P(X)
ARRANGING				
N.T.(-)MAT(+)darkness - in cage		8/100	0.8	.72574
N.T.(-)MAT(+)light - in cage		2/50	0.4	.92785
W.T.(-)MAT(+)darkness - in cage. ord. unknown		2/50	0.4	.92785
W.T.(-)MAT(+)light - cage ord. known		2/50	0.4	.92785
W.T.(+)MAT(+)light, in cage. ord. known		28/50	5.6	8.170×10^{-13} or -log Q(X) 18.94746
CALLING				
W.T.(+)MAT(-)	not in cage ord. known	7/50	1.4	.75174
W.T.(+)MAT(-)	in cage - light ord. known	10/50	2.0	.97614
W.T.(+)MAT(-)	S - in, I - out of cage	6/50	1.2	.59870
W.T.(+)MAT(-)	S - out, I - in cage	7/50	1.4	.75174

4.74 When the experiments were conducted outside of the cage as an arranging test following the procedure of the CONTROL test for telepathy the following scores were obtained:

Stone/Puharich. Total ON hits 12/50 P = .00343

χ = 2.84 P = .00226

Bond/Puharich. Total ON hits 11/50 P = .00824

χ = 2.41 P = .00778

The scores are significant for telepathy in an ordinary room when the arranging technique is used. As previously found with other subjects there is a significant increase in the test scores obtained inside the GROUND FC as compared to ordinary room conditions.

CHAPTER 5

PROJECT X. EXPLORATION OF THE RELATION BETWEEN THE INVESTIGATOR AND THE SUBJECT, AND BETWEEN THE INVESTIGATOR/SUBJECT WITH RESPECT TO THE CAGE IN TESTS FOR TELEPATHY

5.1 It was desirable to find out if any material pathway between the investigator and the subject would augment or inhibit telepathic interaction as reflected in ESP-test scores.

5.11 In Proj. XA it was found that a copper wire connection between the ankles of the subject and the investigator (as the only variation from the Control Level Test) was associated with chance-expectation scoring. Table 25.

5.12 Therefore, a non-conductor of electricity, nylon thread was used as a connection in Project XB. The scores were above chance and significant for telepathy, but below the control level. Table 26.

5.13 The next experiment was to place a copper band on the head of the subject and investigator, and connecting these by a nylon thread. This was associated with a chance-expectation score comparable to that found for the copper wire connection, as seen in Project XC. Table 27.

5.14 In Project XD the subject and the investigator maintained direct skin contact throughout the test by approximating their bare feet. This too resulted in scores below the control level, but significant for telepathy. Table 28.

5.15 In Project XE it was found that if either the subject or investigator were connected to ground by a copper wire that scores below significance for telepathy resulted. Table 29.

5.2 Thus chance-expectation scoring was associated with the subject/investigator connected by a copper wire either together or to ground, or with placing a copper band on their heads connected by a nylon

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
X	X	- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich**
				S - **Stone**
	3/50	3/50	7/50	Total Hits
	0.6	0.6	1.4	Av. Hits per run
	.14037	.14037	.10444	Probability
X =	-1.03			Significance - P = .15151
				I - **Puharich**
				S - **Bond**
	10/50	3/50	3/50	Total Hits
	2.0	0.61	0.61	Av. Hits per run
	.01813	.14037	.14037	Probability
X =	1.98			Significance - P = .02386
				I - **Jackson**
				S - **Bond**
	6/50	4/50	2/50	Total Hits
	1.2	0.8	0.4	Av. Hits per run
	.14622	.17546	.08422	Probability
X =	.25			Significance - P = .40130

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 25
PROJECT XA
Exp. No. 1 - 5

RELATION BETWEEN
I & S.
Connected by Copper
Wire.

4 Aug. 55
29 Aug. 55
14 Sept. 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
X	X	- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Jackson**
				S - **Stone**
	22/50	2/50	3/50	Total Hits
	4.4	0.4	0.6	Av. Hits per run
	.00000001	.08422	.14037	Probability
X =	7.1			Significance - P = -log Q(X) = 11.89285
				I - **Jackson**
				S - **Bond**
	14/50	3/50	6/50	Total Hits
	2.8	0.6	1.2	Av. Hits per run
	.00047	.14037	.14622	Probability
X =	3.70			Significance - P = .00011
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 26
PROJECT XB
Exp. No. 1, 2

RELATION BETWEEN
I & S.
Connected by nylon.

2 Sept. 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X	X	- Contact with MAT
		- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
X	X	- S & I connected by nylon thread from CU headband.

TSD	ON	POST	PRE	SCORE
				I - Puharich
				S - Stone
	9/50	1/50	2/50	Total Hits
	1.8	0.2	0.4	Av. Hits per run
	.03626	.03368	.08422	Probability
X =	1.54			Significance - P = .06179
				I - Puharich
				S - Bond
	7/50	4/50	4/50	Total Hits
	1.4	0.8	0.8	Av. Hits per run
	.10444	.17546	.17546	Probability
X =	.68			Significance - P = .24826
				I - Jackson
				S - Stone
	9/50	2/50	4/50	Total Hits
	1.8	0.4	0.8	Av. Hits per run
	.03626	.08422	.17546	Probability
X =	1.54			Significance - P = .06179

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 27
PROJECT XC
Exp. No. 1 - 3

RELATION BETWEEN I & S.
Copper Headband connected with nylon.

7-9 Sept. 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
X	X	- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Jackson**
				S - **Stone**
	14/40	2/40	9/40	Total Hits
	3.5	0.5	2.25	Av. Hits per run
	.00005	.14652	.01323	Probability
				Significance - P = .00005
				I - **Puharich**
				S - **Stone**
	13/50	6/50	3/50	Total Hits
	2.6	1.2	0.6	Av. Hits per run
	.00132	.14622	.14037	Probability
X =	3.27			Significance - P = .00054
				I - **Puharich**
				S - **Bond**
20/50	5/50	5/50	4/50	Total Hits
4.0	1.0	1.0	0.8	Av. Hits per run
.0000002	.17546	.17546	.17546	Probability
X =	6.28			Significance - P = -log Q(X) = 9.00586

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 28
PROJECT XD
Exp. No. 1 - 3

RELATION BETWEEN
I & S.
Connected by direct
skin contact.

12-14 Sept. 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
	V2	PHYSICAL CONDITIONS - S Grounded
V1		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich - V1**
				S - **Stone**
	4/50	6/50	1/50	Total Hits
	0.8	1.2	0.2	Av. Hits per run
	.17546	.14622	.03368	Probability
X =	-.60			Significance - P = .27426
				I - **Puharich**
				S - **Bond** - V2
	9/50	2/50	4/50	Total Hits
	1.8	0.4	0.8	Av. Hits per run
	.03626	.08422	.17546	Probability
X =	1.54			Significance - P = .06179
				I -
				S -
				Total Hits
				Av. Hits per run
				Probability
				Significance - P =
				Combined Scores
				Total Hits
				Av. Hits per run
				Probability
				Significance
				P =

TABLE 29
PROJECT XE
Exp. No. V1, V2

RELATION BETWEEN
I & S and CAGE.
Connected to Ground.

14 Sept. 55

thread. Since a direct connection between the two personnel by a nylon thread was associated with scoring significant for telepathy although below the CLT score, it may be assumed that the chance-expectation scores were in some unknown way related to the use of the copper on the skin, or by its connections. In order to determine if the conditions cited were indeed to be implicated causally in this effect an analysis of variance was done separating the components of conditions, personnel, and error.

The analysis given in Table 30A was carried out according to the same grouping as shown in Table 30B. In Table 30A the observed scores were analyzed directly. This revealed significance at less than 1 % level with both the F test and z test. However, such strong support for a hypothesis that implicates the conditions as causally related to the scoring must be accepted with all reserve. Because the observed scores do indeed show a distribution that is based on the Poisson, it was necessary to check the analysis of variance computation by the use of a correction factor.

5.21 It has been stated that in the Poisson distribution the variance and the mean are equal. If tests of significance by use of t, z, or F are to be applied, it may be desirable to transform such variates into new sets having the mean and variance independent. To meet such situations suitable transformations have been devised.

If the counts run 50 or more per plot, they may be analyzed usually without change. Counts of less than 50 per plot are likely to be distributed in the Poisson fashion. The appropriate transformation is the square root of the count.

In experiments where 10 or less are counted in the plots, the square root tends to over correct, but $x+0.5$ may be used, x being the observed number.

TABLE 30A

ANALYSIS OF VARIANCE - ACTUAL SCORE VALUE

PROJ. XA - XD

VARIATES	D.f.	SUM SQUARES	MEAN SQ.	F
Conditions	4	4233.25 - 3406.05 827.20	206.80	$\frac{206.80}{26.20} = 7.89^{**}$ Req. F 1 % 5.95 5 % 3.49
Personnel	3	3445.40 - 3406.05 39.35	13.12	
ERROR	12	4587.00 - 3406.05 1180.95 - 866.55 314.40	26.20	
Conditions z test	Nat log $\frac{206.80}{26.20} = 2.06978$ $z = \frac{2.06978}{2} = 1.03489$ z at 1 % = .8443 at 0.1 % = 1.1326			

The use of the square root transformation of the score in Table 30B as a correction factor lowers the significance of the role of the conditions from a level less than 1 % to a level which is estimated at less than 2 %. This result is significant enough to warrant further investigation of this finding.

However, all conclusions as to the role of environmental conditions must be weighed in the light of the following factors: The subject and investigator must have complete confidence in each other, i.e., the subject must feel that the investigator is not out to trick him; and

TABLE 30B PROJECTS XA - XD. RELATION BETWEEN SUBJECT AND INVESTIGATOR

USE OF TRANSFORMATION $\sqrt{\bar{x}}$

	CONTROL NO CONN.	HEAD BAND NYLON CONN.	COPPER WIRE CONN.	NYLON CONN.	SKIN CONTACT	$S_{\sqrt{}}$	Mean $_{\sqrt{}}$	$S^2_{\sqrt{}}$	$S_{\sqrt{}} \times M_{\sqrt{}}$
$\bar{x}$ Bond	28	7	10	9	5		3.26		
$\sqrt{}$ Puharich	5.29	2.64	3.16	3.00	2.23	16.32		59	53.2032
$\bar{x}$ Bond	21	16	6	14	10		3.57	67	
$\sqrt{}$ Jackson	4.58	4.00	2.44	3.74	3.16	17.92			63.9744
$\bar{x}$ Stone	27	9	6	4	13		3.24	59	
$\sqrt{}$ Puharich	5.19	3.00	2.44	2.00	3.60	16.23			52.5852
$\bar{x}$ Stone	25	9	3	22	17		3.70	76	68.9580
$\sqrt{}$ Jackson	5.00	3.00	1.73	4.69	4.12	18.54	13.77		238.3608
$S_{\sqrt{}}$	20.06	12.64	9.77	13.43	13.11	M = 69.01			
Means $_{\sqrt{}}$	5.01	3.16	2.44	3.34	3.27			$S^2 = \overline{261}$	
S^2 of $_{\sqrt{}}$	101	41	25	49	45	S^2-Mm = 22.92			Mm = 238.0845
									m = 3.44

COLS. $S(S_{\sqrt{}} M_{\sqrt{}}) = 252.0077$

ROWS $S(S_{\sqrt{}} M_{\sqrt{}}) = 238.3608$

TABLE 30C

ANALYSIS OF VARIANCE - SQUARE ROOT TRANSFORMATION OF SCORE

PROJECTS XA - XD. RELATION BETWEEN SUBJECT AND INVESTIGATOR

Source of Variation	d.f.	Sum Squares	Mean Square	F
Conditions	4	252.0077 -238.0845 13.9232	3.4808	$\frac{3.4808}{.7267} = 4.79^*$ F 1% 5.41 Req. F 5% 3.26
Personnel	3	238.3608 -238.0845 .2763	0.0921	
Error	12	22.9200 -14.1995 8.7205	0.7267	

$$\text{Nat log } \frac{3.4808}{.7267} = 1.57553$$

$$z = \frac{1.57553}{2} = .78776$$

z at 1% = .8443
at 5% = .5907

the investigator must arrange all conditions so that the thought of spurious results is wiped from his mind. When these conditions are met good performance can be expected in telepathy tests when conducted as cited for the Control Level Test. It is felt that these factors were satisfied during the course of the tests in Proj. XA - XE.

5.3 It is apparent that in bringing either the subject or the investigator to ground potential lowers scoring that is believed to be indicative of telepathic interaction or transmission. Therefore, it is in order in future tests to raise the electrical potential of the subject and the investigator above ground potential.

See. Proj. XIID, Sec. 8.2.

In the case of a material connection between the subject and the investigator an 'equipotential' effect was explored. A direct skin to skin contact between the subject and the investigator maintains the scores above chance level significant for telepathy. A connection by copper wire decreases the scoring to chance-expectation, and may eliminate telepathy. Hence, the net result of the latter is comparable to the condition of bringing the subject or investigator to ground potential. In other words, both skin contact and copper wire contact have the effect of bringing the subject and the investigator to an electrical equipotential state. The former supports telepathic interaction as reflected in scores, and the latter lowers it. Hence, we cannot look to electrical equipotential as a factor that favorably influences telepathic interaction in regard to the relation between the subject and the investigator.

This conclusion is further fortified by the results of connecting the subject and the investigator by a nylon thread. This material is a non-conductor of electricity. But the results show that it also

lowers the scoring below control level. It would appear that if the subject and investigator naturally maintain an individual capacitative potential that a nylon thread connection might bring such a difference in potential to an equipotential state eventually.

It was quite clear that future research must be directed to maintaining the electrical potential of the subject and the investigator with respect to ground at some high value (as yet to be determined). Furthermore, that it would be wise to explore the difference in electrical potential existing between the subject and the investigator.

But before such studies could be carried out we had to do some control experiments as follows:

1) A telepathy test using the MAT in which the subject and the investigator make contact with the wood floor of the GROUND Cage with their bare feet.

2) A telepathy test using the MAT in which the subject and the investigator and the table between them are insulated by glass from contact with the floor.

These relations between the personnel and the cage were studied in Proj. XF and XG.

5.4 In Project XF an additional component was added to the scoring procedure. First, it must be remembered that in the MAT the investigator watches every move of the subject's hands as he seeks to find the correct matching block. It had often been noticed that the subject would pick up the block next to the correct target block. This can be called a target selection displacement (TSD) of one, and must be considered a positional effect. If the subject places a target block one position ahead of the correct position in the matching row this can be called a pre-positional displacement (PRE). Very often this is a time displacement in that the investigator is now concentrating on

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
X	X	- S & I bare feet on Floor
		- S & I contact bare feet on Floor
		- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - Jackson S - Bond
8/100	14/100	7/100	8/100	Total Hits
0.8	1.4	0.7	0.8	Av. Hits per run
	.05207			Probability
				Significance - P =
				I - Jackson S - Stone
1/40	28/40	1/40	1/40	Total Hits
0.25	7.0	0.25	0.0	Av. Hits per run
	$.4027 \times 10^{-15}$			Probability
				Significance - P =
				I - Narodny S - Stone
17/100	7/100	14/100	13/100	Total Hits
.01276	.09007			Av. Hits per run
				Probability
				Significance - P =

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 31
PROJECT XF
Exp. No. 1-3

RELATION BETWEEN
S & I and CAGE.
Bare feet on Floor.

16-17 Sept. 55

S	I	CONDITIONS
X	X	CAGE - Ground
		- No Light
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
X	X	- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - Puharich) 17 Sept. '55 S - Stone) 7 Oct. '55
25/100	21/100	12/100	10/100	Total Hits
2.5	2.1	1.2	1.0	Av. Hits per run
.00002	.00088			Probability
				Significance - P =
				I - Jackson) 1 Oct. '55 S - Stone) 5 Oct. '55
2/100	70/100	9/100	3/100	Total Hits
0.2	7.0	0.9	0.3	Av. Hits per run
	2.27×10^{-35}			Probability
				Significance - P =
				I - Narodny) 14, 17 Oct. '55 S - Stone)
18/100	34/100	7/100	5/100	Total Hits
1.8	3.4	0.7	0.5	Av. Hits per run
	1.53×10^{-8}			Probability
				Significance - P =

Combined Scores	TABLE 32
Total Hits	PROJECT XG
Av. Hits per run	Exp. No. 1-9
Probability	
Significance	RELATION BETWEEN
P =	I & S and CAGE.
	Insulated by Glass.

the contemporaneously correct target block, and because of the position of the subject's hands on the matching row he very often cannot see which picture is coming up next in the matching row. If the subject places a target block one position after the correct position in the matching row this is called a post-positional displacement, (PosT). See p. 70B

It had been observed casually that the subject often made a significant number of TSD hits while his ON target score may have been at a chance level. Hence, in the following tests it was decided to tabulate all such positional displacements as target selection displacements.

5.5 The conditions of Project XF yielded different scores as between the two subjects. Jackson and Bond obtained a score below significance for telepathy, while Jackson and Stone achieved a score significant for telepathy, and in fact, a score that exceeded the control level scores. Unfortunately, this striking difference could not be explored further in the case of Miss Bond because her contract with the Round Table ended at this time, and other committments made it necessary for her to return to New York.

A third investigator, Mr. Narodny, worked with Mr. Stone, and again low scores were obtained with the "bare feet on the floor" condition. In 100 trials this team got an average score of 0.7 hits per run of ten which is chance. (P = .09). Yet the TSD score of 1.70 hits per run of ten was significant for telepathy. (P = .012). This ruled out the question that telepathy was not possible with this team. In order to definitely rule out this latter possibility a control-type test (with rubber shoes) was run by Narodny/Stone who achieved in 150 trials an average score of 5.6 hits per run of ten. This showed a level of scoring comparable to that achieved by Jackson/Stone, and

Puharich/Stone. Project XF posed a knotty problem which was to come up again.

5.6 Project XG again yielded a paradoxical result in the scoring of Jackson/Stone when compared to Puharich/Stone and Narodny/Stone. The latter teams achieved scores significant for telepathy but below the control level, while the former team achieved scores significantly above the control level. These results could not be explained at this time, but made it mandatory to check any crucial experiment independently with all three investigators (senders). The problem posed is summarized as follows:

Proj. XF Bare feet on Cage Floor

Team	On Score	P	Decrease with:	Increase with:
Jackson/Bond	14/100	P = .05	Bond	
Jackson/Stone	28/40	$P = 4.02 \times 10^{-14}$		Jackson
Narodny/Stone	7/100	P = .09	Narodny	

Proj. XG Glass Insulation from Cage Floor

Puharich/Stone	21/100	P = .0008	Puharich	
Jackson/Stone	70/100	$P = 2.27 \times 10^{-35}$		Jackson
Narodny/Stone	34/100	$P = 1.53 \times 10^{-8}$	Narodny	

Jackson's control level score was exceeded significantly when his bare feet contacted the wood floor, and when his bare feet were placed on four inch glass blocks above the wood floor. In the case of Narodny and Puharich, the same two physical conditions were associated with scores significantly below their control level test scores. In comparing the role of the physical conditions and the personnel it is clear that the increase in scoring noted is primarily due to the agency of Jackson.

It must be remembered that in both physical conditions the inside

of the Faraday Cage copper floor is lined with one inch thick plywood. Hence, whether Jackson's feet were on the floor, or on glass blocks, he was in both cases in an inductive capacitative coupling with the GROUND Faraday Cage. Such a coupling apparently was favorable in his case to achieving significant increases in ESP-test scores. The same inductive capacitative coupling had the opposite effect on the ESP-test scores of Narodny and Puharich.

In order to decide whether this physical condition was indeed responsible for the differences noted, Puharich and Narodny should do a test in which they are brought into an inductive capacitative coupling with a high potential D-C source. Jackson should do the same test, and in addition do a test in which he is in inductive capacitative coupling with the ground side of the high potential D-C source.

5.7 Certain conclusions seem to emerge. One, is that the best telepathic team found to date is that of Harry Stone/Henry Jackson.

Two, is that the basic control test (Project VIIIE) yields the best results, and presumably the best conditions found so far for telepathy.

But Project VIIIE leaves some problems to be settled. The primary one is that the wood table as a contact mechanism between the subject and the investigator needs to be evaluated. This can best be done by a test in which the investigator does not touch the table. (This problem was settled in Project XII when it was found that whether the investigator touched or did not touch the table had no effect on the scoring.)

Three, is that the use of the glass blocks on the floor in relation to touching the table must be evaluated. Hence, the second test calls for glass blocks on the floor and investigator not touching the table. (This problem was settled in Project XII when these con-

ditions proved to have no effect on the scoring).

We are now ready to go ahead with a study of the electrical states existing between the subject and the investigator with respect to ground. This made it imperative that both the subject and investigator and all objects in the cage be separated from the cage by glass insulators, even though this condition had been found to be associated with scores below the control level, but significant for telepathy.

CHAPTER 6

FARADAY CAGE ELECTRICAL TECHNOLOGY IN RELATION TO PHYSIOLOGICAL, PSYCHOLOGICAL AND PARAPSYCHOLOGICAL EFFECTS OBSERVED IN HUMANS

6.1 TREATED FARADAY CAGE ELECTRICAL TECHNOLOGY

6.11 Cage construction.

The original idea that prompted this research was to shield a human subject as completely as possible from electrostatic fields by the use of a Faraday Cage. In the course of building better and better Faraday Cages, it was discovered according to the evidence presented in this paper, that a special arrangement of Faraday Cages had an unsuspected property, namely that of increasing significantly ESP-test scores, and presumably also extra-sensory cognition. Therefore, much study was devoted to various combinations of Faraday Cages and their construction.

Experiments have been performed with combinations respectively 1, 2, 3, 4, 5, 6, and 7 Faraday Cages nested one within the other. This particular series of cages was constructed of copper screen wire, the largest being twelve feet per side. The details of these experiments are much too elaborate for presentation in a report of this kind, and therefore only certain positive findings will be presented.

No clear evidence could be found to prove that the use of more than two nested cages resulted in any greater increase in ESP-test scores. Therefore, we will limit our remarks to the dual-nested Faraday Cage. We have already reported on the construction and main effects of a single copper screen Cage A. The prime structural problem offered by Cage A is the method of leading a ground wire from the outside through its walls to Cage B without bringing in at the same time the electrical field on Cage A. Studies have shown that when a

single rubber covered copper wire is pushed through the screening from earth to Cage B, this will allow a field from Cage A to be induced upon Cage B. This can be readily detected with a simple test instrument such as a permanent magnet coil speaker. Our studies have also shown that when such an induced field is present between Cages A & B there is no increase in ESP-test scores when compared to room controls.

In order to eliminate this undesirable state it was found that if a long coaxial lead was soldered to Cage A and the insulated ground wire led through it inside of Cage A that the field induced on Cage B is attenuated to the point where it is no longer detectable.

We have had no reliable experience with the use of a solid airtight Faraday Cage used as the A cage. The only exception was the use of the Circuit Ia Three Cage (see Fig. 6) combination where a test was made of a STANDARD wiring using the solid copper cage as the A cage. The statistical results found were on a par with those for the STANDARD cage. We did not pursue this arrangement because several subjects reported an 'oppressive' and 'exhausting' atmosphere inside.

Experience leads us to believe that Cage B when made of sheet copper and as airtight as possible is the most superior construction. Its chief advantage is the elimination of the undesirable "gasping" effect reported by certain subjects in the open screen cage. In addition it offers a distraction-free environment to the subject. Its chief disadvantage is its limited air supply when sealed. We refrained from using oxygen inside because of the danger of explosion due to the presence of electrical equipment.

6.12 Cage Charging and Fields.

In spite of the amount of research expended in this laboratory on the study of optimum electrical fields surrounding the cage we have come to no final conclusion as to the optimum frequency, amplitude,

wave form and other characteristics to be used. We adopted the 640 cycle frequency in Projects IV - VII because it served us well. As the evidence has shown (see Tables 9 and 10) it offers no more ESP-test score increase than does the GROUND wiring. Yet curiously enough all the frequencies tested from 4 c/s., to 49.8 megacycles/s., yield lower ESP-test scores than the GROUND circuit. Calculation has revealed that 640 cycles is a natural resonant frequency of the cage with its given power supply.

Because the effect of any electrical field on the cage must be measured by the actual ESP-test scores of the human subject, one is severely handicapped by the very instability of such a feedback instrument.

Since the rationale of electrical charging of the cage was unknown, Projects VIII - X were carried out using the simple GROUND circuit. This gave us an opportunity to evaluate the simple factors associated with ESP-testing before focussing on the electrical problem.

6.13 Cage Grounding.

It took us a long time to appreciate the role of grounding Cage B. It was first suspected to be an important part of the circuitry in Project II where it was observed that the subject went on making calls of electric charges on the cage in a regular three minute cycle when there was no known charge on the cage, and this continued as long as the cage was grounded. Such a response to 'targets' was eliminated by disconnecting the ground wire thus leaving the cage 'floating'.

This problem was studied in yet another way. A claim has been made that the significant scoring in Project IV, Group 5 achieved by Mrs. Garrett was due in part to the use of the Treated Faraday Cage. It was decided to repeat a comparable series of experiments with Mrs. Garrett in which certain aspects of the Treated Cage circuit were to be

isolated for study. An accidental use of the negative side of the oscillator for the lead to ground from Cage B was instituted thus eliminating the Cage B to earth connection as illustrated in Fig. 5. This accident was not discovered until Experiments 1 - 4 had been run. It was then decided to leave this wiring intact during the rest of the experimental run in order to see what effect it would have on the scoring. The results are presented below.

6.14 PROJECT V. November 24 - 28, 1952

Subject: Mrs. Eileen J. Garrett

The overall experimental design was the same as Project IV with the exception of the following changes: a) For the Cosmic Ray Trigger Target there was substituted a binary target system wherein the subject had to make a decision as to whether an electrical target was contemporaneously on or off. This was done by building a turn-table that had a forty-minute long spiral groove on its face in which an electrical wiper contact rode. Every three minutes apart on the groove there was selected from a Random Table of Numbers before each experiment the sequence of the on or off contact points. Thus, every three minutes the subject was asked to decide whether the target was on or off in Laboratory 2 from her position in Laboratory 1. Since someone knew the sequence of targets before the experiment started the factor of precognitive telepathy was necessarily included in the experimental design. b) The Faraday Cage was charged by the circuit II arrangement as in Fig. 4. This made the change in ground connection described above which was not present in Project IV, Group 5. In other words, Cage B was not grounded to earth. c) The Treated Cage in which the subject sat was charged with a field that had a three minute period sinusoidal surge of 10 to 50 volts amplitude. The following table summarizes the statistical findings in Project V.

Table 33 PROJECT V

EXPERIMENT Number	Possible = n_i	Correctly Called = x_i
5	10	6
6	10	6
7	10	2
8	11	2
9	10	5
10	7	6
11	11	8
12	11	5
13	11	8
14	11	5
15	11	7
16	11	3
17	10	3

$134 = n_i = n.\ 66 = x_i = x$

$p = 0.50$

$= p \times n$

EXP. $= .50 \times 134$ Actual Score = 66

$= 67$

It was concluded that the chance score was due to the change in circuitry in the Treated Faraday Cage. This charged Faraday Cage was neither STANDARD nor GROUND, because Cage B was not grounded to earth as in Fig. 5. This conclusion has been substantiated by other experiments. For example, it is to be noted that VINOD 1 and 2 circuits do not have a Cage B ground connection to earth, and the scores achieved by the subjects with these circuits were on a par with those under outside room conditions. It is to be noted, Sec. 3.2, 3.3, that the two circuits which consistently favor significant increases in scoring are GROUND and STANDARD. These two circuits have in common only the Cage B ground connection to earth.

Another clue to the effect of grounding Cage B was found in some preliminary dowsing experiments done with Mrs. Garrett. When she sat in a Standard Treated Faraday Cage with an apple dowsing-fork in her hands, she would show strong involuntary muscular movements with either no charge and GROUND circuit, or STANDARD charged. When the Cage B ground connection was interrupted no involuntary dowsing movements were elicited from the subject. This withdrawal of the phenomenon was artificially brought on in yet another fashion. A wire electrode-paste connection was made to the ankle of Mrs. Garrett which was interrupted by a silent foot switch at its point of entrance into Cage B and continuing out to connect with the Cage B earth ground connection. This arrangement made it possible to short-circuit Mrs. Garrett to ground, or when the switch was open leave the cages with a GROUND or STANDARD circuit. With either of the latter circuits in operation the usual involuntary muscular and fork movements occurred. Curiously enough, the often-times violent muscular contortions of Mrs. Garrett and the dowsing fork could be stopped instantaneously by simply pressing the switch and short-circuiting her to ground. This was one of the methods used to eliminate the grounding of Cage B because it eliminated the electrical shielding effect of Cage B. In view of these several cross-checks on the Cage B ground phenomenon we are reasonably certain that it plays a vital role in creating a neuromuscular tension effect, and may be associated with significant increases in ESP-test scores.

6.2 PHYSIOLOGICAL AND PSYCHOLOGICAL REACTIONS TO THE CAGE TECHNOLOGY

6.21 The Phenomenon of Reaction Cycles.

Fig. 19 on page 120 is the result of a careful plot of the total calls made by Mrs. Garrett in Project JV. Each single experiment was analysed on a comparative basis with the others by using the opening phrase of the subject "It is I, Uvani" as the zero point on the X- or

time axis of Fig. 19. The distribution of the calls along the time axis is seen to be not too closely correlated to the target distribution over the same time axis. Furthermore, since these calls were taken from the work in both the treated and untreated FCT experiments it is unlikely that the call distribution was much affected by the Treated Faraday Cage technique.

It is to be noted that there is an absolutely refractory period for calls between 0 and 2 minutes. There is present a relative refractory period for calls between the 8th and 10th minutes. It was suspected that this peculiar distribution of calls was due to an endogenous factor in the subject. The first hint that we had for an endogenous origin of the refractory periods was found in a report[1] of electroencephalograph experiments done on Mrs. Garrett by C. C. Evans and Edward Osborn on September 20 - 21, 1951. They reported a distinct E.E.G. change in the subject that corresponded exactly in time to our relative refractory period. The synchronicity of the two findings was correlated by extrapolating their time axis to the one we used above, namely using the phrase "It is I, Uvani" as the zero or starting time. Their finding for the 8th to 10th minute period can best be described by quoting their words from page 595:

> "The change was characterized by a fairly sudden increase of amplitude, of about 100%, although the voltage was low throughout all the records, and by the appearance of 5 - 6 c/s. activity, which was the most prominent in the parietal area."

As far as we could detect during these two refractory periods there was no discernable change in the speech, acuity or attentiveness

1. Evans, C.C., and Edward Osborn, An Experiment in the Electroencephalography of Mediumistic Trance. JOURNAL OF THE SOCIETY FOR PSYCHICAL RESEARCH Vol. XXXVI, March-April 1952.

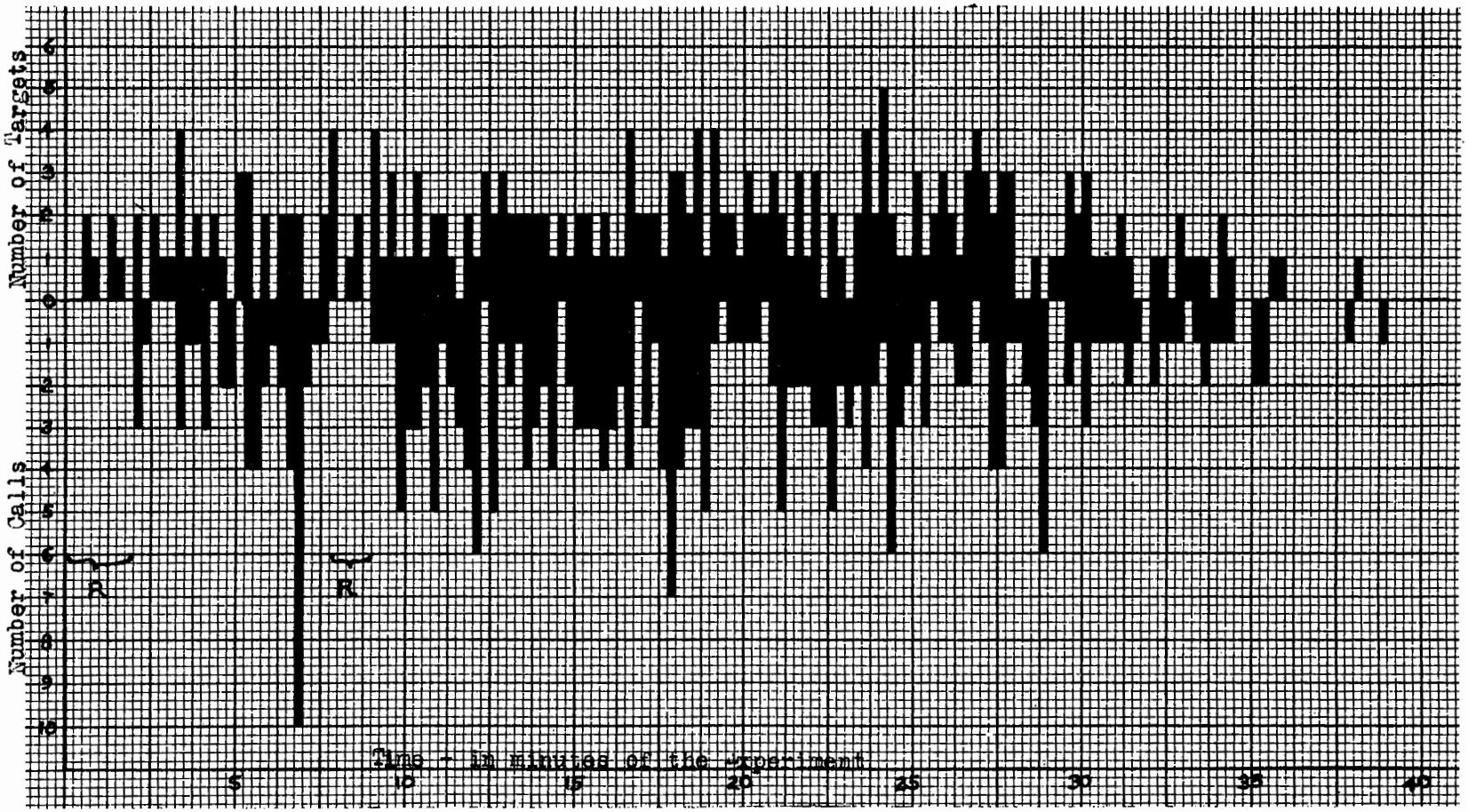


Fig. 4. Distribution of Targets (~~Blue~~), and of Calls (~~Red~~) along the time axis of the experiments in Project IV. Graph shows two refractory periods for target calls.

of the subject. It was rationalized that these two periods represented a fluctuation of a level of awareness that precluded extra-sensory cognition. It seemed desirable therefore to attempt to study the human reaction to selective charging of the cage at the nodal points of the refractory periods, and at the peaks of the call periods. Hence, the following cage-charging cycles were abstracted from the call cycling of Fig. 19.

Table 34
(Given as mid-points)

REFRACTORY PERIODS	CALL PERIODS	DEPRESSANT PERIODS
1'00"		
2'52"	2'15"	2'03"
5'07"	4'07"	
8'37"	6'22"	6'12"
12'22"	11'00"	11'00"
14'37"	13'30"	
16'52"	15'45"	15'15"
20'00"	18'00"	18'32"
24'07"	22'30"	21'50"
27'00"	25'30"	25'00"
29'15"	28'07"	28'05"

6.22 Tension Reaction to Charging Cycles

The subject was placed in a cage that was basically the STANDARD Treated Faraday Cage with certain circuit changes made in each group of experiments as indicated in the outline below. He was asked to call out any and all physiological or psychological changes noted in himself. The basic problem was to find out the range of such reactions that could be found in different subjects under different conditions.

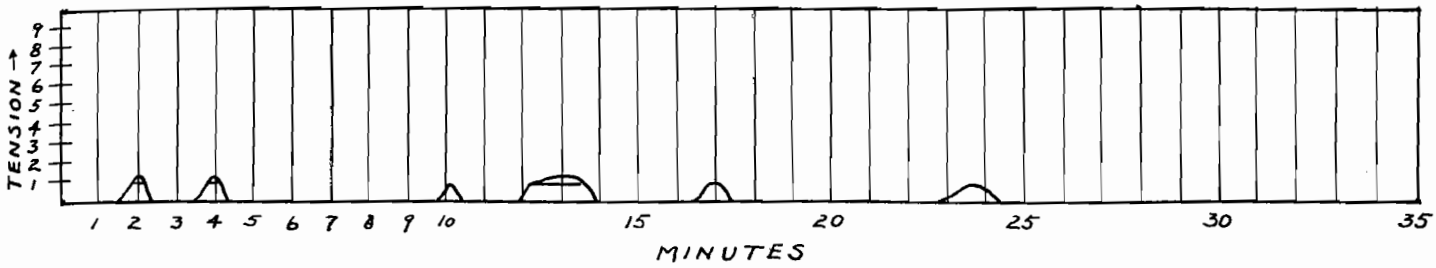
The cages were charged by one of the cycles cited above (Table 34) (the subject was not allowed to know which one was being used) and the precise time of a call by the subject recorded on the same time axis as the charging cycles. In studying the reactions to charging the cage by such cycles it was found that certain normal subjects (non-sensitives) reported that they were aware of muscular tensions, headaches, drowsiness, alertness, blurring of the vision and sweating reactions inside of the STANDARD Cage. These reactions were interpreted as being in general tension-type reactions. These were not unlike those reported by Mrs. Garrett in Projects I and II in the single screen Cage A. Therefore, a study was made of four subjects who reported that they experienced such symptoms in the cage.

The degree of tension that the subject felt was called out by numbers. For example, the minimally detectable onset of a "tension" was designated by the number 1. As the tension increased the subject added a number to denote a notable increase in intensity. Nine was the highest number used and denoted severe pain. This, of course, is a highly subjective index of tension. However, it did serve a useful purpose and gave us an idea as to the relative effects of different cycles. The door of Cage B was not sealed air-tight in these studies.

The results are summarized in a graph for each type of charging cycle used, and represents an admittedly crude composite of the dozen or so experiments that were carried out for each cycle. The sensitivity of the different subjects varied considerably for the same situation, but in general they all showed the same type of reaction. The peaks on the graph represent tension reactions referable to various organs and sensations as illustrated on the arbitrary scale of nine points. It must be stated that many of the tensions reported could easily be ignored by the subject if his attention were distracted from his introspection.

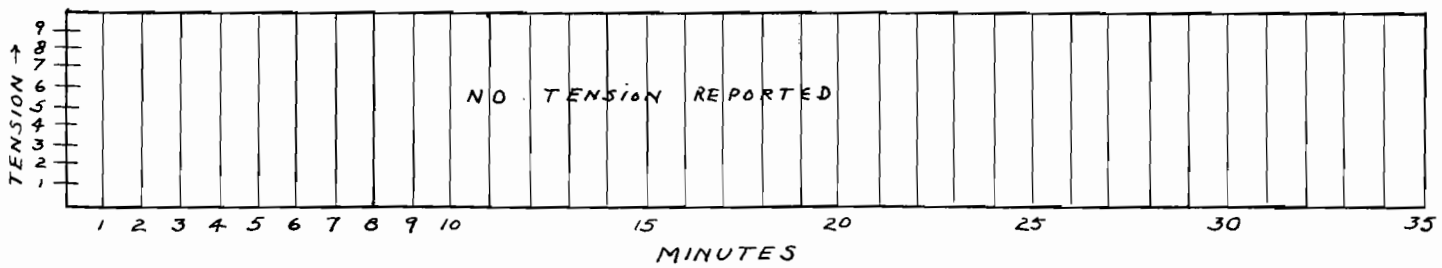
On the other hand many of the tension reactions, particularly headaches, would last for hours after the experiment was over.

6.30 Out of Cage. Subject lying in bed.



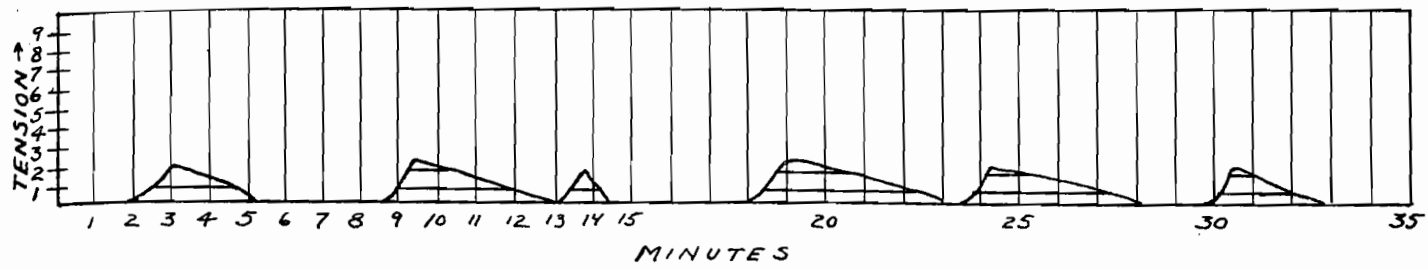
This was used as a control experiment for subsequent studies. It was found that almost any subject lying comfortably in bed, and whose attention is directed toward observing his somatic state, becomes aware of all sorts of internal noises and tensions. The above graph represents the approximate cycle of tensions reported by four subjects in a dozen observations. These tensions are very much like the fleeting pains normally observed in connection with viscera, bones, muscles and joints, and are referable to all parts of the body.

6.31 In Cage. No GROUND, No charge. Cage floating.



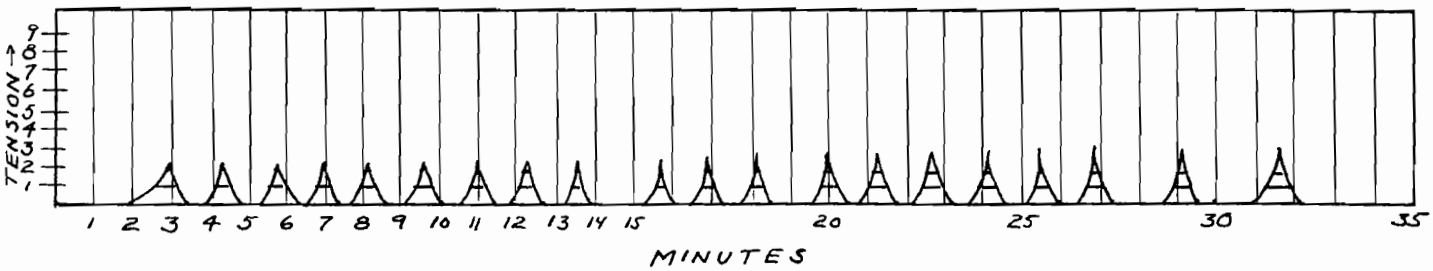
These observations were carried out in the darkness. It was quite surprising to find that the ordinary tensions observed under the conditions of 6.30 were no longer present. There was no explanation for this effect at this time, but see Proj. XIID. P. 161

6.32 In Cage. GROUND only. No charge.



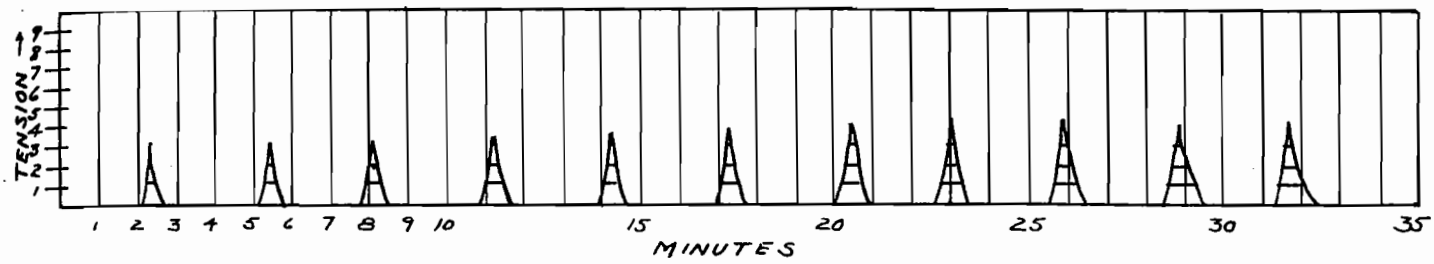
By the simple connection of Cage B to earth, it was found that the mild tensions observed in 6.30 were again present and essentially of the same type, but magnified in intensity and duration.

6.33 In Cage. GROUND. STANDARD. Power supply On, but not connected to Cage.

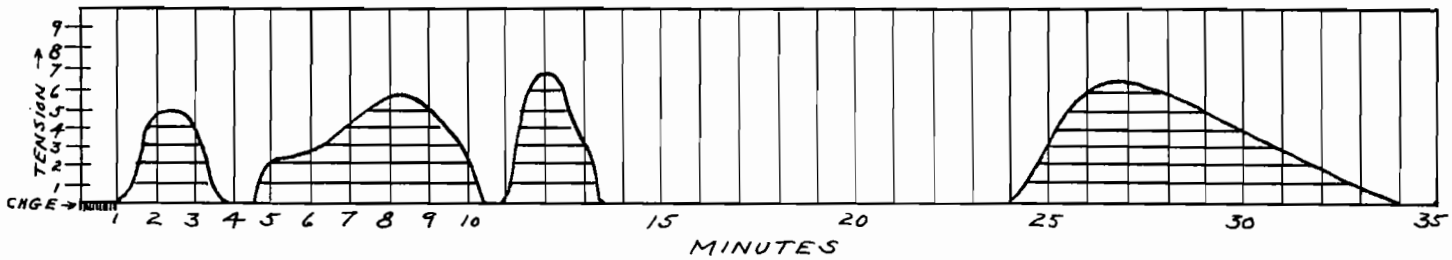


There is present essentially a capacitative coupling of the power supply to the Cage. The rhythmic occurrence of tension that had sharp peaks of intensity, and a rapid fall to zero in a cycle of approximately one per minute and a half was remarkable. The tensions reported were very mild and could easily be ignored by some extra-version of attention.

6.34 In Cage. Same conditions as 6.33, but the subject is the sensitive, Mrs. Garrett.



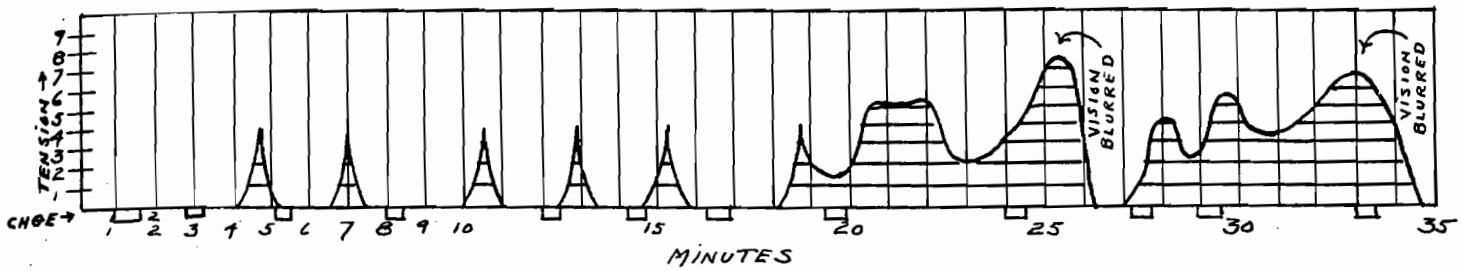
Mrs. Garrett showed the same type of response to the electrical conditions of 6.33 as normal subjects. However, she was much more sensitive in her response, and showed a different time cycle of reaction similar to the three-minute cycling of calls noted earlier.



6.35 In Cage. GROUND. STANDARD. Only one charge placed on Cage during the first minute.

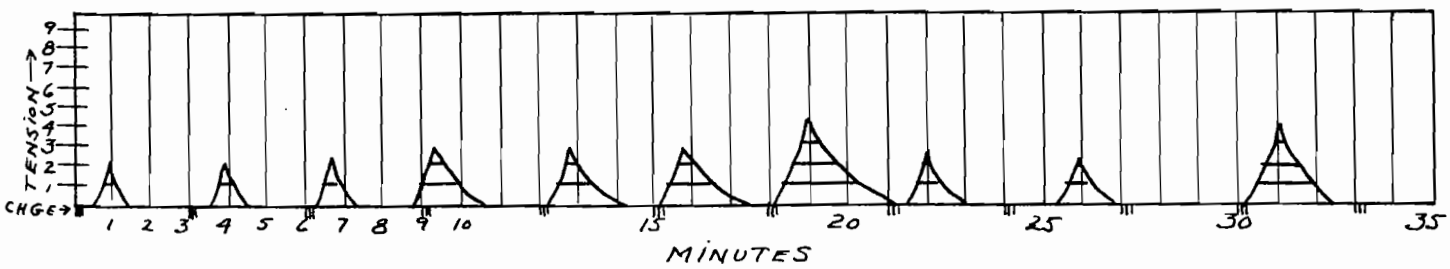
When the Cage was directly charged with electricity, as indicated, the effects observed in 6.30, 6.32 and 6.33 were magnified as to intensity and duration. Some of the subjects reported tensions reaching the level of a pain sensation.

6.36 In Cage. GROUND. STANDARD. Refractory period cycle.



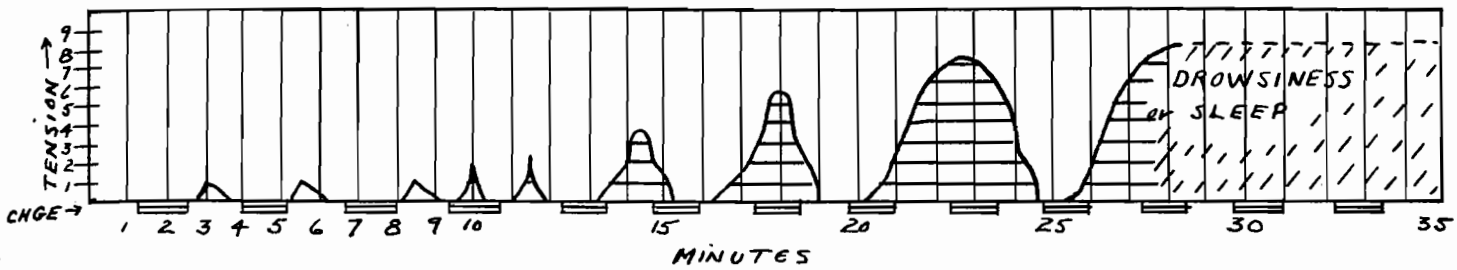
The most remarkable effect of this cycle of electrical charging was on vision. All subjects when exposed to this charging cycle for 20 or more minutes complained of tension in the eyes and visual blurring. Whether these conditions affected the extraocular, or intraocular muscles was not determined with precision, but it is believed that the extraocular muscles were under tension, and showed imbalance temporarily.

6.37 In Cage. GROUND. STANDARD. One 10" pulse on Cage every three minutes.



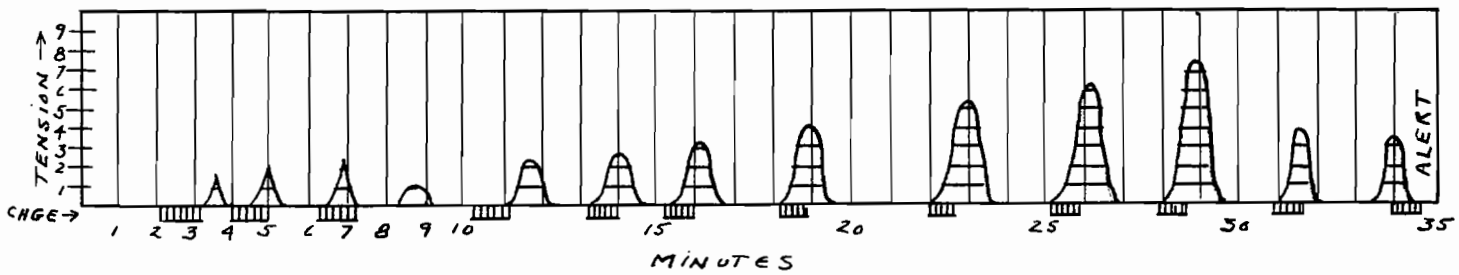
This reaction is essentially a magnification of the intensity of tension already observed in 6.33 and 6.34, visual effects were not reported.

6.38 In Cage. GROUND. STANDARD. Alternation of electric charge on Cage - 1'20" On, and 1'20" Off.



The interesting effect of a staircase increase in the intensity of the periodic tension rising to painful levels, especially in the head, is noteworthy because it usually climaxed in a sense of drowsiness or sleep.

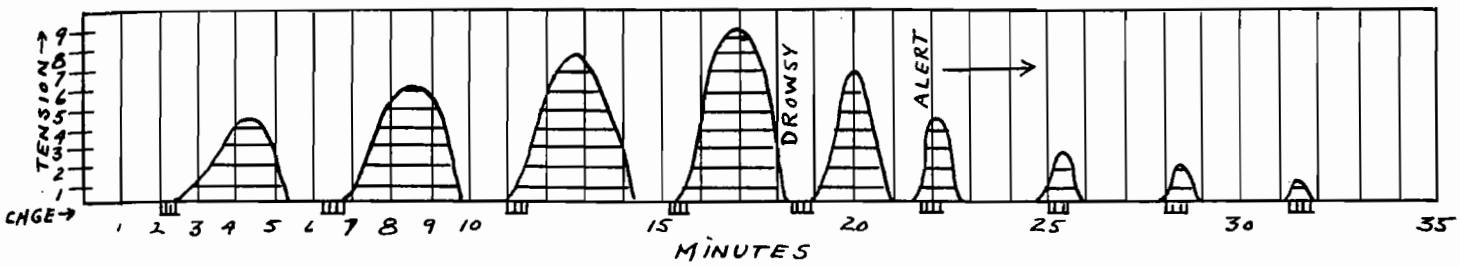
6.39A In Cage. GROUND. STANDARD. Call period cycle. 10" Pulses for approximately 40 seconds.



The end point of this tension cycle was the reverse of that observed in 6.38 in that alertness and wakefulness were reported.

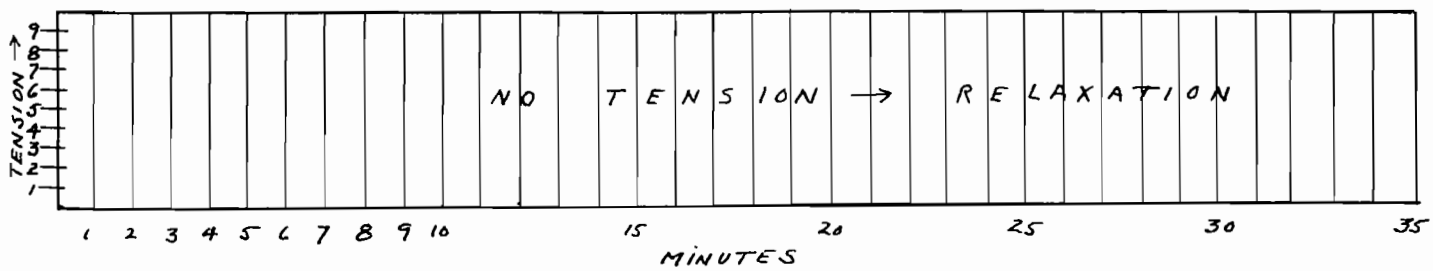
6.39B In Cage. GROUND. STANDARD. Depressant cycle.

10 second pulses for approximately 30 seconds.



With this cycling of electrical charge the effects of 6.38, 6.39A were combined in that the massive cyclical tension resulted in drowsiness at the peak of tension, but curiously enough was resolved by a refractoriness for tension resulting in alertness after twenty minutes.

6.39C Subject in Cage B. No charge. Subject grounded to earth.



The absence of tension is similar to that observed in 6.31 with the important difference that a subjective sense of deep relaxation is superimposed.

No significant correlation was found between the time of Cage charge pulse and the calls in these experiments using non-sensitive subjects.

While these effects were inexplicable at the time, it was evident that the various electrical charging cycles used all produced a periodic sense of tension often at the level of pain. The ground arrangement, 6.32, showed a minimal tendency to induce periodic tension, and the tension appeared to stay on a low plateau most of the time.

It was reasoned that if ESP-test score increases occurred in a GROUND cage that the causative factor might be related to a subtle tension-inducing mechanism that mimicked the somatic and psychic states accompanying intensity of interest.

It was found in Project XE that if either the subject or the investigator were connected to ground while in Cage B that the telepathic ESP-test scores dropped to chance-expectation. Thus, there was a polar relationship between the subject being connected directly to ground, and a subject being completely insulated from a connection to ground by being in a well-grounded Faraday Cage with respect to ESP-test scores.

6.4 Use of the modified STANDARD Treated Faraday Cage to Induce Relaxation in Human Subjects.

It was concluded from the foregoing observations that the STANDARD Cage when used with Cage B grounded to earth, charged or uncharged, is essentially a tension-inducing apparatus. Tension induction is not obtained when Cage B is not grounded and both cages are floating.

It had been noticed in artificial "dowsing" experiments that with the STANDARD wiring, charged, or uncharged, there was produced in the subject involuntary muscular movements that caused a dowsing-fork to be turned. The fork movement was active and prolonged at times, but it

was shown that such action could immediately be stopped by grounding the subject to earth. When the subject was continuously grounded there was induced a state of positive relaxation. It was assumed that this procedure (grounding of the subject) broke the tension-induction phenomenon. Therefore an experiment was devised in order to find out if the basic tension-induction of the STANDARD cage could not be converted into a positive relaxation-induction. The plan was to place a subject in the STANDARD charged cage, and then to lead the same electrical field that was on Cage A into Cage B and place this field on the subject while he was grounded to earth. The results of this experiment showed that not only was there a complete absence of tension, but that a positive state of subjective relaxation was induced in the subject, and that at the same time there was measurable a small degree of fall of blood pressure in the subject.

6.41 The following procedure was used in carrying out this group of experiments:

I. Method of determining blood pressure.

   a. Cuff applied one inch above elbow.

   b. First systolic reading taken from pulse.

   c. Second systolic reading taken from brachial artery.

   d. Reading taken from the same arm in each subject.

II. Pulse reading taken for full minute count.

III. Position of subject.

   a. First reading - taken after lying down for 5 min.

   b. Second reading - taken after two min. hopping.

   c. Third reading - taken lying down after hopping.

IV. Control Test.

   a. Blood pressure taken four times according to section III over a period of four hours on the day preceding test.

b. On the day preceding the test the subject is to have blood pressure taken after lying down and resting for twenty-eight minutes.

V. Test.

a. One reading taken lying down just before test.

b. Relaxation procedure carried out in cage for 28 min.

c. One reading taken at the end of test while subject still lying down.

d. One reading taken the day following test.

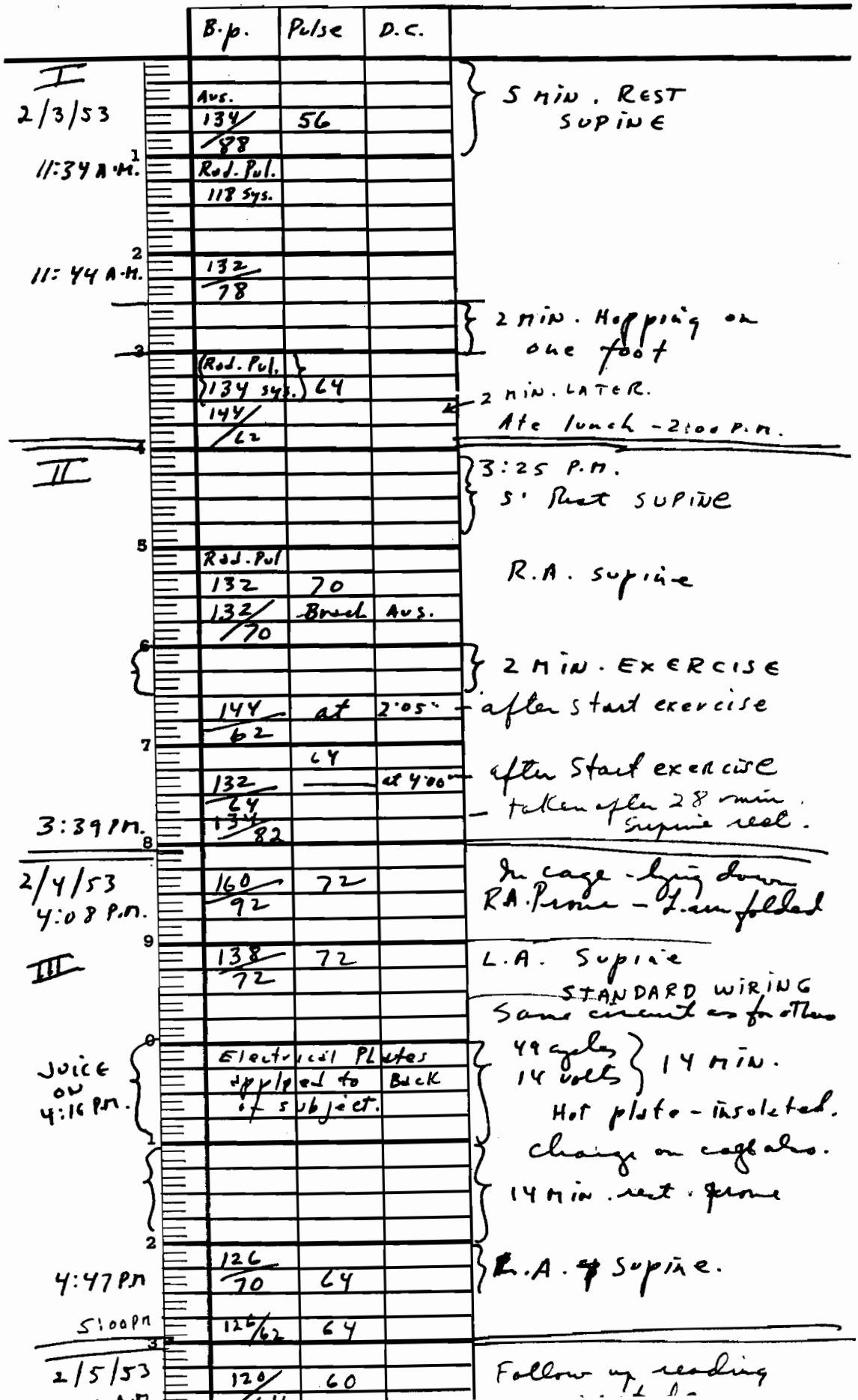
Figure 20 is a facsimile copy of a fairly typical experiment carried out under the conditions described. The blood pressure fall is not remarkable but it was a consistent phenomenon in all of the subjects studied none of whom had any hypertensive vascular disease. It was noticed in subjects who had essential hypertension that there was no fall in blood pressure under the conditions of this experiment. No claim is made that this method is of any medical value in a hypertensive or nervous individual.

6.5 The correlation of these many fleeting and subtle physiological, psychological signs, symptoms, and statistics with electrical conditions presented a bewildering problem. From this complex were abstracted a few inferences that might be fruitfully applied to the experimental problem. It appeared that the "gasping reaction" and the involuntary muscular reactions of Mrs. Garrett in a charged screen Cage A might be due to the effects of charged ions. Hence, one phase of future experiments involved studying the effects respectively of a deficiency of charged ions, an excess of negative ions, and an excess of positive ions in the atmosphere surrounding the subject and the investigator.

All indications pointed to the conclusion that a state of relaxation in the subject was not conducive to statistically significant ESP-test

Fig. ~~III~~ 20

~~55~~


B.p.
Pulse
D.C.
I
2/3/53
11:34 A.M.
Aus.
134/88
56
Rad. Pul.
118 Sys.
11:44 A.M.
132/78
Rad. Pul.
134 Sys.
64
144/62
5 MIN. REST SUPINE
2 MIN. Hopping on one foot
2 MIN. LATER.
Ate lunch - 2:00 P.M.
II
3:25 P.M.
5' Rest SUPINE
Rad. Pul
132
70
132/70
Brach. Aus.
R.A. supine
2 MIN. EXERCISE
144/62
at 2:05
after start exercise
64
132/64
at 4:00
after start exercise
taken after 28 min. Supine rest.
3:39 P.M.
134/82
2/4/53
4:08 P.M.
160/92
72
In cage - lying down
R.A. Prone - L. on folded
III
138/72
72
L.A. Supine
STANDARD WIRING
Same current as for others
Juice on 4:16 P.M.
Electrical Plates applied to Back of subject.
49 cycles
14 volts
14 MIN.
Hot plate - insulated.
change on cage also.
14 MIN. rest. prone
4:47 P.M.
126/70
64
R.A. Supine.
5:00 P.M.
126/62
64
2/5/53
120/
60
Follow up reading

scoring. A state of relaxation was induced by a "floating cage", and by grounding the subject and neither of these conditions resulted in ESP-test scores significant for telepathy. Therefore, it appeared that these two electrical conditions were to be avoided in such tests.

Conversely, tension states could be induced in subjects both by the grounding of Cage B, and the charged Standard Treated Faraday Cage. These were correlated with increased ESP-test scoring significant for telepathy. Hence, it seemed desirable to retain at least the grounding of Cage B, and to work out the problem of electrical states anew.

It seemed desirable to elevate the electrical potential of the subject with respect to ground to some higher, but as yet unknown value. Furthermore, it appeared desirable to maintain a potential difference electrically between the subject and the investigator.

These were the considerations that formed the basis of the electrical technology applied in the next series of experiments.

6.6 FARADAY CAGE ELECTRICAL TECHNOLOGY THAT RESULTS IN A DEFICIENCY OF CHARGED IONS INSIDE OF CAGE B.

It appeared that all of the considerations cited in the foregoing (Sec. 6.5) could be met by the addition of one simple piece of electronic apparatus to the cage. This was a direct-current power supply. For the sake of economy there was obtained a used electrostatic dust sampler that had an 8 - 20 KV, D-C power supply. See diagram, Fig. 21. Only one change was necessary in the structure of Cage B in order to utilize this apparatus. This consisted of cutting an aperture in the copper and wood wall of Cage B in order to introduce the high tension negative electrode into the interior of the Cage. Into this aperture was placed the two-inch diameter collecting (positive-ground) electrode of the electrostatic precipitator. Thus the Cage B wall was maintained at ground potential - positive in accordance with

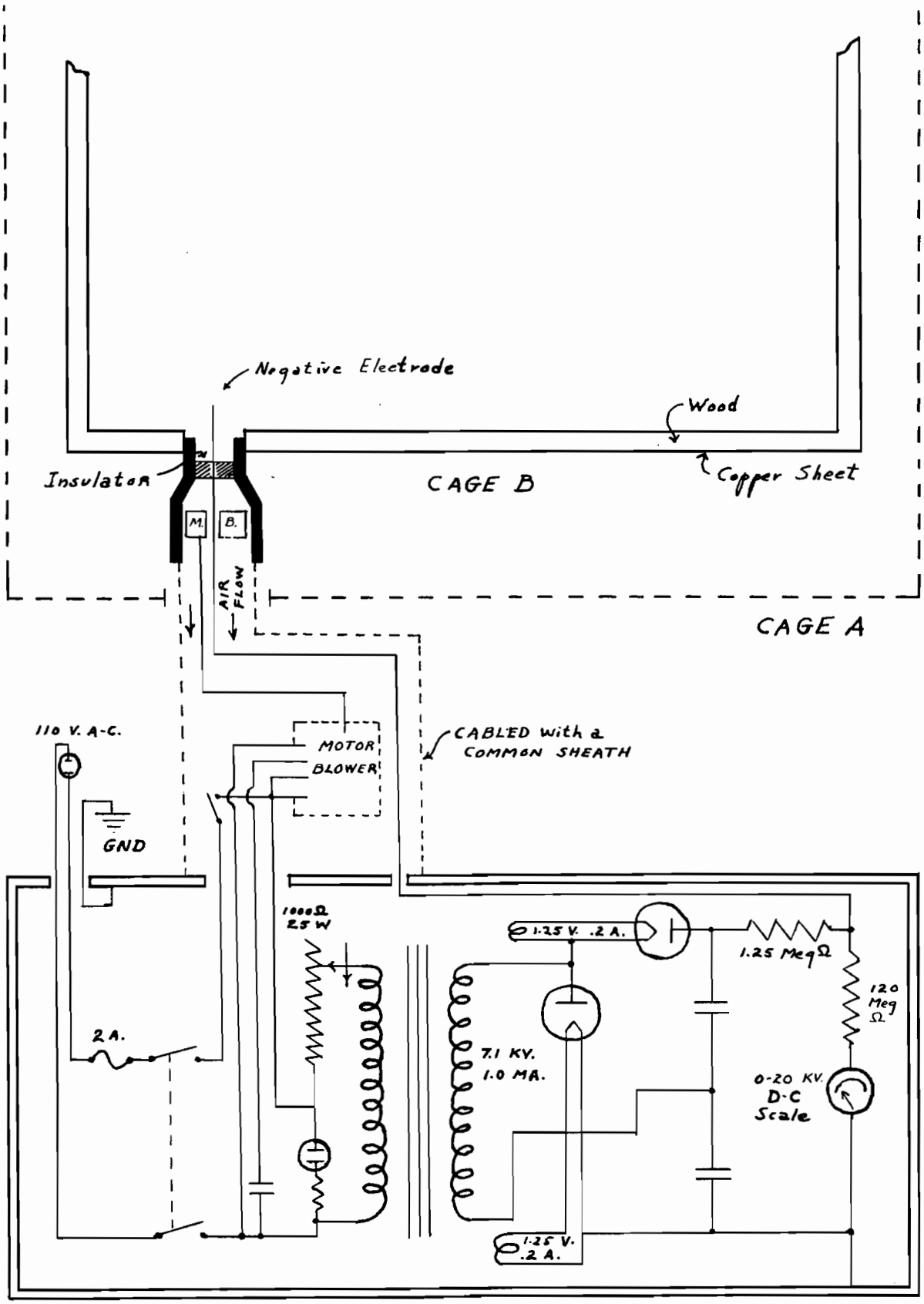


Fig. 21. Introduction of 8-20 KV. Negative D-C into Cage B.

the previous considerations. The inside of the cage could then be maintained at 8 - 20 KV negative D-C potential with respect to ground.

6.61 Project XI

Cutting an aperture through the wall of Cage B lowered the efficiency of this Faraday Cage as an electrostatic shield. It was necessary to establish what effect this would have on ESP-test scoring. A control experiment was done in which all the apparatus of Project XI was in place, but in which no current was used.

6.62 Experiment No. 1. CONTROL

In the control experiment for Project XI the team of Stone/Puharich did 50 trials of the MAT and achieved a score of 2.0 TSD hits average per run, and 2.4 ON hits average per run. This score was significant (P = .00226) for telepathy, but was well below the control level score for the intact GROUND Cage. This was the same score as was obtained by the same team for an arranging MAT done outside of the cage in a room, where in 50 trials there were 1.8 TSD hits average per run and 2.4 ON hits average per run. Thus the scoring in Project XI Control no longer reflected the ESP-test score increase effect of a GROUND cage. All the advantage gained by the use of a GROUND cage had been lost as the probability for the two experiments is the same P = .00226.

The electrical condition of Project XI, Exps. 2, 3 and 4, may be ascertained by reference to Figures 21 and 22, and can be briefly summarized:

a. Cage A was floating.

b. Cage B was positive and ground.

c. There was no potential maintained between Cages A and B.

d. An aperture of two inches diameter was made in the wall of Cage B. Into this opening was introduced the tubular positive-ground electrode of the electrostatic dust sampler. Although

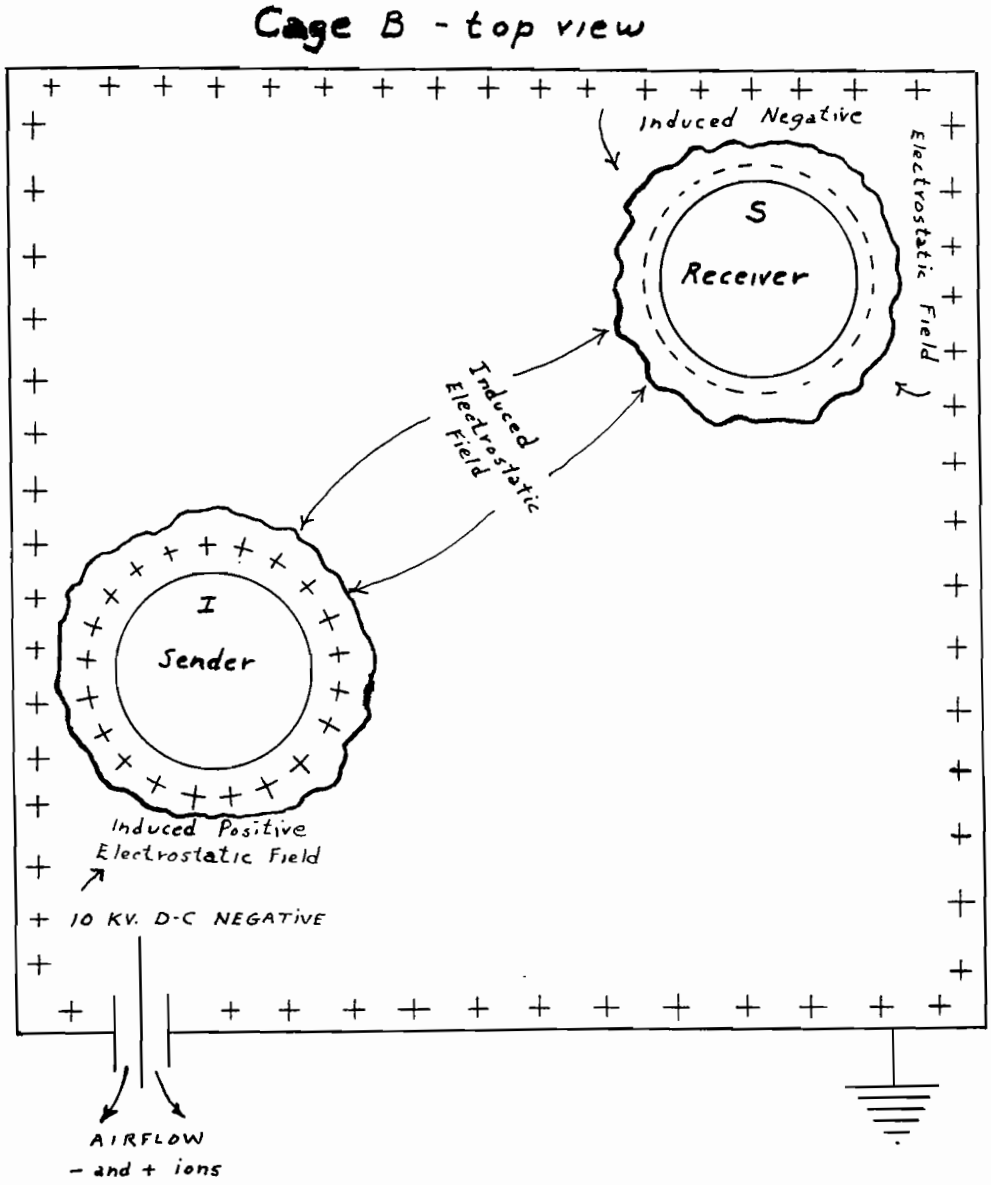


Fig. 22 Proj. XI - Charge and Field Distribution with a deficiency of charged ions and electrostatic distribution as shown there occurs.

Cough reflex, and muscle spasm:

a. E. S. GUN used as a Cottrell precipitator, i.e., the ground electrode encircles the negative electrode all of its length.
b. There is a deficiency of both ions.
c. Investigator is 'floating' electrically with respect to the 10 KV negative potential, and acts as a fluctuating parasitic capacitor, becoming positive at the upper part of his body by induction, and negative at his feet by induction.

S	I	CONDITIONS
X	X	CAGE - Ground - Positive 10.0 KV. D.C.
X	X	- No Light - Inside - 10.0 KV. D.C. Neg. Floating
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
X	X	TEST - Content Unknown
		- Content Known
	X	- Order Known
		- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- I Grounded
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
X	X	- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - Puharich
				S - Stone
8/50	3/50	7/50	6/50	Total Hits
1.6	0.6	1.4	1.2	Av. Hits per run
.06527	.14037	.10444	.14622	Probability
X =	-1.03			Significance - P = .15151
				I - Narodny
				S - Stone
1/50	2/50	6/50	4/50	Total Hits
0.2	0.4	1.2	0.8	Av. Hits per run
.00673	.08422	.14622	.17546	Probability
X =	-1.46			Significance - P = .07215
				I - Jackson
				S - Stone
9/50	9/50	4/50	10/50	Total Hits
1.8	1.8	0.8	2.0	Av. Hits per run
.03626	.03626	.17546	.01813	Probability
X =	1.54			Significance - P = .06179
				Combined Scores
18/150	14/150	17/150	20/150	Total Hits
1.2	0.93	1.13	1.33	Av. Hits per run
.0706	.1024	.0847	.0418	Probability
				Significance
				P =

TABLE 33
PROJECT XI
Exp. No. 2, 3 and 4

ELECTRICAL TECHNOLOGY
Charged Ion
Deficiency

6-7 Dec. 55

Figure 21 does not show it, the tubular electrode extended two inches inside of the wood wall of Cage B. See Figure 22.

e. The motor blower draws air at the rate of approximately three cubic feet per minute. This served to draw large charged ions out of Cage B.

f. The atmosphere inside of Cage B was maintained at 10 KV D-C negative potential with respect to the copper walls.

g. It is inferred that the above electrical conditions resulted in a deficiency of both negative and positive charged ions inside of Cage B.

6.63 Project XI. Test Experiments Nos. 2, 3 and 4. Results.

Project XI yielded a remarkable series of observations which answered many of the questions that had been raised by previous experiments. The critical electrical condition introduced into these experiments was a deficiency of both positive and negative charged ions in the atmosphere of the cage. The observations made during these experiments must be classified under a number of separate headings:

A. SUBJECTIVE EVALUATION OF THE ATMOSPHERE

Both the subject and the three investigators reported that the atmosphere felt cool, dry and pleasant.

B. PHYSIOLOGICAL EFFECTS

a. THE SUBJECT

1. In all these experiments the subject experienced an incontrollable spasm and flexor rigidity of the forearms and the hands. This was so severe and painful that it took about 20 minutes of massage after the experiment to relax the muscles.

2. In all these experiments the subject experienced a spasm of the facial musculature which gave him the

appearance of risus sardonicus. This spasm quickly disappeared after the experiment without massage.

3. In all three experiments the subject experienced a sense of pressure on the skull at the site of the anterior fontanelle, and a headache.

4. Throughout the experiments the subject exhibited an incontrollable dry, hacking cough reflex. Subjectively, he felt a severe dryness in the throat.

Note: In summing up this remarkable group of signs and symptoms it should be pointed out that Mrs. Garrett in Projects I and II in the screen Cage A (where there was no deficiency of oxygen) exhibited the same reactions listed above when the charge was momentarily flashed on the outside of the cage. Thus it was inferred that the identical physiological effects in the two sensitives were due to a deficiency of charged ions.

b. THE AGENT AND THE INVESTIGATOR.

1. Both experienced only the dryness of the throat and a mild cough. None of the muscular spasms of the subject, Harry Stone, were experienced.

C. PSYCHOLOGICAL EFFECTS.

a. SUBJECT

1. In all these experiments there was reported a mild form of "a sense of intoxication--as though drugged."

2. Prominent auditory hallucinations described as church bells, sleigh bells, vaguely heard music, etc.

b. THE AGENT AND THE INVESTIGATOR

1. Experienced the same type of auditory hallucinations as the subject, but milder in manifestation.

D. PARAPSYCHOLOGICAL EFFECTS.

a. The team of Puharich/Stone, and Narodny/Stone averaged 0.6 ON hits per run P = .15151, and 0.4 ON hits P = .07215, per run respectively, or a definite absence of significance for telepathy. These were as low scores as had been achieved to date and indicated that ESP-test significance had been eliminated completely.

b. The team of Jackson/Stone also did not achieve significance for telepathy but showed higher scores: 1.8 TSD; 1.8 ON; P = .06179. This result was important in that it again revealed a marginal difference in response to environmental conditions as between Jackson/Stone when compared to the other investigators as shown in Projects XF and XG. (Sec. 5.6).

Thus a noteworthy difference in sensitivity to the electrical conditions was demonstrated as between the sensitive, Harry Stone, and the investigators, Puharich, Narodny and Jackson. There was present even a marginal difference of sensitivity as between Jackson, and Puharich and Narodny, which was to become magnified in later experiments. It was apparent that all the personnel were subject to the same level of ion deficiency. But there was a difference in the electrostatic conditions obtaining for the subject as against the investigators. This is analyzed in ~~the next~~ Fig. (22).

The investigator sat two feet from the 10.0 KV negative electrode, and the upper part of his body became positive by induction. The subject, on the other hand in his position six feet away in the corner opposite to the negative electrode was made negative by induction from the positive walls, and in addition was to some extent made negative by induction from the investigator.

The problem posed was whether the extraordinary tension effect on the subject was due to electrostatic induction, or to the charged ion deficiency? It was decided to first evaluate the factor of ion deficiency in the next project, by the simple act of enriching the atmosphere with charged ions.

One must also consider that there may be several interdependent causative agencies involved in producing the tension response in a sensitive subject:

a) When a Faraday Cage is charged by a rapid make and break field there is a pulsating migration of charged ions from the atmosphere at the center to the walls and a loss of such ions into the earth.

b) When a tight Faraday Cage is charged on the outside walls by a rapid make and break field, there is a changing potential difference between the subject and the walls although no electric field exists between the two.

c) If a steady high potential D-C field exists inside of a Faraday Cage there is induced an electrostatic stress between the subject and the source. In this case there is an electric field whose direction is from the wall to the center.

CHAPTER 7

ENRICHMENT OF THE ATMOSPHERE INSIDE OF CAGE B WITH CHARGED IONS

7.1 PROJECT XII

There were two simple procedures used to enrich the atmosphere with charged ions that introduced the minimal possible change into the experimental conditions. One was to remove the positive concentric collector electrode from the electrostatic sampler. This minimized the surface area at which negative charged ions could be bound, and the negative electrode was left intact so that it would bind positive charges as before. In addition a copper screen was placed over the outside aperture of the electrostatic sampler so that only the positive charged ions would be expelled from the cage. The changes made are indicated in Fig. 24.?

A simple ion generator was introduced which consisted of a burning candle. This is a rich source of both positive and negative ions. When a 10 KV D-C potential is applied to the candle the positive ions are bound at the negative electrode around the candle, and the negative charges are repelled from the flame into the atmosphere. This arrangement decreased the number of free positive ions, and increased the number of negative ions. The net result is that the atmosphere is enriched with an excess of negative ions.

This change of ionic conditions eliminated the disagreeable physiological and psychological signs and symptoms (Sec. 6.63) observed in Project XI. Thus one could be reasonably sure that the tension effects were due to the deficiency of ions in Project XI.

7.11 PROJECT XII. CONDITIONS:

1. No potential across Cages A and B.
2. Cage A - floating.
3. Cage B - GRND. - positive.
4. Aperture in wall Cage B - open.
5. Air flow out of Cage B.
6. Atmosphere of inside Cage B - at 10 KV. D-C negative.
7. Ions in cage.
   a. Candle is ion source (both pos. and neg.)
   b. Candle negative at 10.0 KV, D-C.
   c. Positive ions bound by candle negative charge, repelled by cage walls and passed out of cage by positive screen. Therefore, deficiency of positive ions.
   d. Negative ions repelled by candle, and attracted to cage wall.

   Therefore, accumulation of negative ions in cage.

7.12 RESULTS - PROJECT XII.

The Jackson-Stone team got the same level of scoring as in Project XI indicating that telepathy was not present, since the scores were not statistically significant. See Table 34

The Puharich-Stone team achieved a chance-expectation score for ON hits, but showed significance (P = .002) in the score for TSD hits.

The Narodny-Stone team achieved a score of 3.4 TSD hits average per run, and 4.2 ON hits average per run which was significant for telepathy. This is an experiment in which the value of scoring TSD hits is strikingly illustrated. In summing up the TSD and ON hits one can assume that it was within the range of possibility to achieve a score of 7.6 ON hits average per run. As it proved later this was a

S	I	CONDITIONS
X	X	CAGE - Ground **Positive 10.0 KV. D.C.**
X	X	**Inside - Negative 10.0 KV. Floating**
X	X	- Light
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
		TEST - Content Unknown
X	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
		PHYSICAL CONDITIONS - S Grounded
		- **Excess Neg. ions in Cage.**
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
X	X	- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

TSD	ON	POST	PRE	SCORE
				I - **Puharich**
				S - **Stone**
12/50	1/50	5/50	1/50	
				Total Hits
2.4	0.2	1.0	0.2	Av. Hits per run
.00343				Probability
				Significance - P =
				I - **Narodny**) **Induction occurred.**
				S - **Stone**)
17/50	21/50	4/50	3/50	Total Hits
3.4	4.2	0.8	0.6	Av. Hits per run
	6.28×10^{-8}			Probability
				Significance - P =
				I - **Jackson**
				S - **Stone**
7/50	9/50	5/50	5/50	Total Hits
1.4	1.8	1.0	1.0	Av. Hits per run
	.03626			Probability
				Significance - P =

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 34
PROJECT XII
Exp. No. 1 - 3
8 - 9 Dec. 55

Electrical Technology
Ion Generator
Negative Ion Excess

permissible assumption. Such a possible score indicated for the first time that there might be inherent in this experiment a method of exceeding the control level of scoring of approximately 5 hits ON target per run.

Therefore, a minute analysis of this experiment was made in order to explain the discrepancies between the results of the three teams. During the experiment Mr. Narodny had an electrostatic voltmeter on the table between himself, and the MAT and the subject. The Candle Ion Generator was on an insulator close to his feet at the distance of six inches. During the test the voltmeter showed a positive drift of approximately 0.1 volt per minute. When Narodny touched the wood table with his hand on which was placed the voltmeter the needle would deflect more positive. This indicated that his hand was negatively charged and induced a positive charge on the wood table.

He then noticed that with his hand on the table, if he moved his knees apart or together, that there would be an immediate full scale deflection negative. This indicated that his hand, with knee movement, became positively charged and induced a negative charge on the table. He observed his knee movement and found that when he separated his knees that his woolen trousers touched the 10.0 KV negative electrode around the candle. Hence, his feet (and hands) became positive by induction from the candle electrode. Thus it appeared by observation that Narodny's body had become highly positive by induction, and his head may have been highly negative by induction.

Because the excess of negative ions eliminated the undesirable tension effects it was decided to further enrich the atmosphere with negative charged ions by introducing a charged copper screen around the candle in Project XII A. A number of steps were planned that

would clear up the inferences drawn regarding the induction effect observed by Narodny.

7.2 PROJECT XII A

This was a short experiment to test the effects of further enriching the atmosphere with negative charged ions. Puharich repeated exactly the same experiment as he had done in Project XII Exp. # 1. It was observed that the subject remained free of the undesirable effects of Project XI, and that the Puharich-Stone score was comparable to that achieved in Project XII. Hence, with the conclusion of this control experiment the question of the sign of the charge - (either direct charge, or induced charge) on the investigator was taken up.

7.21 PROJECT XII A. CONDITIONS:

1. No potential across Cages A and B.
2. Cage A - floating.
3. Cage B - GROUND - positive.
4. Aperture in wall of Cage B - open.
5. Air flow out of Cage B.
6. Atmosphere of inside Cage B at 12.5 KV. D-C neg.
7. Ions in cage.
   a. Candle is ion source (both pos. and neg.)
   b. Candle surrounded by 12.5 KV negative charged screen.
   c. Positive ions bound by candle screen neg. charge, and also passed out of cage by pos. screen over aperture. Therefore, deficiency positive ions.
   d. Negative ions repelled by candle, neg. screen into cage atmosphere. Therefore, accumulation of neg. ions.

7.3 PROJECT XII B

Project XII B was a telepathy test with Harry Stone using the MAT, and in which the test factor, was to place the investigator, Puharich, at 10,000 volts negative potential (D-C) with respect to Cage B and to the subject. It was noticed at the beginning of the experiment that the E. S. voltmeter deflected (when at the 20 setting) 0.05 volts positive per minute. These observations continued for ten minutes and the Volt Meter showed a steady positive drift. When the left hand of the investigator approached the detector-can of the voltmeter there was an immediate and full-scale negative deflection.

7.31 PROJECT XII B CONDITIONS:

1. No potential across Cages A and B.
2. Cage A - floating.
3. Cage B - GROUND - positive.
4. Aperture in Cage B wall - open.
5. Air flow out of Cage B.
6. Atmosphere inside of Cage B at 10 KV D-C neg.
7. Ions in cage.
   a. Candle is ion source (both pos. and neg.)
   b. Candle negative.
   c. Positive ions bound by candle negative charge, and also passed out of cage by positive screen.
      Therefore, deficiency of positive ions.
   d. Negative ions repelled by candle, and repelled by negative copper screen. Also such negative ions bound by positive screen at orifice.
      Therefore, accumulation of negative ions.
      Possibly an excess of negative ions.

8. Investigator at 10 KV negative potential with respect to cage.

7.32 RESULTS

In the first run with Harry Stone it was noticed that he worked quickly and was getting an unusually high number of target selection displacements although he made only two hits ON target. Thus it was felt that he had some telepathic orientation toward the experimental problem under the conditions cited.

With the second run he gained in accuracy and made four hits ON target. In the third run the investigator decided (for the first time) to point his finger (at a distance of about 2 feet) at the subject's hands when he reached the correct matching position. With the first time that finger-pointing technique was used the subject began to complain about getting "electrical" shocks in his fingers. The investigator assured him that there was no danger of getting any electrical shocks, and to continue the test. During this test it was observed that the subject would make selections (independent of the investigator's control) of the target block and place it in the position before the correct matching block. In other words, he was exercising pre-positional displacement even though the investigator had not in any way directed his attention telepathically to the next target. In fact, because of the position of the subject's hands it was impossible to see the matching block that was coming up next. In the third run the subject got only one correct hit ON target and made 6 correct pre-positional displacement hits. In a sixth run in which the conditions of run number 3 were repeated the subject got 5 correct pre-positional displacements.

Hence, it seemed to the investigator that the subject had an unusually good telepathic orientation toward the target that might, in

fact, indicate an uncoupling from the senders telepathic control, and it was decided to run the next test without any specific effort of concentration on the part of the investigator toward the target pictures, and not to use the finger-pointing technique. The investigator decided to be merely an attentive observer of the situation, and not try to make any special effort to influence the actions of the subject. In this run, number 4, and under the conditions cited, the subject made 3 target selection displacements and made 5 correct hits ON target. But he began to complain more about the unpleasant "electrical" sensation in his hands. It was indeed noticed that it was very disturbing to him and that in effect, it was giving him a neurosis about the "electricity". He was quite jittery and handled the blocks as though they were hot coals, and at one point he jumped away so quickly from the correct target that he spilled a number of blocks from the test, something which he had never done before.

Therefore, the experimental flow was discontinued and an effort was made by the investigator to calm the subject. The investigator asked the subject to place his hands, palms facing the investigator (with a blindfold over his eyes); and the subject was requested to tell the investigator the instant when finger-pointing was directed at his hands. In a number of such trials the subject correctly called the moment when the finger was pointed at him. In fact, every time the investigator's hand was pointed at him, he would withdraw his hands violently and complain that he had received an "electrical" shock. By this time it was noticed that the subject was extremely nervous and apprehensive, and it was decided to finish the last run. He performed this last run quickly, handling the blocks very gingerly, and often withdrawing his hand abruptly when he was over the correct matching block. In this test he got 4 correct target selection dis-

placement hits, but made only one correct ON target hit. It was quite apparent that the subject was too jittery to continue with the formal test and it was discontinued.

The subject was reassured that the experiments would be repeated tomorrow under the same conditions but with the lowest possible voltage so that he would not suffer the same trauma. After about a five-minute rest a run was casually attempted in which the investigator made no effort to influence the subject. It was again noted that he made an uncanny number of correct pre-positional displacements, 5 this time. The experiment was discontinued for the day.

There is no doubt that there was a synchronicity between the pointing of the investigator's finger at the subject, and the subject's withdrawal reaction. The question arises as to whether this is a sensitivity to an electrostatic field or whether it is a form of unknown biological interaction.

In order to test the first possibility, the investigator during the test, crossed his feet and clasped his hands together and sat still so that he could maintain a homogenous electrostatic field about him. In this condition he merely directed his concentration to the correct block that the subject was to pick up. The subject stated that he experienced the same "electrical" shock, under the conditions cited, as when a finger was pointed at him. Thus, it seemed that the effect could be induced as a function of the investigator's attention and concentration, as well as by a bodily movement.

One has to consider the hypothesis, namely, that with a sensitive subject there is present some type of electrical biological interaction. Now this interaction was coupled with the investigator's degree of concentration toward certain blocks of the MAT. Therefore, one could

speculate and assume that the electrostatic field may act as a carrier system for telepathic transmission. This hypothesis is fortified by the observation that as the subject became more nervous, and the investigator consequently became drawn into the mental sphere of the subject's apprehension, the subject would show almost continual electrical shock withdrawal reaction when he touched any of the blocks. It was obvious that the apprehension of the subject made him anticipate an "electrical" shock with every block that he touched. It is also apparent that the investigator was drawn unconsciously into this reaction cycle, and this could explain the repetitive shocks felt by the subject even though the investigator was not consciously directing his attention to any particular block.

It was quite evident that this phenomenon needed further experimentation. The first step to be taken is to reduce the electrical potential between the subject and the investigator in order to find a level at which telepathy will be maximal, and the sensation of "electrical" shock minimal.

When the investigator was connected to the 10 KV D-C negative terminal, and if he brought his hand within an eighth of an inch (approx.) of the wood wall of the cage - a weak, but audible and visible brush discharge occurred between the fingers and the wood wall.

7.4 PROJECT XII C

This experiment was a repetition of Project XII B with one change made. Since the subject complained about getting "electrical shocks," and this made him so nervous that he was ineffectual at concentrating on the test, it was decided to reduce the current on the investigator. This was done by introducing a 108 megohm resistor between the copper foot plate and the negative electrode inside the cage. The ion generator was left with the same voltage as in Project XII B. Thus the

S	I	CONDITIONS
X	X	CAGE - Ground **Positive at 12.5 KV. D.C.** (**Negative**
X	X	**Inside - Ion Generator at 12.5 KV. Neg.** (**ion**
X	X	- Light (**Excess**
X	X	PERSONNEL - In Cage
		- Out of Cage
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage
		- MAT Outside Cage
	X	PHYSICAL CONDITIONS - S **Floating electrically.**
X		- I **Direct Charge - Negative.**
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
X	X	- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

	TSD	ON	POST	PRE	SCORE
					I - **Puharich - Control (Floating)**
					S - **Stone**
A	12/50	4/50	5/50	2/50	Total Hits
Control	2.4	0.8	1.0	0.4	Av. Hits per run
	.00343				Probability
					Significance - P =
					I - **Puharich - Bare feet on 12.5 KV. Neg.**
					S - **Stone Terminal (Direct charge - Neg.)**
B	12/50	13/50	4/50	7/50	Total Hits
Test	2.4	2.6	0.8	1.4	Av. Hits per run
	.00343	.00132			Probability
					Significance - P =
					I - **Puharich - Bare feet on 12.5 Neg. Terminal**
					S - **Stone with resistance of 107.5 Meg.**
C	4/50	11/50	6/50	5/50	Total Hits
Test	0.8	2.2	1.2	1.0	Av. Hits per run
		.00824			Probability
					Significance - P =

Combined Scores
Total Hits
Av. Hits per run
Probability
Significance
P =

TABLE 35
PROJECT XII, A,B,C
Exp. No. 1 - 3
10 - 13 Dec. 55

Electrical Technology
Ion Generator
Negative Ion Excess
I - Hi-Potential - Negative

investigator still carried a direct negative charge on his body.

The scores achieved on this test were not in any way remarkable. The sense of getting "electrical shocks" still persisted with the subject.

In regard to Project XII B--~~Henry~~ STONE reported that, AFTER THE TEST he took a two-hour nap in the evening, and then woke up at 10:00 p.m. He could not sleep for the rest of the night and ~~had~~ been awake ever since; But YET he ~~feels~~ FELT fine and brisk. However, during his insomnia, he ~~says~~ REPORTED that he had a great deal of "clairvoyance."

During Project XII C, in the middle of the second run (After ~~HE~~ STONE had made 4 straight hits ON in a row), on the fifth block, the fingers of Puharich and Stone accidentally touched and a small spark ensued. This alarmed Stone but he went on with the test. But he said he "no longer felt sure" and that he had lost his "sensitivity." It apparently was true because he no longer felt the effect of Puharich's finger-pointing, and the ON hits for the last 3 runs were 1, 1, and 1, respectively.

In order to re-establish his sensitivity Stone left the cage. When he returned he did 2 more runs. His score was 4 and 2 hits. He felt his sensitivity had come back, and he showed it by his gingerly handling of the blocks, and his sharp response at times to finger-pointing.

The most important observation of this experiment was that momentary skin contact between the subject and the investigator destroyed the telepathic interaction that had apparently been built up. This was restored when the subject left the cage and then returned in a few minutes.

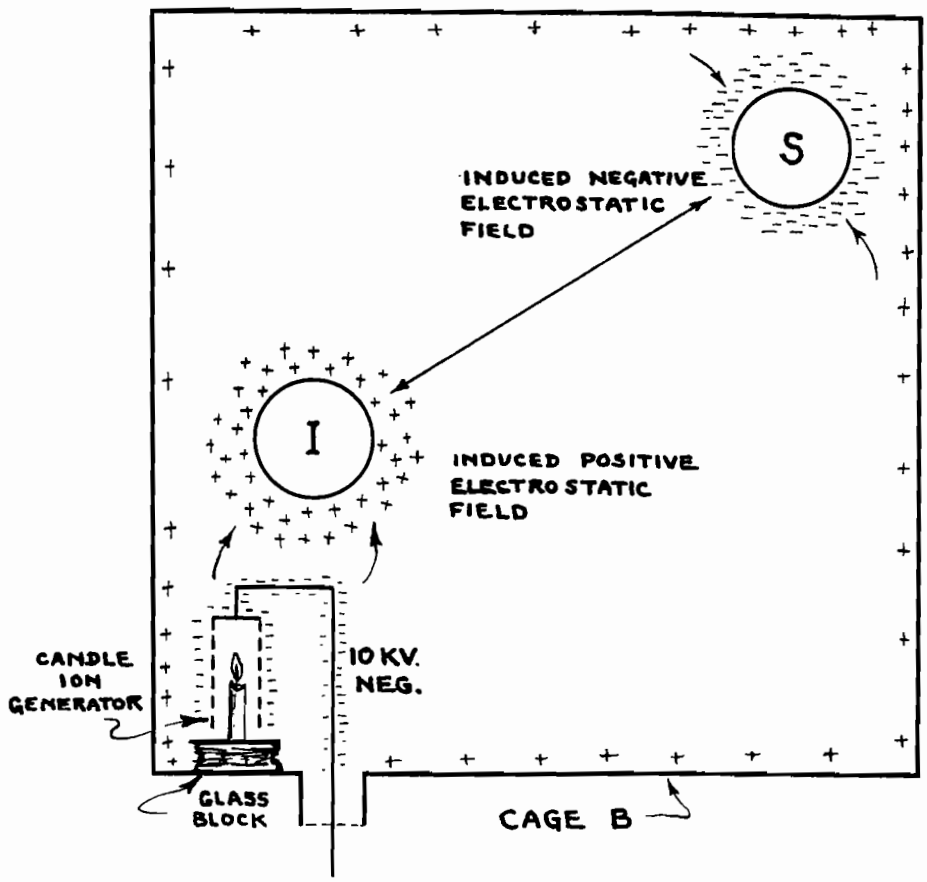
Therefore, in answer to the problem posed in the notes of Sept. 14, 1955, it becomes more evident that a field of D-C electrical

potential difference should be maintained between the subject and the investigator. The practical problem posed was how to maintain the "sensitivity" now shown by the subject toward the investigator, eliminate the sense of getting "electrical shocks", and achieve statistical significance above the control level in telepathic scoring.

The only feasible solution was to leave all the electrical apparatus exactly as in Project XII C, but to place the subject in a separate screen Cage C. It was hoped that this would eliminate the "electrical shock" factor by the screening effect of the Faraday Cage C.

FIG. 23

PROJECT XII - A ELECTROSTATIC FIELD

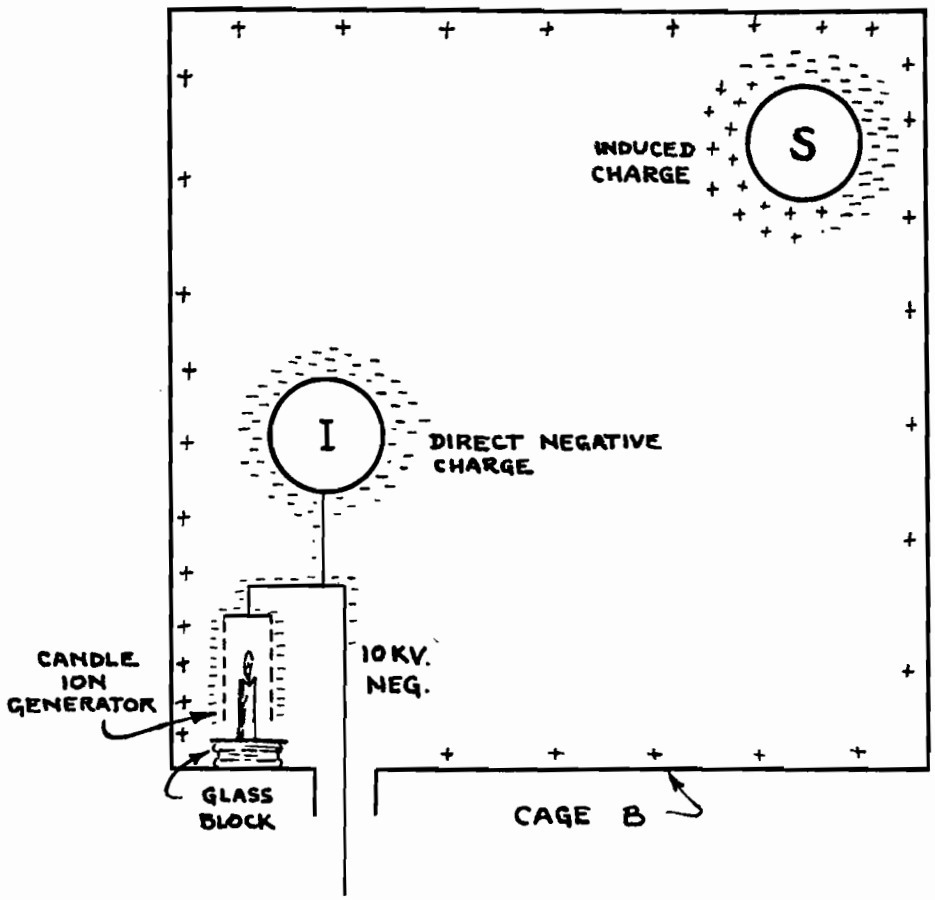


Cough reflex and muscle spasm eliminated with: (Proj. XII A)

A. Cutting short the ground electrode at cage B wall so that it does not act as a precipitator for negative ions.
B. Placing an ion source (candle) in Cage at a 10 KV neg. potential. This yields an excess of negative ions, and removes positive ions from cage.

FIG. 24

PROJECT XII - B ELECTROSTATIC FIELD



1. Subject receives strong sense of "<u>electrical shock</u>" with (Proj. XII B)
   a. Basic electrical conditions as in Proj. XII A.
   b. Investigator has feet on 10 KV negative potential electrode.
   c. Subject is "floating" electrically.
   d. No direct electrical contact between S & I.

2. <u>Loss of telepathic sensitivity</u> by the subject when he and the investigator are at high potential difference: (Proj. XII C)
   a. S & I accidentally touched each other, and a spark flew between them.
   b. When this happened the subject immediately lost his sensitivity to the telepathic "signal" of the sender.
   c. Telepathic sensitivity was restored when subject left Cage for a few minutes, and then re-entered the Cage. Hence, equipotential (electrically) between S & I does not augment telepathy.

CHAPTER 8

EFFECT OF PLACING A TELEPATHIC SENDER AT HIGH D-C POTENTIAL WITH RESPECT TO THE RECEIVER WHEN THE LATTER IS SHIELDED BY A FARADAY CAGE

8.1 Experiment No. 1 - Control - Project XII D

The following were the conditions of this experiment:

a. Subject and investigator in Cage B. Subject is inside of screen Cage C. Screen Cage C is floating inside of Cage B. The investigator sits between the wood wall of Cage B and the screen wall of Cage C. See Fig. 25.

b. In this arrangement all objects in both cages were placed on four-inch thick glass blocks. The feet of both the subject and the investigator also were on such glass blocks.

c. No charge on Cage B. Cage B is at ground potential. Ion generator is not used.

8.11 Results of Experiment No. 1

The average score per run for T.S.D. hits was 1.8 for 5 runs, and the average hits ON target was 1.2 per run. This was a chance score for hits ON target. Neither the subject nor the investigator had any noteworthy physiological or psychological reactions. The subject had no sense of surety in his performance.

8.2 Experiment No. 2 - Test. Project XII D.

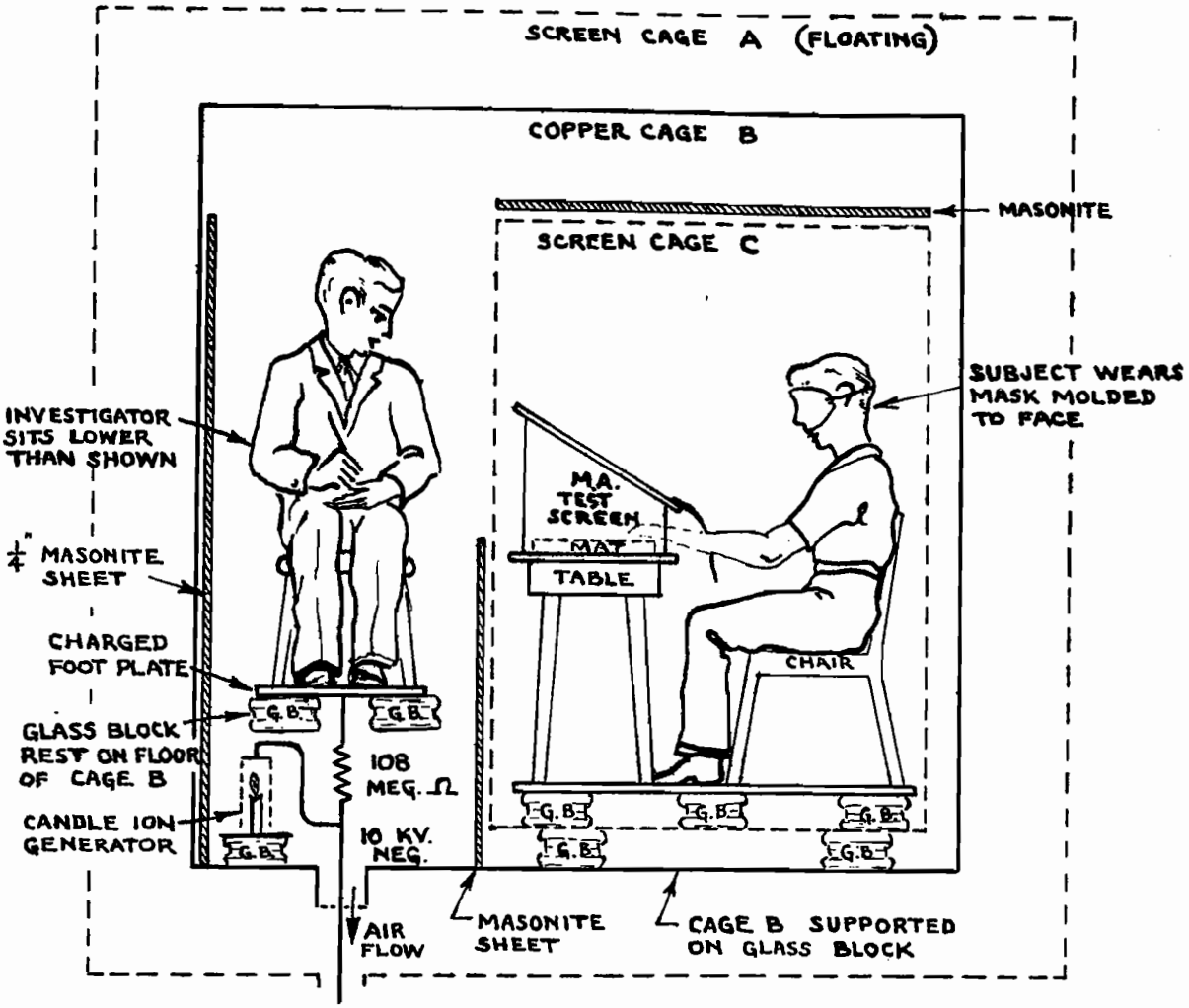
The conditions of the experiment were as follows:

a. The cage arrangements were exactly as in Project XII D, Control No. 1.

b. The main change in the experiment was that the 10 KV negative D-C potential was turned on, and the investigator placed his nylon-stockinged feet on a copper plate connected to the negative electrode

FIG. 25

PROJECT XII-D SIDE VIEW OF CAGE



PROJECT XII D - Physical conditions.

a. 10 KV D-C negative lead in Cage B.

b. Cage B ground and positive in 10 KV D-C circuit.

c. Candle ion generator at 10 KV neg. (neg. ions).

d. Investigator in contact with negative plate.

e. Subject in screen cage C - Cage and subject "floating."

f. MAT with subject in Cage C.

g. Cage C and Cage B insulated from each other by glass blocks.

h. Subject shielded from electrostatic interaction with Investigator by Cage C.

whose current was cut down by a resistance of 108 megohms. The ion generator was on and yielded an excess of negative charged ions.

c. The investigator made a great effort not to touch either Cage B wall or Cage C screen wall. Unfortunately he touched the screen wall of Cage C twice and received a strong electrical shock each time. However, the subject was so well insulated inside of Cage C that these two shocks were not transmitted to him.

8.21 Results of Experiment No. 2.

a. The total hits ON target were 41 out of 50. The average hits ON target per run was 8.2. (The experiment was cut off at 50 trials because the subject was involuntarily going to sleep). $P = 5.3510 \times 10^{-22}$.

b. The subject reported that he no longer felt "electricity" in his hands as he had in Project XII C.

c. However, the subject now had a completely new psychological reaction. He was unable to clearly describe or define this new reaction. He said that he would have to think about it and describe it after he could verbalize it. This is a summary of what actually happened: When the subject's hand was over the correct target, the investigator quietly moved his right hand from its position over the writing pad toward the subject and pointed his finger steadily at the subject's hand. When this was done the subject would slightly withdraw his hand, and then he reported, that although he felt no electricity in his hand, he felt a strange sensation in his head. This consisted of a feeling as though the top of his head had suddenly opened transversely and outward. This was an instantaneous reaction or feeling, and was not accompanied by any tangible sensation of light, unpleasantness, or any feeling that was familiar. In essence, at this stage of observation it can be said that Harry Stone received

a clear, sharp signal from the investigator that is described as an "opening of the head." This feeling was so clearly synchronized with the investigator's telepathic sending that the subject in one run made 10 correct hits in a row within 3 minutes. His normal working time for one run is twenty minutes.

In the fourth run of Experiment No. 2, Stone scanned his right hand over the target row seeking the matching block. He made only one pass over the row for each trial, and when he came to the correct matching block, he stopped, and with an uncanny precision picked up the block and transferred it to the first row. Puharich's telepathic signal was simple:

a. At the start of each trial, he made a mental note that the correct block was in position No. 4, or wherever it was.

b. When the subject's hand reached the correct block Puharich did two things:

1. Concentrated intently.

2. Quietly pointed his right finger at the subject's hand.

8.22 DISCUSSION of Experiment No. 2.

It is clear that in Project XII D, Experiment No. 2 there has been a clear gain in ESP-test scoring over the results of Project XII C. Furthermore, it is clear that the subject no longer received the unpleasant "electrical shock" reaction after he had been placed inside of a floating screen Faraday Cage. In addition to these positive gains in experimental technique the subject reported a new kind of reaction to the telepathic signal of the investigator. This reaction in itself is unique.

Stone, on further reflection, goes this far in verbalizing his new reaction: The reason he can't describe the new reaction is that he now realizes it does not occur "inside" of him. It goes on

"outside" of his head, and doesn't seem to belong to him at all. This is as far as he can articulate the effect.

One can conclude from this experiment that there is no detectable electrostatic interaction between the investigator and the subject. This conclusion is based on the fact that the subject is shielded from such effects by a Faraday Cage, and shows no response to 10 KV D-C electric sparks directed at his cage wall.

It was further observed in the experiment that when the investigator pointed his finger at the subject, and if the subject then responded; he would not respond again if the finger-pointing were repeated within 10 - 15 seconds. If the finger-pointing was repeated after a pause of fifteen seconds then the subject would respond a second time. This effect of a finite refractory period of 10 - 15 seconds to such a "telepathic" signal is comparable to the reaction shown in Project II by Mrs. Garrett. See Fig. 2.

8.3 Observations on Project XII D. Experiment No. 3.

Subject: Harry Stone

Investigator: Puharich

8.31 CONDITIONS

For the physical arrangements in this experiment see diagram of Fig. 26.

The following is an extract from notes made on the D-C voltage setting used in Experiment No. 3.

"I set the voltage on the D-C rectifier by turning it up until I got near the 10 KV reading. In this region of the meter I suddenly heard what sounded like a high-pitched hum related to the blower motor. When I went past 10.5 KV this high-pitched tone disappeared. Hence, I figured that between 10 KV and 10.5 KV there was some sort of an electrical resonance which was audible. Therefore, I set the voltage

FIG. 26

PROJECT XII-D FLOOR PLAN OF CAGE SHOWN IN FIG. 25

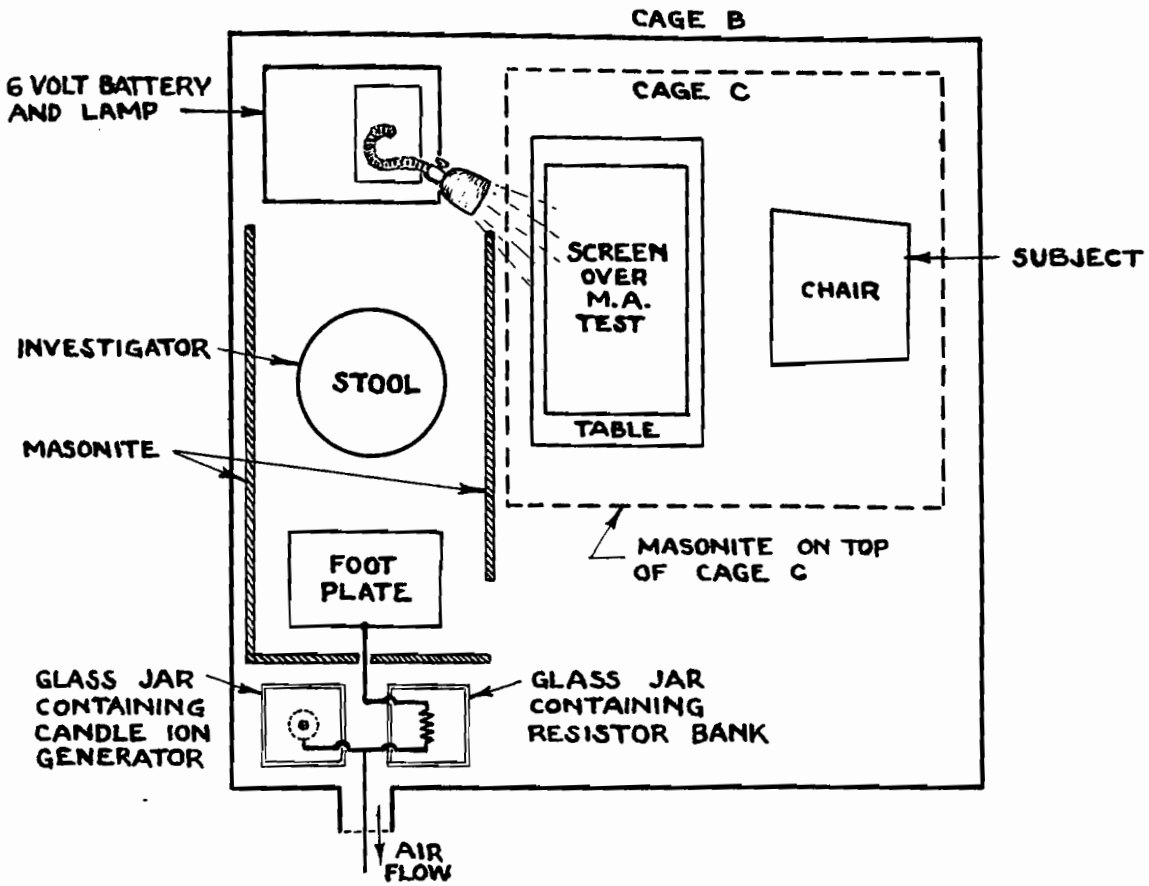
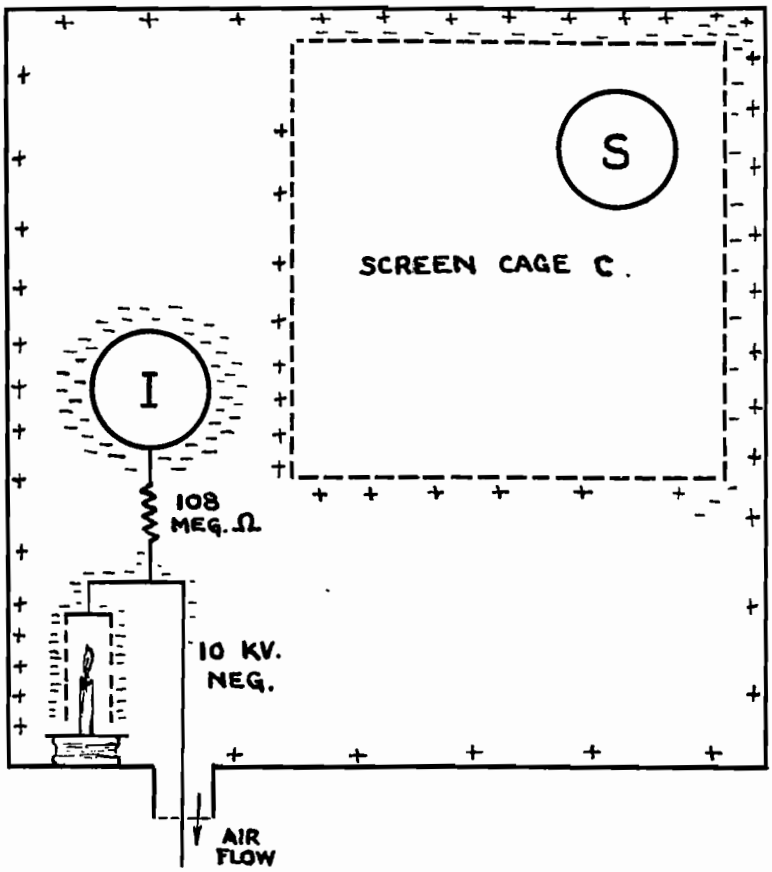


FIG. 27

PROJECT XII - D ELECTROSTATIC FIELD



A. "Electrical shock" eliminated with (Proj. XII D)
   a. Same electrical conditions as Proj. XII B.
   b. Subject is placed in a screen Faraday Cage that is floating, and thereby completely insulated from the electrostatic field of the investigator.
   c. Although "electrical shock" is eliminated the subject gets a clear telepathic signal that is experienced as a "mental shock" which is in no way unpleasant.

B. Significant telepathic potentiation with: (Proj. XII D Exp. 2)
   a. Cage B ground and positive.
   b. Inside of Cage B -- 10 KV "floating" negative electrode with respect to outer wall Cage B.
   c. Negative ion source in Cage (at 10 KV potential).
   d. Positive ions drawn out of Cage.
   e. Investigator connected to 10 KV negative electrode through 108 Megohm resistance.
   f. Subject isolated from investigator and Cage B inside of Cage C (which is inside of Cage B).
   g. Subject and investigator isolated from their respective Cages by glass insulators.

on the cage at 10.5 KV."

8.32 RESULTS

Run No. 1 7 hits ON target

Run No. 2 7 hits ON target

Run No. 3 7 hits ON target

Run No. 4 10 hits ON target

Run No. 5 10 hits ON target

There was a total of 41 hits out of 50 trials, or an average of 8.2 hits per run. $P = 5.3510 \times 10^{-22}$.

8.33 OBSERVATIONS

RUN No. 1 Stone showed a very sharp withdrawal reaction to the telepathic signal. Puharich felt in close rapport with Stone's mental processes.

RUN No. 2 Harry seemed a little less sharp in his withdrawal reaction, and gave the impression that he was getting tired.

RUN No. 3 Harry's withdrawal reaction was getting more blunt.

RUN No. 4 Harry's withdrawal reaction disappeared. He seemed to be picking up the correct blocks independently of the sender's influence. This is evidenced by the fact that he showed no "withdrawal" reaction, but got 10 correct hits. It appeared as though he might be going to sleep.

RUN No. 5 Harry suddenly recovered his sharp withdrawal reaction as he had had it in Run No. 1. He responded instantly to the sender's signal, and was brisk and sure in his reactions and completed the run in exactly four minutes.

The investigator noticed from the very beginning of the experiment that there was a sweet fresh odor in the air inside the cage throughout the experiment. This sense of odor is very difficult to describe, and it can only be compared to the peculiar freshness that

S	I	CONDITIONS
	X	CAGE - Ground **Positive at 10.4 KV DC.** **(Negative**
	X	**Inside- Ion Generator at 10.4 KV. Neg. (ion**
X	X	**- Light (excess**
	X	PERSONNEL - In Cage B
X		**In -** Cage C
	X	- No Blindfold
X		- Blindfold
X		- Contact with MAT
	X	- No Contact with MAT
X		TEST - Content Unknown
	X	- Content Known
	X	- Order Known
X	X	- MAT Inside Cage C
		- MAT Outside Cage **(Floating electrically**
X		PHYSICAL CONDITIONS - S **(inside Cage C.**
	X	- I **Direct charge Negative c 107 Meg. R.**
		- S & I bare feet on Floor
		- S & I contact bare feet on Floor
X	X	- S & I & Table on Glass Insulators
		- S & I connected by copper wire
		- S & I connected by nylon thread

	TSD	ON	POST	PRE	SCORE
					I - **Puharich**) 14 Dec. 55
					S - **Stone**) 1:50 - 2:30 P.M.
A	9/50	6/50	2/50	3/50	Total Hits
Control	1.8	1.2	0.4	0.6	Av. Hits per run
No Charge		.14622			Probability
					Significance - P =
					I - **Puharich**) 14 Dec. 55
					S - **Stone**) 2:40 - 3:30 P.M.
B	2/50	4/50	2/50	0/50	Total Hits
Test	0.4	8.20	0.4	0.0	Av. Hits per run
Charge On I		5.3510	$\times 10^{-22}$		Probability
					Significance - P =
					I - **Puharich**) 15 Dec. 55
					S - **Stone**) 3:50 - 4:48 P.M.
C	6/50	41/50	1/50	1/50	Total Hits
Test	1.2	8.2	0.2	0.2	Av. Hits per run
Charge On I		5.3510	$\times 10^{-22}$		Probability
					Significance - P =
					Combined Scores
	8/100	82/100	3/100	1/100	Total Hits
	0.8	8.2	0.3	0.10	Av. Hits per run
	(2.39	$\times 10^{-45}$	or better)		Probability
					Significance
					P =

TABLE 36
PROJECT XIID
Exp. No. 1 - 3
14 - 15 Dec. 55

Electrical Technology
Ion Generator
Excess Negative Ions
I - Hi-Potential
Negative
S - In Cage C

one gets from the atmosphere in winter just before snow is going to fall.

8.4 Observations on Project XII D, Experiment No. 4, 16 December 1955.

Subject: Harry Stone

Investigator: Narodny

8.41 CONDITIONS

Conditions of Experiment No. 4 were kept exactly like those of Experiment No. 3.

The voltmeter of the D-C rectifier was set at 10.5 KV. No attempt was made to try to tune the voltmeter to the "resonance" achieved in Experiment No. 3.

8.42 RESULTS

The total score was 9 hits ON target out of 50 trials. The average score per run was 1.8 hits ON target. This can be considered a score not significant for telepathy.

8.43 OBSERVATIONS

At the beginning of the experiment Narodny noticed what he described as a smell of "ozone" in the air as soon as the current was turned on. A short while later this smell of ozone disappeared. When the current was turned on in the beginning, Narodny felt his hair standing on end, and this continued throughout the experiment until the current was turned off. Narodny reported that Stone showed absolutely no withdrawal reaction when he pointed his finger at him. Narodny was careful throughout the experiment not to touch either the Cage B or the Cage C wall.

Narodny reported that he felt no sense of rapport with Stone during the experiment, and in fact, felt completely isolated from him. Furthermore, he did not experience the usual sense of fatigue that he

for all practical purposes he could have been a thousand miles away from Harry as far as any interaction with him is concerned.

8.44 DISCUSSION

It is apparent that Experiment No. 4 yields chance results when compared to the unusually high extra-chance results of Experiment No. 3. The only factor that was different in Experiment No. 4 as compared to Experiment No. 3 was that Narodny was the sender instead of Puharich. In addition, it might be stated that Stone did not feel well in that he had mild abdominal cramps before, during, and after the experiment.

Since Narodny was charged electrostatically the same as Puharich, it is reasonable to assume that the "telepathic signal effect" is not due to electrostatic transfer through Cage C.

8.5 Observations: Project XII D, Experiment No. 5, December 17, 1955

Investigator: H. Jackson

Subject: Harry Stone

Before the test started Jackson and Puharich "tuned" the voltage dial on the D-C generator until they both heard a high-pitched HUM at 10.0 - 10.5 KV. The conditions were exactly the same as Experiment No. 3.

Before Jackson's test started, Puharich did one run with Stone to see if everything was working properly in the cage.

8.51 PUHARICH - INVESTIGATOR <u>CONTROL</u>

1:52 p.m. - 1:56 p.m. Total hits <u>ON</u> target for one run--10.

Av. Hits ON target per run--10.

P = .000001

8.52 JACKSON - INVESTIGATOR <u>TEST</u>

1:58 p.m. - 2:53 p.m. Total hits <u>ON</u> target for 5 runs--4/50

Av. Hits ON target per run--0.8.

P = Chance

8.53 PUHARICH - INVESTIGATOR CONTROL

2:58 p.m. - 3:02 p.m. Total hits ON target for one run--10.

Av. Hits ON target per run--10.

P = .000001

8.54 The results were so paradoxical as between Jackson and Puharich, that it was decided to repeat the test with Puharich as investigator, Stone as subject, and Jackson in the cage as observer immediately after Experiment No. 5.

3:15 p.m. - 3:20 p.m. Total hits ON target for one run--10.

Av. Hits ON target per run--10.

P = .000001

After Stone had left the room, Jackson made the observation that each time Puharich had pointed his hand at Stone that he "felt" the whole cage shake. It was his opinion that Stone got a sensory clue by hearing the shaking of the cage. Jackson stated that if Puharich repeated the test with him as subject that he could get as many hits as Stone. Hence, a series of experiments was run to test this possibility.

8.55 Jackson was subject, Puharich the investigator, and Narodny the observer in the cage. Puharich repeated the same technique that he had used with Harry. When Puharich pointed his finger at Jackson the correct target block was picked up five times in ten trials. Both Narodny and Jackson stoutly affirmed that they felt the whole cage "shake".

Score: Total hits ON target for one run--5/10.

Av. Hits ON target per run--5.0 P = .003

8.56 Therefore, in order to eliminate auditory and vibratory clues, Puharich agreed to quietly lift his finger when the correct target block was reached by Jackson. This time neither Jackson nor Narodny

recognized any "objective" vibration of the cage, but now realized that they both "felt" something in them shaking when Puharich lifted his finger. They admitted that what they thought had been shaking of the cage earlier, was indeed a sense of "shaking", but it was going on inside of them.

Score: Total hits ON target for one run--5/10.

Av. Hits ON target for one run--5.0. P = .003

During this test Puharich did not have his stockinged feet on the negative charged copper plate. He had rubber boots on his feet, and these made contact with the copper plate. In spite of the fact that there was no detectable vibration of the cage Jackson was sensitive to the signal of Puharich.

8.57 Therefore, it was decided to have Narodny as investigator, Puharich as observer, and Jackson as subject. Narodny was to duplicate Puharich's finger-pointing technique.

Score: Total hits ON target for one run--1/10.

Av. Hits ON target per run--1.0. P = chance

It was apparent that Jackson could not demonstrate the response he had shown to Puharich when working with Narodny.

8.6 In spite of the wide discrepancy between the ESP-test scoring of Puharich-Stone as compared to Jackson-Stone and Narodny-Stone it was clearly established over many experiments that this was not due to an artifact. However, no degree of alteration of electrical conditions could be found at this time that permitted the latter two teams to achieve extra-chance scores on the MAT for telepathy. It was quite clear that the electrical conditions of Project XII D exerted their primary effect on the sender, since the same conditions produced either chance, or extra-chance ESP-test scores on the part of Stone depending on who the sender was.

Since the dilemma could not be solved by various combinations of electrical conditions, it appeared that the use of two subjects in telepathy experiments, both of proven ability in ESP-tests, might offer an opportunity to rationalize the observed phenomenon. The problem posed was to find a gifted sensitive who could work harmoniously with Stone in experiments where either could assume the role of sender or receiver. A long search was satisfactorily ended when Mr. Peter Hurkos of Dordrecht, Holland was found and tested. In the first place both Hurkos and Stone were from Holland and this common background of nationality proved to be a strong personal bond. Other factors naturally contributed to building up a personal friendship, and the factor of rivalry was minimized to a healthy level of sportsmanship. Furthermore, they were a natural telepathic team in that many different types of telepathic interaction proved to be possible from the very beginning of their association at the Round Table laboratory.

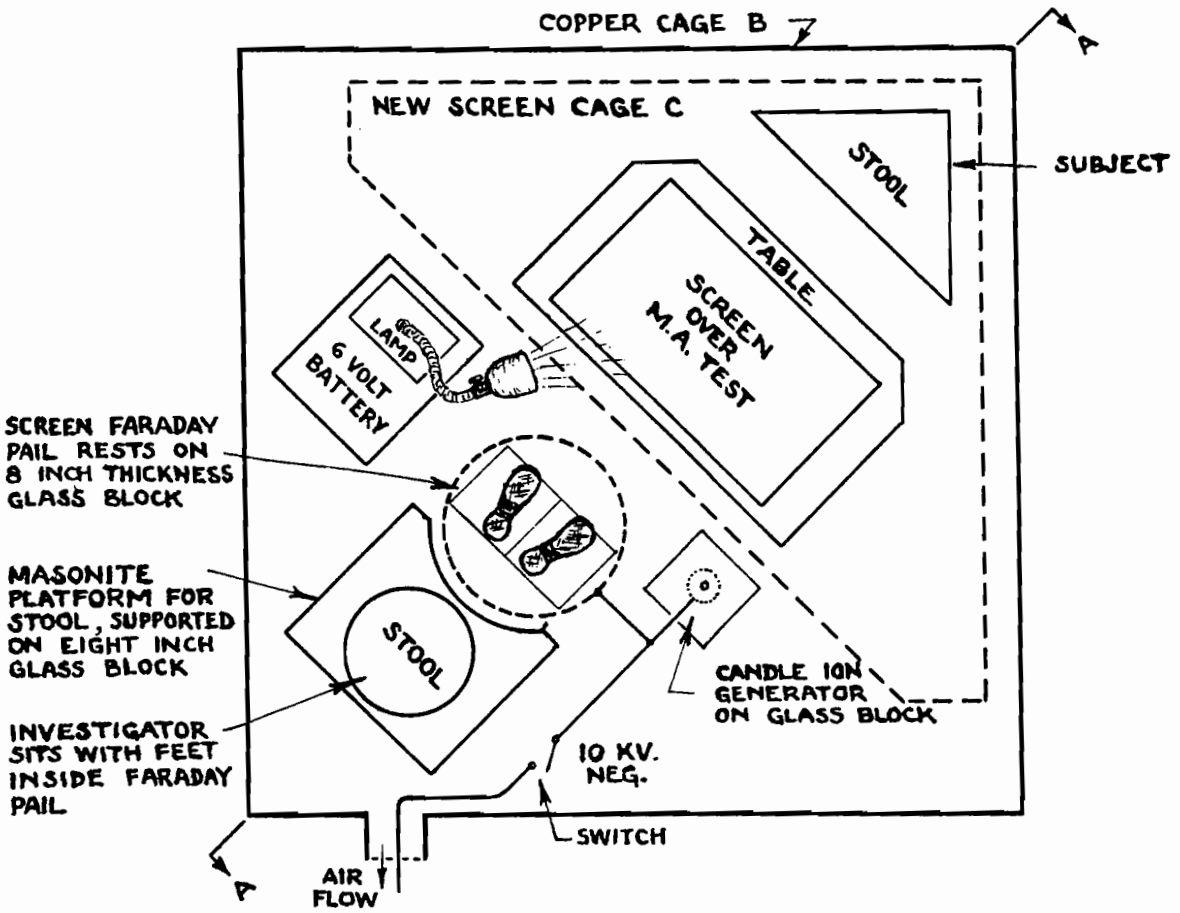
The Treated Faraday Cage with Ionically Enriched Atmosphere was standardized according to the scheme presented in Fig. 28. The Matching Abacus Test was used as previously described. The critical problem at hand was to evaluate the relative efficiency of each of these men as a sender and as a receiver in telepathy experiments under the fixed conditions of the Treated Faraday Cage as described in Fig. 28.

8.7 Experiments with the telepathic team of Hurkos/Stone.

The following results show in synoptic form the telepathy ESP-test scores of this team when each subject acted as a sender and as a receiver under identical conditions.

FIG. 28

PROJECT XII-E STANDARDIZED FARADAY CAGE WITH IONICALLY ENRICHED ATMOSPHERE



Physical conditions of Standardized Faraday Cage with ionically enriched atmosphere.

a. 10 KV Negative D-C lead in Cage B.

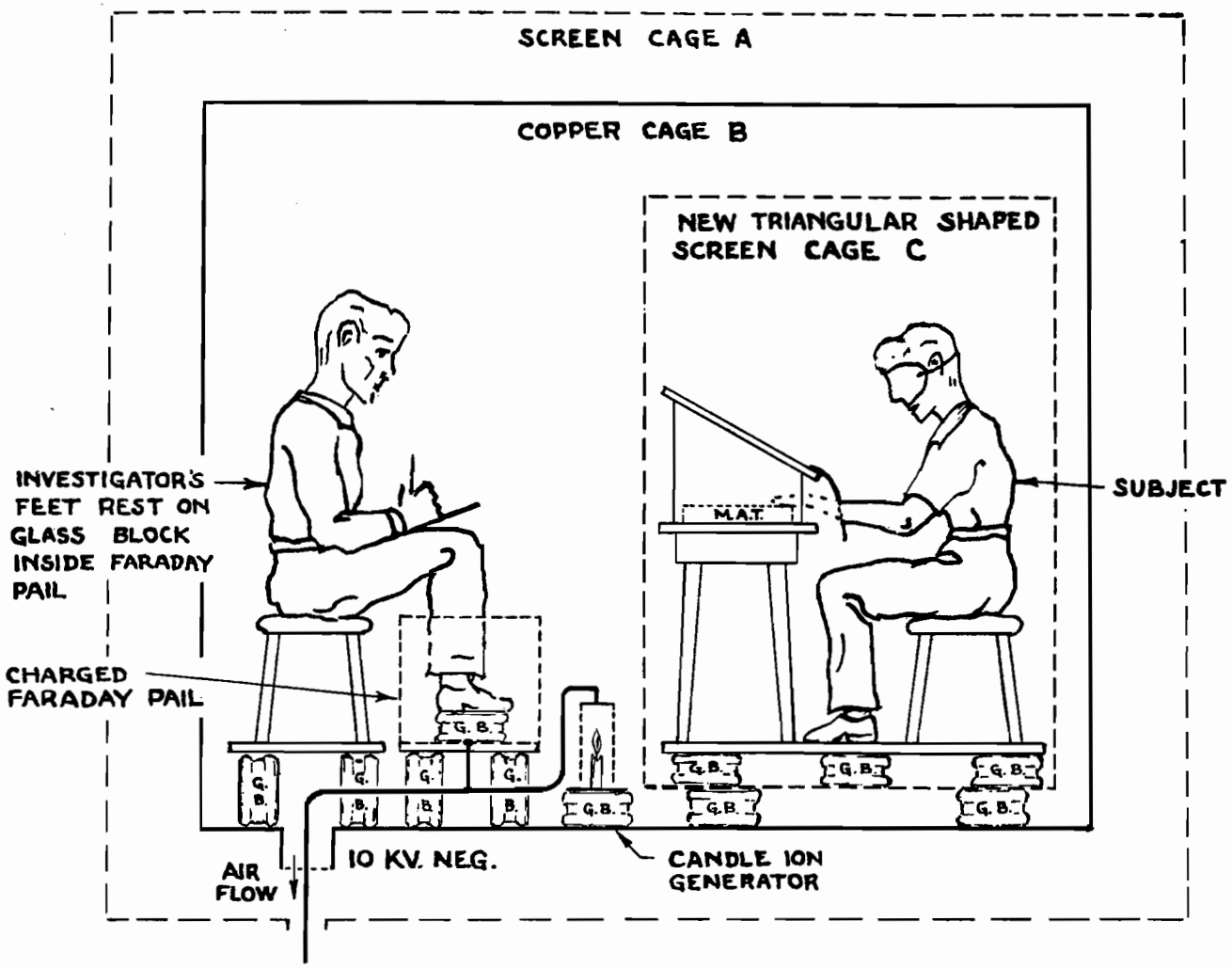
b. Candle ion generator at 10 KV negative D-C resulting in excess of negative ions.

c. Foot electrode consists of screen Faraday pail charged 10 KV Negative D-C. Investigator charged by induction when his feet are placed on glass blocks in Faraday pail.

d. Screen Cage C constructed as shown. Cage C floating.

FIG. 29

SECTION A-A of CAGE SHOWN IN FIG. 28



HURKOS - Sender STONE - Receiver	HURKOS - Receiver STONE - Sender
Control Cage. No charge. ON Hits - 9/50 P = .036265	Control Cage. No charge. ON Hits - 5/50 P = .17546
Test Cage. 10 KV D-C Negative - Induced charge on sender. Negative ion excess ON hits - 44/50 P = 5.50×10^{-27}	Test Cage. 10 KV D-C Negative - Induced charge on sender. Negative ion excess ON Hits - 13/50 P = .00132

The above experiments were repeated four times in order to be sure that the results were not due to idiosyneratic fluctuations in sensitivity. It was found that the results were repeatable with a comparable level of scoring for each of the conditions cited. Thus there was obtained dramatic evidence confirming the earlier findings that the electrical conditions had a selective effect on different individuals.

It was important now to ascertain if we were indeed dealing with genuine telepathic transmission between these two individuals. To this end the remaining possible sensory clues were removed from the experiment. For the receiver, the MAT pictures were placed in clear plastic boxes so that he could not digitally feel the surface print, see p. 70A but which the sender could easily see. The sender was instructed to abandon the finger-pointing technique of sending, and to sit as quietly as possible and try to effect a telepathic signal solely by mental concentration. The experiment was conducted in the cage under the same conditions as Project XII D, Exp. # 3. Hurkos was the sender, Stone the receiver, and Puharich the agent-investigator. The results

are presented below for one experiment -- the first one tried. Subsequent experiments have yielded a comparable level of scoring.

Project XIV. Experiment No. 11. 27 July 1956, 3:00 p.m.

RUN	TSD	ON	POST	PRE
1.	2	3	0	1
2.	0	8	0	0
3.	0	6	0	0
4.	0	8	0	0
5.	0	10	0	0
Total	2/50	35/50	0/50	1/50

Probability ON Hits = 1.683×10^{-17}

Thus the assumption that we were dealing with a true telepathic interaction was fortified by the results of this, and subsequent experiments.

CHAPTER 9

A THEORETICAL CONSIDERATION OF THE EXPERIMENTAL FRAGMENTS OF THE PHYSICAL MOSAIC OF THE ENVIRONMENTAL CONDITIONS FOR TELEPATHY

PART I

There are physical agencies to be considered which may have enhancing or depressing parapsychological effects. There is an ancient tradition that certain types of atmospheric disturbances have a negative effect, and that other atmospheric conditions have a positive or enhancing effect on the outcome of operations which we now term parapsychological. The earliest recorded reference that I can find on this subject is alleged to be the authorship of Solomon the King. The Key of Solomon is a classic on the techniques to be used in psychic operations, or Magic, as it was called. One of the admonishments given in this work is that before the operation is undertaken; "It is necessary to make the following Experiments and Arts in the appropriate Days and Hours, ---. Note that the last three days (before the experiment) should be calm weather, without wind, and without clouds rushing hither and thither over the face of the sky." [1]

Repeated allusions of the same character, too numerous to mention, have been made throughout the history of such rituals, which I will call the ritual of the irrational. These are of such a consistent nature that they bear analysis. Almost three thousand years later we find a modern author coming to the same conclusion as King Solomon. J. Cecil Maby, an authority on the alleged 'extra-sensory' faculty of water dowsing [2] makes the following statement: (1950 A.D.)

1. THE KEY OF SOLOMON, Translated from various 13th and 14th Century (A.D.) Mss. in the British Museum by S. Lidell MacGregor Mathers, George Redway, London, 1889. page 14.

2. J. Cecil Maby, International Congress of Radionics, London, 1950, page 82. See also the Journal of the British Society of Dowsers, 11: # 80, page 55 et seq., 11: #81, page 117 et seq. Ibid. 12: # 85, pages 7 - 26, 1954

"Probably no other single factor upsets dowsing so much as the weather, when it is stormy and unsettled; isolated, electrically-charged cloud masses, with their associated rising columns of damp air and subjacent electrostatic and ionisation effects, being capable of causing violent local fluctuations of intensity and also polarity of the serialized reaction bands of a radionic or dowsing field, as well as general perturbation of delicate instruments and animal physiology. And this is often the case on stormy afternoons, in, say, April and mid-summer. Wet gales, likewise, are most disturbing.

In my opinion, therefore, and pending any final solution of this problem (which may prove insuperable) it is best simple to avoid such interference or perturbation by careful choice of time and place." [3]

Let it be assumed that these empirical observations of great antiquity have some substance and deserve further analysis. Let us begin the analysis with a discussion of the fluctuations of atmospheric electricity associated with weather phenomena.

"The phenomena of atmospheric electricity can be divided into two main groups, associated with fine weather and stormy weather respectively.

In fine weather, there is no considerable concentration of charge in the lower atmosphere, but there is a charge of negative sign on the earth's surface, associated with a positive field. The lines of force from the negative charges on the earth proceed upwards and must end on positive charges in the atmosphere or in the ionosphere. (See Fig. 29A). The ionosphere above an area of fine weather must therefore be at a positive potential with respect to the earth, and, since the ionosphere is a conductor, it is all at the same potential, the currents within it having negligible effect. There is always some part of the earth which is experiencing fine weather, so it follows

3. J. Cecil Maby, Op. Cit. page 80, 82

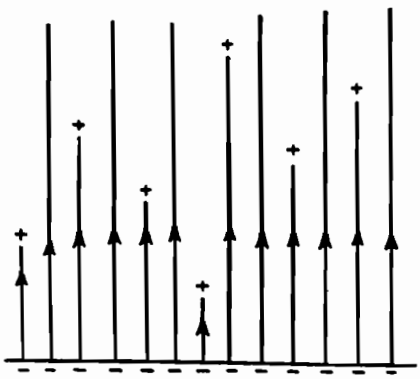


FIG. 1. Lines of force in the earth's normal field

Figure 29A.

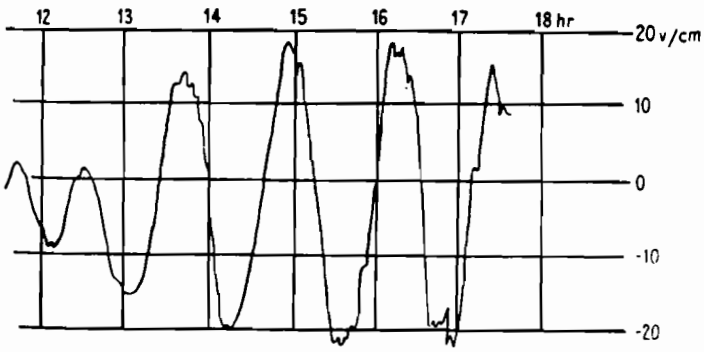


FIG. 16. Wave pattern of field during snow (*copied from* Simpson, 207).

Figure 29B.

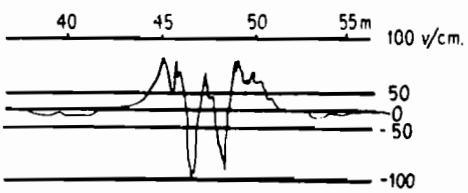


FIG. 17. Symmetrical pattern with squall (*copied from* Simpson, 207)

Figure 29C.

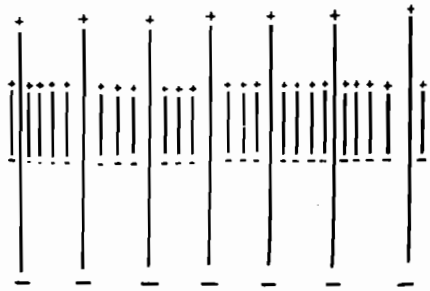


FIG. 3. Lines of force with non-raining cloud.

Figure 29D.

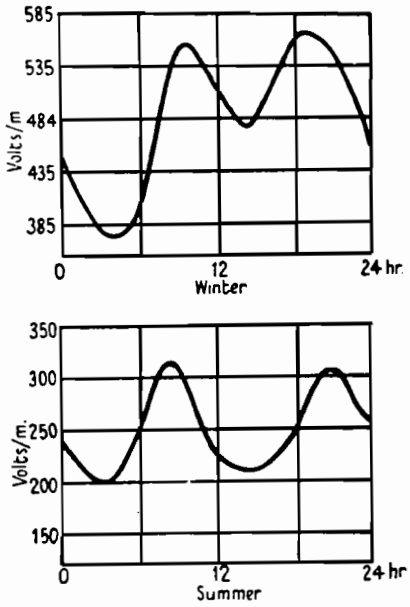


FIG. 10. Diurnal variation of field at Kew, winter and summer (*copied from* Scrase, 192).

Figure 29E.

that the ionosphere is always at a positive potential with respect to the earth. In addition to the vertical field, there is a vertical current, because there are ions in the atmosphere and these move in the field. This current brings positive charge down to the earth during fine weather.

During fine weather there are only small changes in the phenomena of atmospheric electricity and there can be no accumulation of charge at any point, so that the conditions are "quasistatic". This means that there must be some mechanism by which the positive charge carried down by the vertical current from the ionosphere to the earth can be neutralized; and it also means that the vertical current density must be the same at all heights. It is believed that this "supply current" is provided by the areas of the earth suffering stormy weather." [4]

"Measurements during Stormy Weather. Surprisingly few continuous measurements have been made of the field during stormy weather, the reason being that the fields often get beyond the range of the continuous recording instruments designed to measure the fine-weather field. Simpson has analyzed recordings made with a radioactive collector for fields up to 20 volts per cm., and with point discharge, for fields over 20 volts per cm. He found that, when there was rain due to a warm front or other quiet condition, the field is negative and fairly steady; for cold front rain or other instability, the fields are larger and under-go rapid changes in sign. The character of the field bears no relation to the rate of rainfall. Snowfall is generally similar to rainfall, except that, for light snowfall, the field is usually positive. (This refers to the potential gradient at the earth's surface and above it).

Simpson also found occasionally remarkable 'patterns' of the

4. J. Alan Chalmers, Atmospheric Electricity, Oxford, 1949. pp. 17 - 18.

field during disturbed conditions. He classified these as wave patterns and symmetrical patterns. Wave patterns, approximating to simple harmonic waves, sometimes with a regular change in amplitude, were found with up to five complete waves with ranges of from 7 volts per cm. to 230 volts per cm. and with periods from four minutes to one hundred and six minutes, the centre of the waves being always close to the zero. The most remarkable is reproduced in Fig. 16 (see Fig. 29B), which occurred during a light snowfall. Symmetrical patterns occurred of five different types and the most striking feature of these is the symmetry in time, as can be seen in the example shown in Fig. 17. (See Fig. 29C). The centre of the pattern is often at the time of the passage of a cold front or other discontinuity, so that the two symmetrical halves of the pattern occur with different air masses present. Simpson has not been able to offer any adequate explanation of the patterns." [5]

"In contrast to the results for fine weather, those for stormy weather show that there are considerable concentrations of charge, particularly in the clouds. It is found that the fields in stormy weather are often much higher than in fine weather and frequently are negative or reversed. In addition to the conduction current due to the motion of the normal ions in the existing field, there are other currents which take part in the transfer of charge in stormy weather. There is a precipitation current due to rain or snow, and there are lightning discharges which bring charge to the earth. In addition, the conductivity may be altered from its normal value by the production of fresh ions by means of point discharge, by lightning-flashes, and perhaps by the effect of rain splashing. As a result, the phenomena of stormy weather are much more complicated than those of fine weather.

5. J. Alan Chalmers, Atmospheric Electricity, Oxford, 1949. p. 74.

In general, it is not possible to consider the concentrations of charge, the vertical current, the field, or even the ionic conduction as remaining constant for any period of time, so that it is much more difficult to apply the laws of static or of current electricity than it is when conditions remain constant.

It has been shown that storm clouds usually, and probably always, have a concentration of positive charge in their upper regions, with a lower region negative charge. In many cases, at any rate in England, these is also good evidence for a concentration of positive charge in a limited region of the base. This suggests that there may be two distinct processes effecting the separation of charge and operating at different levels. In the case of non-stormy clouds, there is less evidence, but it is probable that clouds which give continuous rain are usually negatively charged in their lower regions.

If we have a non-raining cloud without any agency for the separation of charge within it, we should still find charges resident at the top and bottom of the cloud, because of the change of conductivity. A cloud consists of droplets of water or particles of ice, and the ions in the air may attach themselves to these, decreasing the ionic mobility, so that, unless there is some process by which the number of ions is increased, the conductivity of the atmosphere is less within the cloud than outside. If, then, there is the same vertical current inside and outside the cloud, there must be a greater field inside, and a simple consideration of lines of force shows that there must be charges on the top and the bottom of the cloud. Fig. 3. (See. Fig. 29D). In the case of the normal positive field, the charge must be positive at the top and negative at the bottom, exactly the opposite of the induced charges to be expected if there were a conductor in place of the cloud. The production of these charges is

somewhat analogous to the magnetic poles in a diamagnetic material. Since the field is positive downwards both inside and outside the cloud, the change in conductivity could never produce a reversal of the field at the earth's surface, but only a decrease." [6]

"Significance of the Fine-weather Field. The field at the earth's surface is one of the most easily measured of the phenomena of atmospheric electricity, but its actual significance is not immediately clear. Let us suppose that, at a given instant, there is a definite potential difference, V, between the ionosphere and the earth, and that a column of one cm.^{2} cross section of the atmosphere, where there is fine weather, from the ionosphere to the earth has a resistance R. Then the vertical conduction density is: $i = V/R$.

Nor the measurement of the field at the earth's surface is a measurement of the potential gradient in the lowest region of the atmosphere. Suppose that one cm. of the column of the atmosphere near the surface has a resitance r, then the potential drop in this cm. is: $F = i \times r = Vr/R$ and this is what is measured in the measurements of the field. When the field varies, this may be due to variations in any or all of the three quantities V, r, or R. Actually, in most cases, it is r which is most variable.

The resistance of the lower portions of the atmosphere varies from time to time owing to changes in the conductivity brought about largely by changes in the relative numbers of large and small ions. Since it is only the lowest portions of the atmosphere in which there is much alteration of the conductivity it follows that the variation in R and hence in i, is much less than the variations in r or in F. In undisturbed conditions, r remains constant and the changes in F imply changes in V. But when r varies, this has the major influence on F." [7]

6. J. Alan Chalmers, Atmospheric Electricity, Oxford, 1949. p. 22.

7. J. Alan Chalmers, Atmospheric Electricity, Oxford, 1949. p. 62

"Diurnal Variation of Field. Results for the diurnal variation of field during fine weather vary considerably from one part of the world to another and from one season to another. As we have seen in the last section, the main significance of such variations lies in the alteration in the values of the resistance of the lowest layers of the atmosphere. Typical examples of the diurnal variation are shown in Figs. 10 and 11. (See Fig. 29E). Even in fine weather the field does not remain quite regular, but there are continual small variations, probably connected with gusts of wind causing changes in the local resistance.

Mauchly, in analyzing the results obtained during the cruise of the Carnegie, pointed out that the diurnal maximum occurs at about 19 hours Greenwich Mean Time wherever there are no disturbing local sources of pollution, giving a variable number of large ions; Sherman, in Alaska, and Sherman and Gish in South Dakota are among those who have found this maximum. The maximum of the potential difference between the ionosphere and the earth has been correlated with the maximum of thunderstorm activity over the earth by Whipple.

The conductivity of the air is almost entirely due to the small ions, and depends upon the number of small ions present. The number of small ions is very much affected by the number of Aitken nuclei, so that the conductivity is a minimum when the number of nuclei is a maximum. ('Aitken' nuclei are the nuclei for the condensation of moisture from the clouds. The number of small ions present depends upon their chances of combination with Aitken nuclei to form large ions, and is obviously less when the nuclei are plentiful.)

Local effects, giving rise to a diurnal variation which is very marked, are most prominent near large cities, where the number of Aitken nuclei is large and variable. In agreement with the view that the field

is dependent on the number of nuclei are observations that, on days when the visibility is exceptionally good, the field is remarkably low, both being associated with the absence of Aitken nuclei; on the other hand, when there is little convection and little wind, the field is very high. Fog reduces the number of small ions and so gives high fields." [8]

Let us compare these weather facts with the reported effects of fine weather and stormy weather on the ritual of the irrational in Tabular form:

Type of Weather	ATMOSPHERIC ELECTRICITY	RITUAL OF THE IRRATIONAL
FINE	Current Ionosphere - Positive Earth - Negative (with positive Field) Force Electrical Conditions - Stable r is constant.	Favorable
	On a clear day - small ion concentration is high - Field P. D. is low.	Doubtful or Unknown
	Max. Field P. D. at 19 Hrs. G.M.T. falling to Min. at 6 Hrs. G.M.T.	Favorable
STORMY	Earth Field unstable with fluctuation from positive to negative. Fields tend to be high. Clouds - high conc. charges.	Unfavorable

TABLE 37

We find three suggestive correlations here: a) Fine weather with a low P. D. positive field, and high concentration of small ions coincides with a possibly favorable time for the ritual of the irrational. b) The fine weather high P. D. positive field of night time (falling from 1900 to 0600 Hrs.) is also allegedly favorable for the ritual of the irrational. c) The traditional use of the ritual fire (burning of fats, vegetable matter, incense, terpenes, etc.) produces a high concentration of small ions (charges of both signs) and can augment the effects

8. J. Alan Chalmers, Atmospheric Electricity, Oxford, 1949. p. 72.

a) and b).

Because of such a possible correlation it was decided in 1950 at the Round Table Laboratory to set up an experiment in which an approximation of the stormy weather electrical effects could be duplicated in a laboratory procedure in order to test its effect on an individual who was in self-induced trance. In Projects I and II an interrupted electrical charge was placed on the outside of the cage, leaving the subject exposed primarily to the effects of the ion deficiency produced (presumably by a diffusion outward through the screen). This condition was simulated under the better-controlled experiments of Project XI (Sec. 6.63), and produced marked physiological and psychological effects in other subjects.

That the screen cage, as described in Projects I and II, can produce both positive and negative ions when interrupted alternating current is used is illustrated in Fig. 29F. This shows a grid effect that separates the negative ions in the open atmosphere. An opposite charge on the copper screen grid will separate out the positive ions in the open atmosphere. Such devices are in commercial use, here the ion source is a hot electrode, or a radio-active electrode (Polonium salts) [9] Biological experiments with such separated ions have shown that: 1) A sudden reversal in polarity of ionization momentarily disturbs the normal development and growth of animals, [10] 2) increases the carbon dioxide capacity of the plasma in hamsters kept in negatively ionized air, [11] 3) in rats it has been found that exposure to an excess of

9. H. H. Skilling and John C. Beckett, "Control of Air Ion Density in Rooms", J. of the FRANKLIN INSTITUTE, 256: 423-434, 1953. W. W. Hicks, U.S. Patents No. 2,594, 777; 2,640, 158.

10. This work is not too impressive and should be viewed skeptically. J. C. Beckett, "Air Ionization as an Environment Factor", APPLICATIONS AND INDUSTRY, Sept., 1954.

11. John L. Worden, "The effect of air ion concentration and polarity on the carbon dioxide capacity of mammalian blood plasma" Lecture before the American Physiological Society, April 12, 1954 at Atlantic City, N. J.

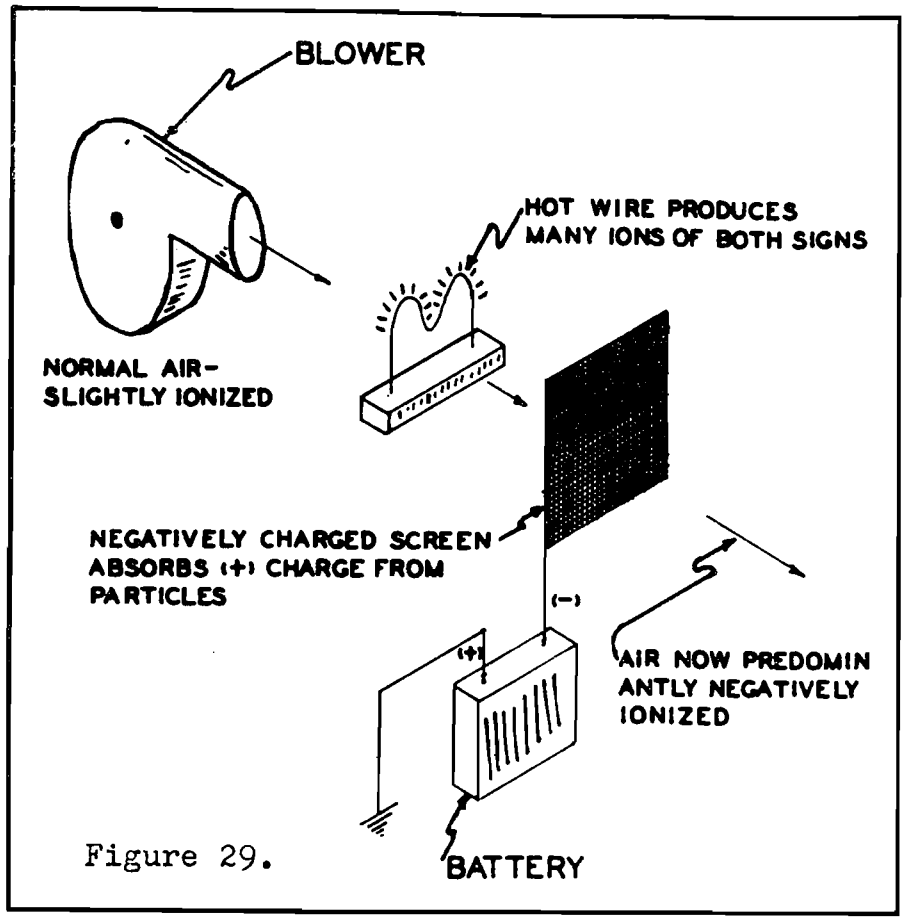


Figure 29.

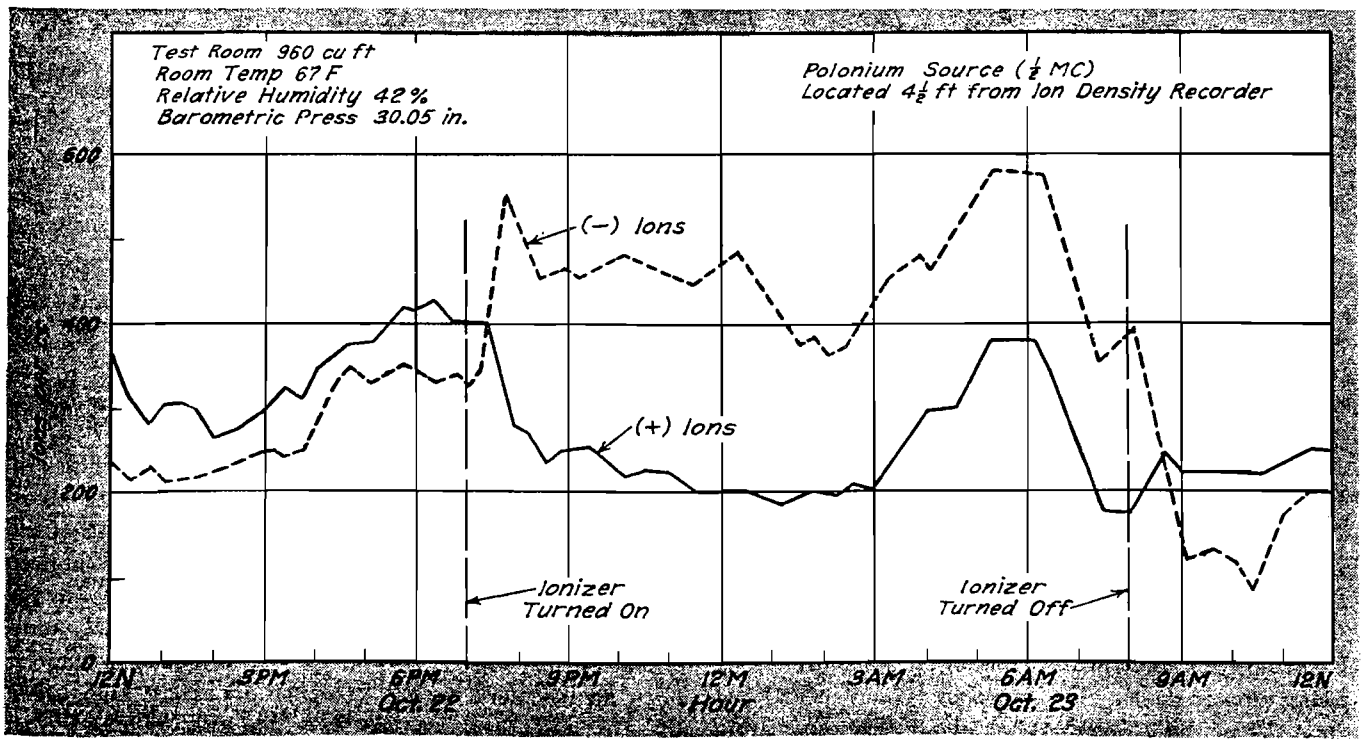


FIG. 30. RESULTS OBTAINED by using a simple ion generator are charted above. When the ionizer was turned on, negative ion concentration increased from 200 per cc to almost 600 cc, exceeding positive ions by over 200 per cc. With the ionizer turned off, positive ions outnumbered nega-

positive ions produces histological changes in the adrenal glands indicative of elaboration of both salt and carbohydrate regulating corticoids. [12] According to Ferrannini [13] "given equal ionic concentrations, negative charges slow down respiration, whereas positive charges have an opposite effect" in humans. Gorriti and Medina [14] report that significant lowering of the blood pressure occurred in hypertensive patients given negative ion therapy over long periods.

The studies with the use of unipolarized airborne electric charges, both in this country and abroad [15] seem to indicate as a rule, that with certain sensitive individuals, negative ions produce a feeling of physical and mental well-being, mental alertness and optimism. On the other hand, treatment with positive ions are frequently reported to be the apparent cause of headaches, fatigue, dizziness, ill temper and fear. In our experimental work the temporary assumption was made, on the basis of the above reports, that the presence of an excess of small negative ions might be a favorable condition in tests of extra-sensory cognition. Therefore, the following fair-weather criteria were used for the design of an environmental situation in which to carry out the studies:

1) Stable Electrical Conditions in which r (conductivity of small ions does not fluctuate) is relatively constant. Any change in r would have to be in the direction of a slow decrease in resistance (comparable to that found in the night-time falling P. D. from 1900 Hrs. to 0600 Hrs. G.M.T.).

12. Christian B. Nielson and Harold A. Harper, "Effect of air ions on succinoxidase activity of the rat adrenal gland", PROC. SOC EXP. BIOL. & MED. 86: 753-756, 1954.

13. Ferrannini, L. Revista de Meterologia e Scienza Affine, Roma, julio-agosta, 1939.

14. Augusto M. Tobles Gorriti and Antonio Medina, "The application of Ion Therapy in Hypertension", National Ministry of Public Health, April 12, 1954, Buenos Aires.

15. Manfred Curry, BIOKLIMATIK, 2 vols., American Bioclimatic Research Institute, 1946.

2) Small ion concentration high in immediate environment of the subject, preferably with an excess of negative ions.

3) The external walls of the room in which the subject worked were to have a negative charge sign. This was achieved by connecting the external metal wall of the room to ground which may be considered as a vast reservoir of negative electricity. Thus, with respect to the positive charge of the ionosphere, the subject would be in the center of a field in which the lines of force would run from the room to the ionosphere, and the direction of current flow would be from the ionosphere to the room.

Criterion 1 is satisfied by the use of the sheet copper Cage B described in Sec. 1.31a. Criterion 3 is satisfied by placing the sheet copper Cage B inside, and insulated from, the screen Cage A described in Fig. 10, and connecting Cage B to ground. This arrangement was reversed in Project XI in regard to charge sign. Criterion 2 was tested in Project XII D, and found to be associated with increased ESP-test scores.

Yaglou and his associates at the Harvard School of Public Health [16] found that the number of small ions in an unoccupied room was substantially the same as outdoors. When the room was occupied by a human being, however, the number of small ions decreased rapidly. The initial ion concentration in his tests was approximately 250 ion pairs per c.c. In one hour and 25 minutes, the count was reduced to 50 per cc. Work at the Wesfix Foundation [17] has shown that an unoccupied room tends to have a higher number of positive ions (about 100 ion pairs) than negative ions. See Fig. 31. In general, an occupied room will have a

16. C. P. Yaglou, L. D. Benjamin and A. D. Brandt, "The influence of respiration and transpiration on ionic content of air of occupied rooms", IND. HYGIENE, 15: 8. 1933.

17. Howard C. Murphy, "How ion density affects comfort", Heating, Piping & Air Conditioning, October, 1954

higher number of positive ions than negative ions, depending on the heat source, number of people present, humidity, etc. Thus one could assume initially that with a subject and one observer in a tightly closed room of 216 cubic feet capacity, there would not be a natural excess of negative ions. We have carried out a crucial experiment to decide whether Criterion 2 represents a favorable or an unfavorable condition. The results of Project XII D argue for the favorable effect of an excess of negative ions. However, it has also been found that an excess of positive ions under the electrical conditions of Project XII D yield ESP-test scores comparable to those found with an excess of negative ions.

Let us discuss separately, the events going on outside of the metal skin of Cage B, and events going on inside of the metal skin of Cage B. As a model of the 'stormy weather' condition let us analyze the SINGLE SCREEN CAGE - GROUND, without an A-C charge. Here the outside wall of the screen Cage A is negatively charged because of the connection to earth. The plate has a positive charge. The capacitor field between the plate and the cage will accumulate slowly a positive charge from the atmosphere. The negatively charged Cage A will tend to bind positive charges, and any disturbance of the field, either by earth/atmosphere oscillation, capacitance change due to a moving object, etc., will allow negatively charged ions to drift into, or out of the cage. This effect is increased when an interrupted A-C field is placed across the existing D-C field, by causing an attraction and repulsion of ions at the surface of the screen Cage A resulting in a gate-type of action propelling negative ions into the cage initially, and thereafter out of the cage. In the normal subject this action of negative ions causes the symptoms described earlier; and in sensitives gives, for a period of a second or two, a psychomotor stimulation, followed by a marked

psychomotor depression; and in certain conditioned sensitives gives an exaggerated facilitation of neuromuscular reflexes. A steady sine field neutralized the ionic migration, and concomitantly had no stimulating or depressing effect on a sensitive subject.

As a model of the 'fine-weather' condition let us analyze the Treated Faraday Cage (Cage B - GROUND, Cage A - not charged with the A-C field) with the GROUND circuit. Here we have a double cube capacitor, the inner cube sheet copper cage B with a negative charge from the earth, and the outer cube screen Cage A with a positive charge from the atmosphere. This is a large capacitor with a capacitance of 0.0014 microfarads. Nikola Tesla has shown [18] that such an arrangement acts as an accumulator of positive electricity from the atmosphere, and that such charging of the capacitator will continue indefinitely, even to the point of rupturing a high order dielectric (if such is used). Thus the positively charged Cage A will absorb the negative particles, and build up a field of positive ions (since Cage A is a 'permeable' copper screen), between Cage A and Cage B. Since in our experiments the Cage B was elevated ten feet above ground level there would be a normal D-C potential of about 300 volts between Cage A and B (assuming under ideal conditions a P. D. of 100 volts per metre above ground level). Any natural fluctuation of this field by normal earth/atmosphere oscillation, capacitance change induced by moving objects, or moving motor vehicles (electrostatic field), etc., would cause a fluctuation in the positive field between Cages A and B. Such fluctuation of positive field is associated in normal subjects with a "depressant" psychic tension and in sensitive subjects with psychic tension which is experienced primarily as a sense of 'lift' or well-being, and reflected by increased ESP-test scores. It is to be noted that in this case the subject is protected

18. Nikola Tesla, "Apparatus for the utilization of Radiant Energy". U.S. Patent No. 685,957, 685,958, and 685,959.

TABLE 38

"FINE-WEATHER" CAGE	"STORMY-WEATHER" CAGE
SINGLE SCREEN CAGE - with Steady A-C Field. Effect on Sensitive: No untoward effect. Ionization - stable.	SINGLE SCREEN CAGE - with interrupted A-C Field. Effect on Sensitive: Gasping, psychomotor depression, and tension. Ionization reversing. Deficiency of ions in cage.
SINGLE SCREEN CAGE - with subject grounded. Effect on Sensitive: Relaxation of tension. Ionization stable.	SINGLE SCREEN CAGE - with ground, or interrupted A-C Field. Effect on Sensitive: Neuromuscular reflex facilitation, or spasm. Ionization reversing, and deficiency of ions.
CAGES A & B. STANDARD Effect on Sensitive: Exhilaration and well-being. No gasping, psychomotor depression, reflex facilitation, nor tension. Ionization - stable. Physical tension disappears, and a form of 'psychic' tension appears as a residue. ESP-test scores significant.	
CAGES A & B. GROUND No notable effects on sensitive, except significant ESP-test score increase ionization stable.	
CAGES A & B. GROUND, AND ATMOSPHERE INSIDE AT 10 KV D-C NEGATIVE WITH EXCESS NEGATIVE IONS. Effect on sensitive: Disappearance of all untoward effects in opposite column. Chance-expectation ESP-test scores.	CAGES A & B. CAGE B GROUND, AND ATMOSPHERE INSIDE AT 10 KV D-C NEGATIVE WITH ION DEFICIENCY. Effect on Sensitive: Activation of cough reflex, neuromuscular spasm, headache, auditory hallucinations. Chance-expectation ESP-test scores.
CAGES A & B. GROUND, AND SENDER AT 10 KV NEGATIVE POTENTIAL, EITHER DIRECT CHARGE, OR INDUCED CHARGE. RECEIVER IN CAGE C. POSITIVE OR NEGATIVE ION EXCESS. Effect on Sensitive: No untoward effects. Unusually high ESP-test scores with certain telepathic teams.	

from any direct effect of ionic changes.

When this positive field in the capacitor is altered by the effect of pulse-modulated square waves of five per second (640 c.p.s. interrupted five times per second) the sense of well-being of the sensitive subject is increased, and this is reflected in increased ESP-test scores, as compared to the GROUND condition. What change is induced in the positive electrostatic field between Cages A and B by the pulse modulated square waves? Such modulation would obviously increase the positive ion content and positive field strength of the air dielectric between the cages. The application of continuous pulse modulation would not only serve to increase the positive ion concentration, but would act to conserve it from dissipation. Loss of strength of field could occur primarily by dielectric leakage and since the system was not built with high order dielectric strength this leakage would tend to diminish the field conservation established by the pulse modulation. Measurements of the field strength between the cages with ionization indicators (gas filled tubes), tuned circuits, galvanometers (ballistic galvanometers were not used, unfortunately), and electrostatic meters, did not show any measurable current. It seems theoretically possible, however, that there was an energy transfer between the cages, on the assumption of an electrostatic charge moving at the velocity of sound. [19]

Such a movement of the electrostatic envelope of Cage B is pulsed by the five per second modulation. If this assumption is correct, a pulsating electrostatic envelope would have a definite effect on the ionic contents of the air - (20.9% oxygen, 79.0% nitrogen, and 0.1% constituents such as the rare gases, hydrogen, and air impurities).

The first question that one asks is - what happens to the above gases placed between electrodes (such as Cage A and Cage B) at the

19. International Congress of Radionics. London, 1950. page 60.

potentials used? The formation of ozone in an electrical discharge has been known since Van Marum's discovery of this effect in 1785. [20]

Siemens in 1857 showed that ozone could be produced by passing air through a silent discharge between two electrodes at high potential. [21] In commerical usage this potential is five to ten thousand volts in order to get high yields. The reaction of oxygen to ozone can also occur at very low energies as a photochemical polymerization and depolymerization reaction, according to the reaction, $3\ O_2 \rightleftharpoons 2\ O_3$. Here the active radiation is 1970 - 1765 A. U. and the absorbing molecule is the O_2 [22].

Oxygen, O_2, is an electronegative gas which attaches electrons directly to form negative ions, O_2^-. In O_2 the energy of formation of the O_2^- ion is between 0.1 and 0.3 volt. It involves the incorporation of the electron with its 0.2 volt energy of attachment plus its energy of heat motion into the molecule of O_2, the energy being taken up in the vibrational states of the O_2 molecule. This energy must be dissipated in collisions with other O_2 or N_2 molecules if the O_2^- ion is to remain stable. Unless it collides in a short time the electron will dissociate. When a positive ion, O_2^+, strikes a metal surface at about 180 volt potential it bounces off as an O_2^- ion - picking up an electron after neutralizing itself. [23]

Thus it may be that in the electrostatic field of Cage B it is possible to have an excess of O_2^- ions by the nature of the double capacitor as defined. Since it can be shown by calculation [24] that

20. Thorpe's Dictionary of Applied Chemistry, Longmans, London, Fourth Ed., 1949. Page 192 et seq.

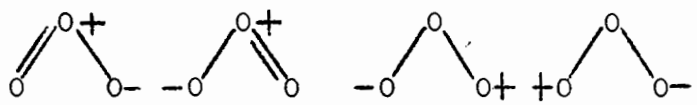
21. Thorpe's Dictionary of Applied Chemistry, Longmans, London, Fourth Ed., 1949. Page 193.

22. Encyclopedia Britannica, 1953 Ed. 17: page 786.

23. Encyclopedia Britannica, 1953 Ed. 8: page 241.

24. Thorpe's Dictionary of Applied Chemistry, Longmans, London, Fourth Ed., 1949. Page 194. Warren B. Boast, Principles of Electric and Magnetic Fields, Harper & Bros., N. Y. 1948. Page 60 et seq

the field intensity between the cages is greater at the surface of the Cage B metal wall, than at the surface of Cage A, this would increase the probability of collision of the O_2^+ with the copper metal wall, resulting in the production of some amount of O_2^- ions as well. The presence of such ionic forms of oxygen would in turn favor the production of ozone at the low potentials involved. Ozone is believed to exist in the following resonance between structures: [24]



Ozone can also be formed by the collision between a photochemically activated oxygen molecule, and a normal oxygen molecule: [25] $O_2^* + O_2 \longrightarrow O_3 + O$. Thus there are a number of processes that could contribute to the production of ozone in small quantities. That this is so in our experiments in borne out by the fact that the smell of ozone is often detectable in the vicinity of the STANDARD cage. However, since the field energy levels involved are rather low, one should expect to find a continuous transition of the oxygen to the ozone state, and the reverse, with each pulse of the field, with little or no conservation of stable ozone. The importance of this postulated polymerization and depolymerization of oxygen and ozone is the emergence of various wave forms, such as the absorption and emission spectra, and functions such as the probability wave (Psi). [26] How these

24. Thorpe's Dictionary of Applied Chemistry, Longmans, London, Fourth Ed., 1949. Page 194. Warren B. Boast, Principles of Electric and Magnetic Fields, Harper & Bros., N. Y. 1948. Page 60 et seq.

25. Thorpe's Dictionary of Applied Chemistry, Longmans, London, Fourth Ed., 1949. Page 193.

26. Encyclopedia Britannica, 1953 Ed. 23: page 639.

* Activated Oxygen

could influence the state of consciousness in the subject is unknown, but it is well to remember that some of the same functions may be involved in the mechanism whereby oxygen is associated with the maintenance of consciousness in the organism. That the subject is sealed off from this activity of the oxygen in the electrostatic field is not a deterrent to this idea, since one can accept the radical postulate that in the phenomenon of extra-sensory cognition the locus of consciousness is not limited to the cranium, but may have extension beyond this boundary.

Let us leave this outer sphere of activity, for the moment, and consider those events going on inside of the metal skin of Cage B. Here again, there are two phenomena to consider, the radiation and the chemical. We can consider the subject sitting inside of Cage B as a radiator of electrical oscillation (albeit a feeble one) from the evidence of electroencephalography. That such an electrical oscillation is not confined to the box of the cranium is evident from the fact that E.E.G. recordings from the surface of the scalp are identical to those made from the surface of the exposed brain. [27] It is well known that waves, sonic or electrical, in an enclosure, or box, will result in standing waves. This problem has been analyzed for low frequency sound in a room by Morse [28]. But let us first analyze the ideal case of an electron in a box.

"These considerations are well illustrated by the concept of 'the particle in the box' (Fig. 10) See Fig. 32. If a particle moves to and fro in a box with parallel walls, its behavior may be treated

27. Identical means for the practical purpose of clinical diagnostic procedures. Some absorption of the energy is obviously incurred in the passage through the bony and soft tissues.

28. Philip M. Morse, Vibration and Sound, International Series in Pure and Applied Physics, McGraw-Hill, N. Y. 1948, page 381.

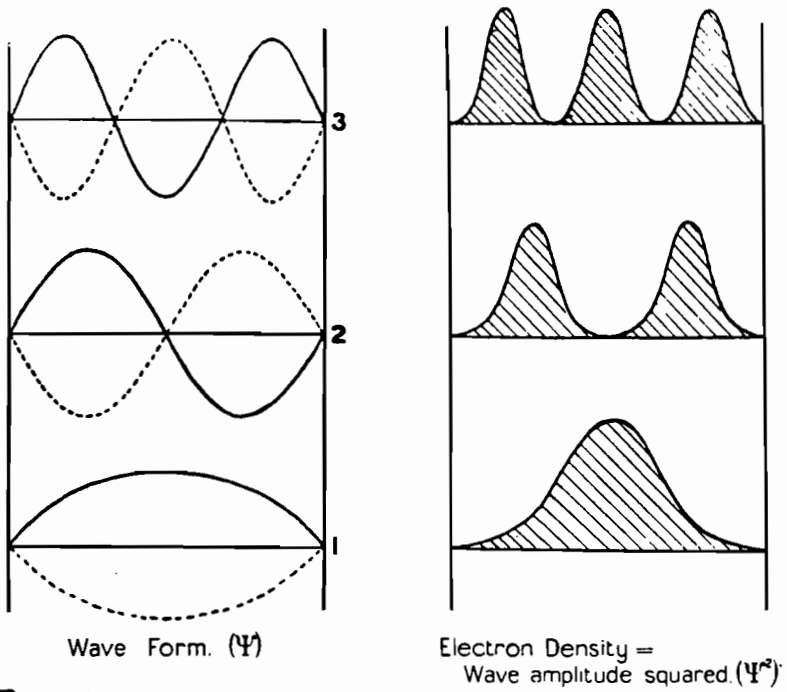


FIG. 32 FIG. 10. Energy levels of the Electron in the Box.

A closer inspection of the spectrum in Fig. 83 shows (see Chapter IV, section 1) that the band at 667.3 is a perpendicular band (species Π_u of the dipole moment, $M_z = 0$, strong central maximum),

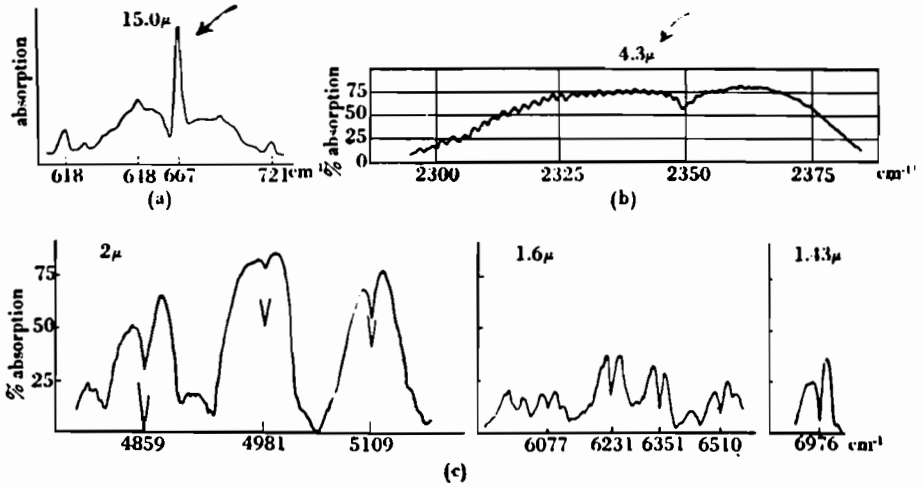


FIG. 33 **Parts of the observed infrared absorption spectrum of CO_2 under low dispersion** [according to Martin and Barker (602) and Barker and Wu (113)].—The equivalent absorbing paths at atmospheric pressure in (a), (b), and (c) are 0.23, 0.10 and 560 cm. respectively.

whereas the band at 2349.3 cm^{-1} is a parallel band (species Σ_u^+ of the dipole moment, central minimum). This identifies the low frequency as ν_2, the high frequency as ν_3 (see Fig. 25b). Investigations with higher dispersion show also that the intense Raman "line" at 1340 cm^{-1} (which should be ν_1) really consists of two lines at 1285.5 and 1388.3 cm^{-1} with an intensity ratio 1 : 0.59 [see Hanson (409) and Langseth and Nielsen (556)]. This observation is less easily explained, since one would expect just one Raman line corresponding to ν_1. However, the average of the two observed Raman lines agrees very closely with double the low frequency ν_2. If $2\nu_2$ is very close to ν_1, a Fermi resonance is to be expected (see p. 217), which will lead to the occurrence of two almost equally intense Raman lines instead of one, as is observed. Then, however, we cannot say that one Raman line is ν_1 the other $2\nu_2^0$, but both are mixtures of ν_1 and $2\nu_2^0$. We write $2\nu_2^0$, since only the one component with $l = 0$ of the state $2\nu_2$ takes part in the resonance. The other component $2\nu_2^2$ ($l = 2$, species Δ_g) would also be allowed in the Raman effect according to the rigorous selection rules (Table 55), but as an overtone it is much weaker than a fundamental and is not observed. $2\nu_2^0$ appears strongly only because of resonance with a fundamental. The degree of depolarization of the two strong Raman lines is small [$\rho \sim 0.18$ and 0.14, respectively, according to Langseth and Nielsen (556)] in agreement with the assumption that both upper states are totally symmetric (Σ_g^+), whereas the line $2\nu_2^2$, if it occurred, would be completely depolarised.

The above interpretation of the strongest Raman lines and infrared bands is confirmed in every way by an investigation of the overtone and combination bands, partly represented in Fig. 83b, [Adel and Dennison (37), Dennison (280)]. In Table 56 we give all the observed infrared and Raman bands together with their interpretation [mostly according to Adel and Dennison (37)]. It should be noted particularly that no overtones $2\nu_3$ and $4\nu_3$ (which would lie approximately at twice and four times the frequency 2349.3) have been observed in the infrared, although $3\nu_3$ and $5\nu_3$ are observed, in agreement with the rigorous selection rules, the states $2\nu_3$, $4\nu_3$ having species Σ_g^+ while

by 'classical' dynamics, and the particle may have any energy, provided that the box is large. The equations of wave-mechanics require us to take account of the wave theory interpretation of the motion. The governing equations are:

$$mv = h\lambda^{-1} \text{ and } n\lambda = 2a$$

where mv is the momentum of the particle, lambda the wave-length, n an integer, and a the width of the box. These expressions embody the Uncertainty Principle and the assumption that if the motion has a wave character it must necessarily be a stationary wave, i.e., have nodes at the walls of the box, or otherwise the motion could not persist unchanged in time.--Fig. 10 shows the wave-forms of the first three quantum levels of a vibrating particle. It is possible to attach a physical meaning to the amplitude, Psi (ψ) of the above wave motion, or rather to its square (ψ^2). The square represents the probability that the particle will occupy any region of space. Experiment cannot establish simultaneously the exact momentum and position of the particle, if it determines the momentum within fixed limits, the position of the fixed particle can be expressed only as a probability curve in space. Such probability distributions are called the 'partial density' curves. In Fig. 10 it can be seen that Psi ^{2} for n = 1 has a maximum in the center of the box. This is the opposite of the result given by classical theory for a particle vibrating in a box, which is there expected to be found with equal probability anywhere across the box. For n = 2 there are two maxima, for n = 3, three, and so on. It will be observed from the shapes of the curves, however, that at high values of n the forms of Psi ^{2} must tend to uniform probability of position across the box, i.e. to approximate to classical dynamics, which applies when n is large.

These considerations lead us to the conclusion that when particles

are relatively unconfined by walls of force fields they may be treated as particles in ordinary dynamical theory; when on the other hand they are restricted in space, they must be treated by wave-theory." [29]

The Rev. Father A. K. K. Glazewski [30] has analyzed this problem for the case of a human placed in a 'box', and his analysis is here presented in synoptic form: 'Let a human body, m, situated not far from other objects, e.g., in a room, be suddenly charged electrostatically with, say, a plus charge. At that precise moment the lines of the electric field will move with a certain velocity x (at app. the velocity of light) towards the walls, and will end on a minus charge. On reaching the walls they will induce an additional charge of minus sign, which in its turn will reverse the process. Owing to slow discharge, the process will be maintained for a certain time, and a damping phenomenon will take place. But in addition it must be taken into account that the body m vibrates with its molecular, thermal, and electric agitation; and statistically at a certain moment, 50% of the molecules of the body m will retreat from the direction of the wall and at a moment t, will again approach the wall. A resultant wave will be produced, and an extremely faint mutual exchange of induction and radiation between these two bodies, the wall and the body m, will take place. This change will be extremely small relative to the size of the human body, but by no means small relative to the size of the molecules in the surrounding air. This mutual process between the body m, and the walls, will naturally produce a standing wave.'

Now, between the mass of the body m and the walls of the room there is a gaseous medium, the air. It is composed of the same con-

29. E. J. Bowen, The Chemical Aspects of Light, Oxford, 1946, pages 60 - 63.

30. International Congress of Radionics. London, 1950, Page 138 et seq.

stituents as those cited for the air outside the cage, with the addition that there is present the expired carbon dioxide, and other organic constituents of respiration, perspiration, and sebaceous secretion. What happens to these molecules? We know that they vibrate with thermal agitation in all directions. Suppose that to a great extent they are electrically neutral. The moment we charge the body electrically, all the neutral molecules of the air, now in an electrical field, will become electrical dipoles, and their thermal agitation will be polarized to a certain degree (plus minus an angle Phi) in the direction of the field lines. This polarization will be a function of the intensity of the electrical field of the body m.

Owing to this polarization of the vibration of the molecules, a sonic wave will necessarily result. However, the intensity of the field is too small to produce an audible noise. Prof. T. J. J. See rightly compares the charged capacitor to a singing bell [31], and has given the mathematical analysis for the relation between sound and electrostatics.

Thus there is postulated a theoretical picture of an ionized state around the subject (that one can imagine to appear very much like the traditional aureole) that has nodal characteristics due to the standing wave phenomenon. The nodal points represent probability areas where the energy density is increased. Such an energy density can be expected to result in transitions of the vibrational energy of the molecules. This would result in certain observable changes in the absorption (or emission) spectra of the molecules, depending on the level of energy in question.

Let us revert for a moment to the results of direct observation of a medium or a person in some advanced stage of the ritual of the

31. T. J. J. See, Wave Theory, 12 Vols., Wheldon and Wesley, Nicols Press, Lynn, Mass. 1938 - 52. See Vol. 5, pp. 94 - 102.

irrational. It has been repeatedly reported [32] that at times a field can actually be visually observed around such an individual, that has the following characteristics: 1) It is of a gaseous type of appearance, and has been called the aura, or OD. 2) It, at times, has luminous qualities with different colors reported for different states. 3) It has an odor which is usually of a fragrant perfume quality often described as musk, heliotropin, jasmine, etc. The author can confirm these observations of sensory characteristics on the basis of personal experience. The appearance or production of such a gaseous field is traditionally associated with the degree of power exhibited by the subject, i.e., the greater the production of this substance, the greater the capacity to produce 'phenomena'. Assuming that these traditional observations are correct, and not illusions, what mechanism could produce such a substance?

The most apparent source is the secretion of the sweat and sebaceous glands of the skin. The sebaceous glands secrete cholesterol, oxycholesterol, lanolin, simpler fatty acids including unsaturated fatty acids, and fatty acid esters of octodecyl and cetyl alcohols, as well as albumins. [33] The sweat glands secrete urea, uric acid, creatinine, lactic acid, ethereal sulfates of phenol and skatol, amino acids, sugar, albumin, as well as water and sodium chloride. [34] Some of these substances, particularly, the unsaturated fatty acids can by such a simple operation as exposure to activated oxygen or ozone result in a 'perfume' odor. Marchand [35] concluded that perfumes are compounds which contain oxygen in the form of a bridge linkage which contain

32. Gerda Walter, "The Human Aura", TOMORROW, 2: 81 - 87, 1954. Hans Driesch, Psychical Research, G. Bell, London, 1933.

33. Howell's Physiology.

34. Howell's Physiology.

35. R. W. Moncrieff, The Chemical Senses, John Wiley & Sons. New York, 1944. Page 230.

oxygen in the form of a bridge atom. Esters, lactones and ethers contain an oxygen linkage, but not ketones, aldehydes, or ionones. It may be assumed that such a chemical re-action can occur endogenously in sensitive individuals who are exhibiting parapsychological phenomena.

What functional purpose would the production of such a perfume-like substance serve? Zwaardemaker and Hogewind [36] found that the spray formed by extruding water from a fine jet is not electrically charged, but if the water contains an 'odorant' in solution, even in very small quantities, then the spray carries a strong positive charge. The quantity of the electric charge per c.c. of saturated solution has been worked out for various substances by Zwaardemaker, Backman and Huyer, separately. The following are taken from a list compiled by Zwaardemaker in International Critical Tables 1, 359, 1926.

ODORANT	SPRAY ELECTRICITY per c.c. of saturated solution. 10^{-10} Coulombs
Aniline	0.4
Skatol	1.0
Trinitrosisobutyl (Artificial Musk)	1.0
Toluene	5.1
Nitrobenzene	9.6
Phenol	15.2
Camphor	20.3
Heliotropin	52.0
Citral	360.0

Thus we see the possibility of another method of increasing the ionic charge in the atmosphere around a sensitive. It can be assumed that in addition to the phenol and skatol produced by the skin of the sensitive other perfume-like substances would have the effect of increasing the positive charge in his vicinity. This effect would be increased by water vapor from induced sweating.

36. Zwaardemaker and Hogewind, PROCEEDINGS OF THE ACADEMY OF SCIENCES. AMSTERDAM, 22: 429 - 437, 1920.

Building up the positive charge in the immediate environment of the subject would then further build up the intensity of the standing wave phenomenon. Let us return now to a consideration of the ionized field around the subject in the cage. Activated molecules, to simplify the matter, emit radiation in three wave length regions: 1) the far infra-red, 2) the near infra-red, and 3) the visible or ultraviolet. The radiation in the first group is ascribed, in the simple theory, to changes in the rotational energy of a dipole molecule. The second group is ascribed to simultaneous changes of rotational and vibrational energy, and the third, to simultaneous changes in the rotational, vibrational and electronic energy of the molecule. We can expect that the carbon dioxide in the atmosphere of the cage would be subject to rotational-vibrational stress and result in near infra-red emission or absorption bands. It is known that CO_2 has two unusually strong absorption bands in the infra-red, one at 15.0 microns, and the other at 4.3 microns. (See Fig. 33). We have already argued for the presence of activated oxygen and ozone in the electrostatic field outside of Cage B (between it and Cage A). It is a curious coincidence that ozone also has a strong absorption band in the infra-red, one at 4.8 microns, and one at approximately 15 microns. (See Fig. 34).

In Project XII D there was introduced into the cage an electrode that is at 10 KV D-C negative potential with respect to the walls of Cage B. This arrangement provides an obvious mechanism for the production of activated oxygen and ozone. It is inferred that the ozone must be present in trace amounts since some observers could smell it and others could not. But such disagreement as to whether ozone can be smelled or not is a well-known phenomenon. Curiously enough the garlic odor which some people associate with ozone was never detected.

The intimate dependency of consciousness on oxygen is too well-

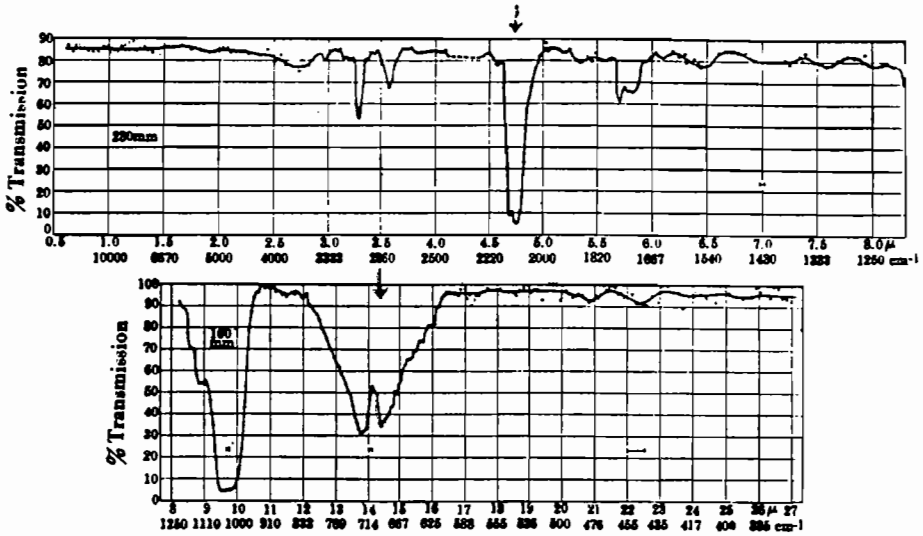


FIG. 85. **Infrared absorption of O_3** [after Hettner, Pohlmann and Schumacher (449)].—The length of the absorbing path was 30 cm. at the pressures indicated.

TABLE 66. INFRARED SPECTRUM OF GASEOUS OZONE.

ν_{vacuum}, observed (cm^{-1})	Band type	Assignment, Sutherland-Penney (831)	References
695, 725 } 710	I. doublet s.	$\nu_2(a_1)$	(449)
1043.4[43]	I. doublet? v.s.	$\nu_1(a_1)$	(351) (449) (40)
1724, 1755 } 1740	I. doublet? w.	$\nu_3(b_1)$	(449)
2105	I. ? s.	$2\nu_1(3\nu_2)(A_1)$	(351) (449)
2800	I. ? w.	$2\nu_1+\nu_2(A_1)$	(449)
3050	I. ? w.	$3\nu_1(A_1)$	(449)

If the nuclei in the O_3 molecule were at the corners of an equilateral triangle (point group D_{3h}) there would be only two normal vibrations, a totally symmetric one and a doubly degenerate one (see Fig. 32a), only the latter being infrared active (see Table 55). It is easily seen from the observed frequencies in Table 66 that it is quite impossible to interpret the observed spectrum on the basis of one active and one inactive fundamental only. Thus the equilateral model of O_3 is definitely ruled out.

If O_3 had a linear symmetric structure no binary combinations of active bands could occur (see p. 265), whereas actually a number of such combinations seem to occur. The rotational structure of the 1043.4 band [Adel, Slipher, and Fouts (40)] also definitely rules out the linear symmetrical model as well as the non-symmetrical linear model. Thus only an *isosceles triangle* or a completely unsymmetrical structure remains. The latter structure does not appear to be at all likely for a molecule consisting of three equal atoms. In both cases, there should be three active fundamentals. Choosing the three strongest bands 710, 1043.4, and 2105 cm^{-1} for these, as was done by Hettner,

[43] On p. 283.

FIG. 34

known to describe here in detail. One must assume that telepathic interaction as gauged by ESP-test scores is a function of consciousness. It became an intriguing question as to whether the postulated field effects in the cage, and the observed increase in ESP-test scores with increased ionic concentration were in any way related to oxygen physiology as it affects consciousness.

Since all previous experiments had been conducted with both nostrils and the mouth open and therefore available as airways, and that all sensitives when doing ESP-tests seem to breathe not through the mouth, but only nasally, it was decided to selectively seal both nostrils, and then each one separately during ESP-tests. Project XIII used the conditions of Project XII D with the sender at a positive potential induced by the 10 KV D-C negative foot electrode, and a negative ion excess. The subject was in Cage C.

The significant difference in scoring between both nostrils sealed using only mouth-breathing, and when the nostrils are open is dramatic. Of special interest is the fact that the highest scores are associated with respiration through the left nostril. Since an adequate amount of oxygen is delivered by mouth-breathing through the pulmonary alveoli to the brain one cannot look to the known functions of such oxygen absorption as being vitally related to telepathy under the conditions cited.

Hurkos - sender
Stone - receiver

Summary: Project XIII. Protocol.

Experiment No. 1

Control Cage. No charge. Nostrils open.

ON hits - 9/50 P = .036265

Experiment No. 2

Test Cage. Charge - Nostrils plugged (papier mache mask)

ON hits - 9/50 P = .036265

Experiment No. 4

Test Cage. Charge. Nostrils plugged tightly (collodion seal)

ON hits - 14/50 P = .000471

Experiment No. 5

Test Cage. Charge. Left nostril open. Right(closed collodion seal)

ON hits - 43/50 $P = 5.52 \times 10^{-26}$

Experiment No. 6

Test Cage. Charge. Right nostril open (left closed - collodion seal)

ON hits - 24/50 $P = 6.47 \times 10^{-10}$

Experiment No. 11

Test Cage. Charge. Both nostrils open.

ON hits - 44/50 $P = 5.50 \times 10^{-27}$

Summary

Right Nostril Only Open

Hits - 24/50

$P = 6.47 \times 10^{-10}$

Both Nostrils Sealed

Hits - 14/50

$P = 4.71 \times 10^{-4}$

Left Nostril Only Open

Hits - 43/50

$P = 5.52 \times 10^{-26}$

Both Nostrils Open

Hits - 44/50

$P = 5.50 \times 10^{-27}$

Since I know of no known physiological explanation of the above observations regarding nasal respiration and telepathy (although there is present a YOGA literature on the subject), one must resort to speculation until such a time as the facts are elucidated by experiment. There are not enough facts established about this phenomenon to lead to a theory, and the speculation tendered can best be put forth in terms of clear questions, and an attempt at a provisional answer.

There is some reason to believe that the type of telepathic interaction observed in Project XIII is dependent on gaseous constituents in the atmosphere that are related to nasal respiration, particularly left nasal respiration, as seen in Stone. Although one may invoke oxygen, it is best to include these under a generic title, and I propose the use of the word OD (coined by Reichenbach) until they are identified chemically and their role established.

The following line of speculation in the form of questions, and provisional answers is put forth with all reserve:

PART II

Q. Where does OD come from?

A. OD probably is a constituent of the atmospheric gases.

Q. Which constituent of the gaseous atmosphere?

A. It may be one that is absorbed in respiration.

Possibilities:

1. O_2. O_2^* At. no. = 8. At. wt. = 16. Mol. wt. = 32

2. O_3 Ozone = 48. O_4 oxozonide = 64

3. H At. no. = 1

4. Is N_2O produced in Cage B under Project XII D conditions?

Q. What is unique about the respiratory system of a sensitive that would give a clue as to active atmospheric gas constituent?

A. A. An analysis of mediumistic trance-breathing phenomena:

--Left sided nasal intake is traditionally alleged to be the receiving function in telepathy.

--Mediums usually develop left-sided upper respiratory pathology.

--Sensitives tend to hypercapnea rather than hyperventilation.

--Paramagnetic property of O_2 and N_2O and its relation to nasal chambers?

--When charge flashes on cage, medium's breathing is momentarily cut off. (Gasping reaction or reflex).[37] (charged ions pulled out of cage).

B. Breathing block of medium:

1. A 2 second electric charge on cage is sufficient to produce this effect--1st of momentary stimulation (for 1 - 2 seconds).

2. Primary blocking occurs in 2 - 4 seconds after end of charge.

3. Full secondary blocking occurs 7 seconds after end of charge. This secondary blocking lasts for approximately 8 seconds. The telepathic "sensitive" is refractory to finger-pointing for approximately 15 seconds, after showing response.

4. Tertiary partial blocking effects last for at least 2 minutes.

Q. What does the blocking effect mean?

A. 1. It means that an energy gets through a screen cage, initiated by an electrical charge outside the cage, that has the effect of initial stimulation on sensitive subject (psychomotor) followed by profound respiratory effect (which starts on expiratory phase of

37. Bell, Davidson & Scarborough, Textbook of Physiology and Biochemistry, Williams & Wilkins, 2nd Ed., 1953. page 512 for physiology of gasping center at posterior end of 4th ventricle.

breathing) and psychomotor depression.

2. This primary effect (mostly depressive) is eliminated by the use of a double Faraday Cage which, however, does not remove the ESP-stimulating effect. This is well-proven.

3. This may point to an ionic effect that has a double component:

a. Initially there may be an ionization of gas and excess of ions in the cage atmosphere.

b. When deficiency of ions occurs--depression. When direct deficiency ionic effect is blocked out there remains an important secondary effect which is able to act through a solid air-tight Faraday Cage. This is an unknown system.

Q. What is the nature of the secondary effect?

A. 1. It may be due to the oscillatory movement of an ion such as O_2^-, O_2^*.

2. However, it may be due to a property of this ion which is not blocked by the barrier of the Faraday Cage.

3. This property could be:

a. Nuclear property?

b. Paramagnetic resonance?

c. Quantum shift in ionized molecule which gives off a radiation of such wave length that the copper is permeable to it? The direct or prime ionic effect may drain or bleed off the OD that the medium is dependent on. (Ions migrate toward walls inside of the cage).

Q. It is a fact thus far that only mediums, or sensitives, can demonstrate the increased ESP-test scoring effect of the cage. What distinguishes the medium or sensitive from the ordinary human?

A. It may be the ability to maintain a concentration of OD, or to properly utilize it.

Q. Do we have any clues as to what OD is?

A. OD is alleged to be seen by sensitives as the human "aura".

Q. From these sources what do we know about the aura?

A. 1. It envelopes the human body.

2. It probably has a gaseous composition, O_2, N_2 and H.

3. It is luminous,--has form and color to the eye of the sensitive.

4. It has the properties of an odorant. This I can personally testify to. This may mean that it activates either the central or peripheral centers for olfaction.

5. It has been described by sensitives as contracting, or condensing about a human inside of the charged Cage B (Standard).

6. The appearance of the aura to the sensitive is alleged to be indicative of past or present disease as well as present health.

Q. What conclusion can we come to from these observations as to the nature of OD?

A. OD is associated with normal atmospheric gases, and appears to be of a luminous gas-like nature. Mediums are able to utilize it better than normal humans, and to concentrate it for use in bringing about phenomena.

Q. What time factors are associated with OD?

A. 1. It takes Eileen Garrett exactly 2 minutes to go into trance and establish contact for "control". This is the same time period as the duration of tertiary depression induced by an electrical charge of one cage. This may mean that the OD is dispersed by a single screen cage and that it takes 2 minutes to condense a new supply in the absence of further cage charging.

2. After this 2 minute induction period it takes 8 - 10 more minutes for the sensitive to clearly grasp and demonstrate ESP-cognition. This may mean that 2 minutes is required for medium to gain control of ESP process but that it takes 10 or more minutes to concentrate enough OD to utilize it precisely.

3. Thus one may say that it takes a medium about 12 minutes in which to concentrate enough OD to demonstrate ESP-cognition.

4. Stone in ESP-tests in the cage always does poorly on the first MAT run which normally takes from 12 - 20 minutes. His best score always appears in the last 2 runs of a series of five.

5. After ESP-cognition sets in there is evidenced a cycle of 3'20" presence of ESP showing cognition and 20 seconds showing no cognition. See Fig. 19.

6. Such warming-up time values, and subsequent oscillation is not inconsistent with gas-ionization phenomena or the induction period of fatty acid saturation with O_2 and O_3.

Q. Since the entire air supply for the medium is confined to the cage volume (216 cu. feet) what is it that the medium does to "process" the respired air?

A. 1. Before OD can be produced the medium goes through a breathing exercise which is the 1st step in processing the air.

2. First processing may occur in nasal chambers as a selective filtration and absorption of certain molecules.

3. It is conceivable that the medium processes OD in the left side of the respiratory passage.

4. Oxygen is absorbed in greatest quantity through the pulmonary alveolar wall.

Trace amounts of N_2 and H are also absorbed.

5. CO_2 production should be studied closely for evidence of hypercapnea.

6. The OD component of air may not necessarily be transferred via the pulmonary blood stream, but nevertheless it appears that it probably undergoes chemical linkage somewhere. Since OD has an odor there must occur some linkage by a molecule of gas (O_4, O_2) and an atom or molecule of an organic substance which gives off the scented odor. This is then excreted through skin pores as OD, or aura. What could this linkage be?

a. Sex steroid?

b. Adrenal ketosteroid?

c. Adrenochrome?

d. Unsaturated fatty-acid compound: Lecithin - glutathione - O_2 Glycerides - linolenic acid?

e. Glutathione system?

f. Serotonin?

What clues do we have?

a. The medium loses weight during a trance, but over a number of sittings gains weight. Weight increase is due to edema fluid. Over-activity of adrenal cortex-cortone effect is implied.

Q. What substance could be lost during a trance that accounts for weight loss, and then leads to compensatory edema?

A. Water would be only substance of such mass that could be lost so rapidly. Water would most likely be lost by a diuretic effect, combined with a sudorific or perspiratory reaction. The release of some compound from the adrenal cortex can be suspected (electrocortin?). Such an excessive fluid loss would entail a loss of electrolyte, and probably an excess production of cortisone compound which would lead to a compensatory edema.

Q. It would appear that there could be a sequence of events in the realm of gas phenomena, respiratory physiology, and stress-reaction physiology that may furnish clues to the mode of OD production, and

to the identification of OD. If this be so then what experiments should be conducted to test the above hypothesis?

A. A minute gas analysis in the cage--before and after the medium worked, and compare this to a control study. A spectrographic analysis would be the most satisfactory. Excretion studies of the urine, sp. gr., electrolytes, ketosteroids.

Q. Assuming as a postulate that the medium produces from the air via the body a hydrated-organic chemical-gas compound called OD how can this contribute to aiding extra-sensory perception?

A. Let us assume that ESP exists. Let us further assume that all humans continually produce some amount of OD as a part of the life process. Let us assume that the special function of the medium is to produce the quantities of OD necessary for ESP function. Let us now map out a hypothetical arc of ESP communication.

First let us assume that all things that have been or are related to humans have a trace of OD on or around them.

Second, all humans have a field of OD around them.

The problem is to establish contact between these two fields. Let us disregard the question of space and time for the moment.

Communication theory and development has shown that all things are within the grasp of our observation dependent on the bits of information available. We need only to establish the proper steps of perceptive transformation between the seer and the object. The example of the telescope, microscope, radio, and television come readily to mind. In addition, some element of redundancy is necessary.

In the case of telepathic ESP-cognition what are the necessary theoretical transforming steps that we must postulate in order to realize such communication?

1. A proper focus of consciousness on the point in space-time of which we desire intelligence.

2. Proper amplification of the correct focus of consciousness.

3. Elimination of conditions interfering with the line of communication between the point of consciousness and the object point of perception (inanimate, or animate).

We can assume that the proper focus of consciousness in ESP can be achieved by training and experience by the same methods necessary for a comparable power of concentration in any of the pursuits of life such as art, logic, and science. In the study of humans exhibiting ESP-cognition it has been found that better orientation can be achieved if the sensitive can come into tactile contact with some object belonging to, or related to the target area in question. For example, if the target area is a person at a distance half way around the world, it is a great aid to the sensitive to be able to handle a specimen of the person's handwriting or an object belonging to him. This contact is sufficient to enable the sensitive to focus sharply on the person in question. While this technique serves as an aid to the proper focus of consciousness it is not a necessary device for a highly gifted sensitive.

Once having achieved the proper fix of consciousness the sensitive needs the aid of a power factor in order to bring in clearly and sharply the desired intelligence. This is where the concept of OD is helpful in the theory.

The sensitive can amplify his acuity by being on the inside of a dense shell of OD. A thin sparse shell would not give the requisite amplification and power. The shell of OD acts as a sensitive amplifier for intelligence and if the medium does not have a sharp focus of consciousness he is overwhelmed by too many impressions. He is blinded by

the multiplicity of data which enters from all sides of his consciousness. Hence, he must focus on that part of his OD shell which is in a "line" with the object of his perception. In order for such a steady fix to be held the Odic field around him must be stabilized.

Experience of others records that if it is windy, drafty, clouds moving overhead, or if electrical or other storms are present--there is a definite depressing effect on mediumistic or ESP-cognition performance. The following points may be enumerated as to what is the function of the Faraday Cage in increasing ESP-test scores and cognition:

1. It shields out all electrical disturbance which could make the odic field unstable.

2. It provides an area which can concentrate ODic energy around the sensitive, and stabilize the field.

3. The ground arrangement of the Faraday Cages may act as a collector of the gaseous elements of odic energy. This effect is increased by adding charged ions into the cage.

4. The maintenance of charge potential on the cage aids telepathic cognition to gain intelligence from outside of the walls of the cage. Hence, some transfer is implied through the metal boundary of the cage.

Q. Is there any function of the Copper Cage in ODic concentration?

A. A basic function of the Copper Cage may be polarization. The face-centered cubic crystal structure of copper (tough pitch copper with 0.03% O_2) is postulated to be the polarizing structure. As far as ESP-cognition is concerned it is the O_2 and O_3 in the copper that may polarize the consciousness system involved.

Q. What properties of copper support this postulate?

A. Gold, silver and copper are diamagnetic.

ISOTOPES - Copper At. No. 29

Protons	MASS NO.	Neutrons	% Abund.	½ Life	Trans to
	58	29	0	7.9 min.	Ni 58
29	60	31	0	81 sec.	Ni 60
	61	32	0	3.4 hrs.	Ni 61
	62	33	0	10.5 min.	Ni 62
29	63	34	70.13	stable	-----
	64	35	0	12.8 hrs.	Zn 6
	65	36	29.87	stable	-----
	66	37	0	5 min.	Zn 66

Q. What property of oxygen would couple with the diamagnetism of copper resulting in polarization?

A. O_2 is strong in paramagnetism.

At. no. = 8

Protons	MASS NO.	Neutrons	% Abund.	½ Life	Trans to
* 8	15	7	0	126 sec.	N 15
8	16	8	99.757	-----	-----
8	17	9	0.039	-----	-----
8	18	10	0.204	-----	-----
8	19	11	0	31 sec.	F 19

* Does charged cage produce? If so would $N_{15} \longrightarrow N_2O$?

Nuclei having too many protons emit a positive electron and transform a proton into a neutron.

Q. In regard to Project XII D what electrical conditions ~~obtain~~ exist on Cage B wall?

A. Copper in the wall of a Faraday Cage tends to have all free electrons pulled to the outer surface of the cage. This should leave an excess of protons on the inside of the copper wall which in time will be neutralized or satisfied by the electrons on the outer surface

of the dielectric (wood) lining. Since the charges are bound in the dielectric, the inside surface of the dielectric will tend to become positively charged with respect to the outer surface. This will induce a certain stress in the dielectric whose direction will be outward. A human being inside the cage will be subject to the stress of a high potential of positive electricity in respect to his own electrostatic field. This will tend to pull negatively charged ions away from his body. This effect is magnified by the electrical conditions of Project XII D.

Q. Is there any possible relation between the 15 micron band of ozone, and brain cell function?

A. It is assumed that the olfactory centers are activated by the ODic energy acting through the nasal chambers. It has been observed in the case of Mr. Hurkos that there is present on EEG recording a form of self-excited synchronous discharge in the temporal cortex contemporaneous with an act of ESP-cognition.

Let us assume that such cortical cells are behaving like a cavity resonator. The formula for the wave length of a cavity resonator is $\lambda = 2.28$ radius. Substituting in the place of lambda the value of a wave length of 15 microns we can calculate that the radius of the nucleus, or cytoplasm, of such a cell would be approximately 6.5 microns, or 13 microns in diameter. This is the size of the cell body of the ordinary small cell in the temporal cortex. The assumption that the cortical cell body could behave like a cavity resonator must be based on some structural characteristic compatible with such a function. The following structural characteristics are present that are compatible with such an assumption: 1) The geometry is correct. 2) It can be argued quite plausibly that the plasma membrane of the cell body has properties that fit closely the properties of a piezo-

electric crystal of the Rochelle salt type. 3) The elements of resistance, (R), capacitance, (C), and inductance, (L), in a nerve have been measured, and postulated by Curtis and Cole [38] to exist in the form of a series-resonant circuit. In a piezocrystal these same elements are arranged in a parallel resonant circuit. A parallel-resonant circuit would satisfy the electrical requirements of the 'after-discharge' phenomenon observed in humans showing self-excited synchronous discharge. Hence, it is suggested that the series connection of L and C of the 'series-resonant' circuit in a nerve in the normal state, is shifted in a sensitive to a parallel connection between L and C which is in series with the rest of the circuit, thus resulting in a parallel-resonant circuit. Such a change could be effected by a re-orientation of molecular elements as the result of chemical shifts. 4) The energy and power requirements are satisfied. 5) The use of piezocrystals as microphones is well-known. It is suggested that sonic activation is the simplest method of activating a cell body of the temporal cortex to shift its function toward being a parallel resonant circuit, and act as a cavity resonator of wave length fifteen microns.

Absolutely no assumption is made that such intraneuronal radiation is the source of the transmission phenomenon in telepathic interaction. This theoretical suggestion is made only to clarify the direction that future experimentation may take. The hypothetical 15 micron radiation of the activated temporal cortex cell body is put forward to show that it is desirable to perform the following experiment: If intermittent 15 micron radiation from the brain, and absorption of the same by carbon dioxide, ozone, or other like molecules in the atmosphere, can increase the "power factor" of the subject, it should be possible to

38. Curtis and Cole, J. CELL. & COMP. PHYSIOLOGY. 19: 135, 1943.

test this by introducing such monochromatic radiation (preferable intermittent) inside the cage, and then to test the effect on the ESP-test performance of the subject. Such a radiation band can only be of importance as it influences some other property of "matter", such as the eigenfunctions and eigenvalues of molecules. These correspond to the Psi (ψ) functions of wave-mechanics. The intriguing suggestion has been made [39] that the sensory modality of touch is probably stimulated by the probability wave, Psi (ψ) of the electron. This is especially interesting in the light of the fact that the sense of touch is the one sensory modality that probably aids the process of extra-sensory cognition.

Furthermore, no claim is herein made that any of the problems of extra-sensory perception or of the ritual of the irrational have been solved. The aim has been to highlight the problems that appear to exist, so that the empirical method would have its direction fixed toward more fruitful experimentation.

Why is the ground connection of Cage B important in the phenomenon described, and why is pulse modulation of such an arrangement contributory? The following line of speculation might be helpful in finding an answer. Consider the surface of the earth as the inner shell of a capacitor, and the atmosphere or ionosphere as the outer shell of a capacitor. What are the requirements to produce a standing wave in a shell of such dimensions? Using the circumference of the earth as one physical dimension (approx. 40,000 kilometers), and the circumference of the ionosphere 200 kilometers above the earth as another dimension, simple calculation reveals that it would require a frequency of 14.53 to 14.99 cycles per second to form a standing wave whose node would be at the opposite pole of the earth from the

39. Encyclopedia Britannica, 1953 Ed. 23: page 635.

point of origin. Using as a mean, the value 14.76 c.p.s. - one could pulse (with suitable power) a double Faraday Cage at this frequency and maintain such a standing wave.

It would be interesting to activate by photic stimulation, or auditory stimulation the brain electrical oscillation (alpha) at a frequency of 14 c.p.s., and since the earth-atmosphere oscillation is resonant at approximately 14.76 c.p.s., it might be possible to get these factors in synchrony. In order to achieve this certain requirements would have to be met. The first is that the geometry of the inner Cage B should be such that it resonates (perhaps sonically) at a fundamental of 14.76 c.p.s. This would be a simple achievement in that the model of an organ pipe of this fundamental would be adequate. Such a geometrical configuration would set up new electrical requirements for the resonant frequency of the total structure in terms of its capacitance, inductance and resistance. The outer cage should be charged with this frequency (which would still be in the audio range), and this carrier frequency would then be interrupted with a square wave front (preferably 'sawtooth') pulses at a rate of 14.76 c.p.s. On the basis of such simple geometric and electrical considerations the design of a physical environment for the subject can be tested for its parapsychological effects to test some of the postulates put forth.

The prime requirements inside the cage are the design of the proper reflecting wall surfaces, the regulation of the vapor and gaseous composition of the air, and the maintenance of a high induced positive D-C field around the subject. The purpose of such techniques is to increase the 'power' of the subject as an aid toward achieving more precise and controllable ESP-cognition.

Of outstanding importance is the extension of the work done on the effect of various charged ionic atmospheres on sensitives. The correlation of EEG events with ESP-cognition events should be explored.

For practical purposes this line of research will have reached maturity when normal non-sensitives can yield extra-chance scores in ESP-tests by the aid of the techniques cited. Some fruitful results have already appeared in this direction.

ARKGNOSIS

SUMMARY OF THE ARGUMENT

Chapter 1

A study was made of the reactions of a sensitive, Mrs. Eileen J. Garrett, when placed inside of an A-C charged Faraday Cage A enclosure. When an interrupted A-C field was placed on the outside of a screen Faraday Cage A, Mrs. Garrett, who was on the inside, and shielded from the electrostatic effects of the A-C field, exhibited the following signs and symptoms: 1.1 Contemporaneous with the appearance of the A-C field on the cage Mrs. Garrett showed an inspiratory gasp of 2 - 4 seconds duration, followed by an 8 - 10 second respiratory depression. It was later determined, Sec. 6.63 B, that the respiratory reflex was due to an acute deficiency of charged ions in the atmosphere surrounding the sensitive. Associated with this physiological respiratory effect was a transitory psychomotor stimulation followed by depression. Hence, an attempt was made to eliminate these two undesirable effects on the sensitive. This was achieved by placing the sensitive in an air-tight sheet copper Faraday Cage B. Sec. 1.12.

1.34 Mrs. Garrett was then placed inside of Faraday Cage B. The outside walls of Faraday Cage B were charged in a random sequence with short pulses of an interrupted A-C field, the electrical target. Mrs. Garrett was asked to try to guess the arrival time of the electrical target. It was found after the experiment that the electrical targets were distributed in the Poisson series with a mean of 1.08. Since the assumption is made that in the absence of ESP-cognition, both the calls and the electrical targets are random events and independent series, such homogeneity argues for an interaction between the targets and the cognition of Mrs. Garrett. Hence, an attempt was made to determine if Mrs. Garrett was indeed showing evidence for extra-sensory cognition. This

with a mean of 1.11, and Mrs. Garrett's calls

test was carried out in Project IV.

Chapter 2

In Project IV the subject, Mrs. Garrett, was separated from the electrical target by a distance of 0.3 miles. The subject was inside of the Treated Faraday Cage. This consisted of the air-tight Faraday Cage B wherein the subject was placed. Faraday Cage B was nested in and insulated from Faraday Cage A. The walls of Faraday Cage A were charged continuously throughout each test with an interrupted A-C field. The electrical target was a random generator pulsed by big cosmic ray showers. This provided an electrical target appearing in a random sequence that followed a Poisson distribution. Mrs. Garrett again was asked to call the correct arrival time of the electrical target 0.3 miles away. In the test experiment, Group 5, Project IV, Sec. 2.3 A, there appeared a total of 59 targets distributed in the Poisson series with a mean of 0.475. In relation to these targets Mrs. Garrett made 61 calls distributed in the Poisson series with a mean of 0.491. Statistical analysis of Group 5, Sec. 2.3 B, yielded a critical ratio of 4.87 with Probability .000001. This result was considered statistically significant and argued for extra-sensory cognition on the part of Mrs. Garrett. However, because of the possibility that large cosmic ray showers could simultaneously strike the target area and the call area it was felt that the evidence for extra-sensory cognition was incomplete. The main finding of Project IV ~~was~~ is that the special physical arrangement, and electrical charging of the Faraday Cages called the Treated Faraday Cage was associated with statistically significant scoring. In order to ascertain whether or not the Treated Faraday Cage did indeed positively influence the outcome of ESP-test scores it was decided to repeat an experiment testing for the presence of extra-sensory cognition by using playing cards as the test material inside and outside of the Treated Faraday Cage.

Chapter 3

Mr. Frederick Marion was used as the subject in Project VII. His reputed telepathic and ~~and~~ psychometric skill was tested when performing inside and outside of the Treated Faraday Cage. As an additional control there was introduced into the experiment the physical arrangement of the Treated Faraday Cage but electrically uncharged. This arrangement is as shown in Fig. 10 minus the interrupted A-C field. This is called the Ground Faraday Cage and has Cage B grounded to earth. It was found that Mr. Marion showed statistically significant scores in calling out whether a playing card was red or black under ordinary room conditions. It was found that he could only attain significant scores when the investigator held the cards in his hands and offered each card separately for calling - the so-called "broken" technique. He did not show significant scores when no one held the cards, i.e., called down through the deck, or the so-called "down-through" technique. Mr. Marion argued that he was dependent for his knowledge of the card-order via psychometry, i.e., a human hand has to contact each card. This was our first clue as to the importance of the role of touch in such ESP-tests. This was to be explored later (Chapter 4) in the design of a new ESP-test called the Matching Abacus Test. In all the tests with Mr. Marion the broken-technique with playing cards was used.

Using the broken-technique, but not allowing Mr. Marion to touch the cards, he achieved a critical ratio of 10.5 as a control under normal room conditions. Inside of the Treated Faraday Cage he achieved a critical ratio of 14.8, and this represented a statistically significant increase over his control score under normal room conditions. In addition, it was found that his critical ratio in the Ground Faraday Cage was 13.7 and this was a statistically significant increase over the room control score.

Hence, it was concluded that both the Treated Faraday Cage and the Ground Faraday Cage were associated with significant increases in ESP-test scores over scores associated with normal room conditions in the case of Mr. Marion. It was now desirable to ascertain the reason for this difference in ESP-test scores obtained in the Faraday Cages as used.

Chapter 4

The problem was to find out if the Treated Faraday Cage Technique influenced the outcome of ESP-test scores primarily for telepathy, or for clairvoyance, or both. No evidence for clairvoyance was found in the case of the new subjects, Miss Bond, or Mr. Stone. Both showed evidence for telepathy. Hence, attention was focussed on telepathic ESP-tests.

In order to standardize telepathic testing a procedure was devised that fitted our experimental requirements. This is the Matching Abacus Test (MAT), a fundamental probability set of 10. The problem was to attempt to match two sets of 10 distinct symbols. The chance expected score is 5.4 for five such tests (a series of 5 x 10 = 50 trials). Eleven correct matches in 50 trials is significant at the one per cent level.

Each experiment was conducted as a block of 50 trials. Each experiment is expressed as the number of correct matches in 50 trials. Thus 15 correct matches is given as 15/50. This score can also be expressed in terms of a probability, or 15/50 equals $P = 1.572 \times 10^{-4}$, or $P = .0001572$.

In order to find out why the Faraday Cage Technique apparently influenced ESP-test scores it was used without an electrical field. Thus, only the physical arrangement of the Faraday Cages was used in the form of the Ground Faraday Cage. This means that Cage B was connected from one point to earth by a single copper wire.

Scores significant for ESP-cognition were obtained only when the

sender and the subject were allowed full telepathic interaction.

Sec. 4.65, p. 81. For two telepathic teams under normal room conditions the MAT score was 12/50 P = .003, and 11/50 P = .008 respectively. The scores for a comparable test inside the Ground Faraday Cage were 27/50 $P = 4.59 \times 10^{-11}$, and 28/50 $P = 8.17 \times 10^{-13}$. This was a significant increase in scores over those for ordinary room conditions. A total of five telepathic teams achieved a comparable level of scoring inside the Ground Faraday Cage averaging 5 hits per MAT run (approximately 25/50 or better). For each of these teams the critical ratio was 9.0 or better. These scores were obtained when the blindfolded subject was allowed to manually arrange the matching pictures. This is termed the "arranging" technique of MAT utilization. When the subjects were not allowed to manually arrange the pictures, but were allowed only to call the name of the picture the scores were at a chance level. This is termed the "calling" technique of MAT utilization. As in the case of Mr. Marion it was found that the sense of touch was important in the extra-sensory cognition process. Thus touch is a vital auxiliary to the process. Hence, the term "Extra-sensory" is a misnomer if the process is indeed fortified by the sensory modality of touch. However, in order to avoid confusion the use of the term extra-sensory perception (ESP) was retained keeping in mind the qualification cited.

This problem was further clarified in subsequent studies. The team of Stone as sender, and Hurkos as receiver did demonstrate the ability to achieve extra-chance scores by the calling technique of MAT utilization. The experience of parapsychologists with the Rhine card test is that scoring declines with successive runs. For example, the first run score may be 18/25, second 16/25, third 14/25 and fifth 10/25. This illustrates a declining score rate and is associated with the "calling" technique.

Our experience with the arranging technique of MAT utilization conducted in a Treated Faraday Cage shows an opposite curve of performance. For example, the first run score may be 4/10. second 6/10. third 8/10, fourth 10/10 and fifth 10/10. In other words, ESP-test scores go up with prolonged confinement in the cage. There was no explanation for this effect until the following experiment was performed. See Appendix 3.

Stone was the sender, and Hurkos the receiver. Both were inside of the Faraday Cage B with the MAT between them as in Fig. 29. The position of each picture in the target row of the MAT was designated by the numbers from 1 to 10. Before each trial the sender was to attempt to telepathically communicate the number of the position at which could be found the correct matching target picture. The receiver then called out the number that he thought he had received. The receiver then completed the trial by attempting to find manually by the arranging technique the correct target picture (and disregarding the number that he had already selected). Thus a contemporaneous score was kept for each trial of success by calling, and success by arranging.

With this team the score for calling was 18/50 $P = 4.014 \times 10^{-6}$, and the score for arranging was 50/50 $P = 1.589 \times 10^{-33}$. But more striking than this difference in ESP-test scores was the fact that the calling scores showed a declining curve of performance. The first run score for calling was 8/10, the second 2/10, the third 6/10, the fourth 2/10, and the fifth 0/10 making a total of 18/50. Conversely, the arranging technique scores started high and stayed high, or 10/10 for each run, making a total of 50/50.

Hence, the advantage of the arranging technique was dramatically illustrated in this experiment. The difference in scoring between the two techniques has been confirmed in other experiments. It appeared therefore that the curve of increasing performance found heretofore was not due to the use of the Treated Faraday Cage, but is due to the use of

the relatively non-symbolic technique of arranging, as against the symbolic technique of calling.

Chapter 5

The MAT was now utilized only with the arranging technique. It was desirable to find out if any material pathway (copper wire, nylon thread, direct skin contact) between the sender and receiver in ESP-tests inside the Ground Faraday Cage influenced the level of scoring. With the four telepathic teams of Puharich/Stone, Jackson/Stone, Puharich/Bond, and Jackson/Bond it was found that all these connections were associated with a significant decrease in ESP-test scores. It was desirable to ascertain if the decrease in ESP-test scores was indeed dependent on the physical conditions cited. An analysis of variance with the physical connections as the prime source of variation yielded significance at the two-per cent level. Such a level of significance did not offer sufficient proof that the physical conditions were responsible for the decline in ESP-test scores, but were interesting enough to warrant further investigation of the phenomenon.

From this study it was concluded provisionally that when the sender, and the receiver are brought to an electrical equipotential state ESP-test scores decline. The next procedure was to study the effect of connecting either the sender, or the receiver to earth via the Ground Faraday Cage. This procedure was associated with chance-expectation ESP-test scores. The next procedure was to inductively couple the subjects to earth by placing their bare feet on the wood floor of Ground Cage B. Here the results were not uniform in that Jackson/Bond, and Narodny/Stone ESP-test scores were chance-expectation, while Jackson/Stone were maintained at the Control Level Score associated with the Ground Faraday Cage Technique. It was concluded that it was Jackson as the sender who was the least affected by this condition, and in fact, that his ESP-test score increased.

The next procedure was to couple the subjects to earth via the Ground Faraday Cage by a capacitative inductive coupling which consisted of placing them on four-inch thick glass blocks. With this condition all three teams achieved extra-chance ESP-test scores. But the team of Puharich/Stone, and Narodny/Stone had ESP-test scores significantly below their control level scores, while Jackson/Stone maintained scores at their control level score (in a Ground Faraday Cage). Again it was concluded that it was Jackson as sender who was the least affected by this condition, and that his ESP-test score increased over his control level score.

From these studies it appeared desirable to test the effect on ESP-test scoring by placing the subjects at a high D-C potential with respect to ground--both by direct coupling, and by inductive capacitative coupling. The analysis of the rationale for this experimental course is taken up in the next chapter.

Chapter 6

Analysis of all the work done to date with the Treated Faraday Cage led to the conclusion that it had the effect of inducing a neuromuscular tension in a sensitive subject. Furthermore, a Treated Faraday Cage whose walls were of screen, and therefore permeable to charged ions, had the effect on a sensitive subject (when its walls were suddenly charged electrically) of inducing a respiratory reflex. This is best described as a "gasping" reflex, and denotes a neuromuscular tension on the respiratory reflexes resulting in an acute gasp for breath.

Conversely, when the Faraday Cage B carried no electrical charge, and was not grounded to earth (floating) none of the above signs and symptoms were observed. See Section 6.31. With the same conditions as for Sec. 6.31, but with the addition of a copper wire connection between the sensitive subject and earth there was again an absence of undesirable

tension symptoms, and often a subjective sense of deep relaxation.

Thus to over-simplify the situation the electrical conditions of a Treated or Ground Faraday Cage that induced tension symptomatology in a sensitive subject was also correlated with ESP-test scores significant for extra-sensory cognition with respect to the probability model tests. Conversely, with a sensitive subject in a floating Faraday Cage, or when he was grounded to earth in such a cage, there was an absence of the tension-inducing symptomatology, and often there was a subjective state of relaxation; this state was correlated with ESP-test scores not significant for extra-sensory cognition with respect to the probability model tests.

For Project XI it appeared desirable therefore to attempt to exaggerate the tension-inducing technology, and then to observe the effect on the sensitive subject. In order to achieve this aim the collector electrode of an electrostatic dust sampler was introduced through a two-inch aperture cut into the wall of Cage B. The sampler carried a 10 KV D-C potential with the outer two-inch concentric electrode (ground positive) connected to the copper wall of Cage B. This maintained Cage B at ground potential. The inner electrode of the sampler was at 10 KV Negative D-C potential. Air was drawn out of the cage at the rate of three cubic feet per minute. The sampler exhausted the inside of Cage B of charged ions thus creating a deficiency of charged ions. The 10 KV negative electrode was floating with respect to the sender and the receiver who were insulated from contact with the cage by glass blocks. The sender and receiver thus had induced on their bodies a D-C potential (value not determined) with respect to ground. See Fig. 22. It was believed that this technology would increase the tension-inducing effects previously observed with low voltages, and moderate charged ion deficiency.

The observations made on the sensitive, Mr. Stone, with the use of this technology in Project XI were quite remarkable. They may be classed under three main headings: physiological, psychological, and parapsychological. It must be pointed out that in all the previous experiments done with Mr. Stone he had never before exhibited any of these signs and symptoms.

6.63 B. Physiological Effects.

In the three experiments done Mr. Stone exhibited and experienced after thirty minutes exposure to Cage B an incontrollable spasm and flexor rigidity of the forearms and the hands. This was severe and painful. He exhibited a spasm of the facial musculature which gave him the appearance of risus sardonicus. He also exhibited a continuous dry hacking cough, and reported a sense of pressure on his skull at the site of the anterior fontanelle, and a headache. The agent and the investigator who were also present in the cage during the three experiments experienced only a dryness of the throat and a mild cough.

6.63 C. Psychological Effects.

In all three experiments the subject, Mr. Stone, reported a mild form of "a sense of intoxication--as though drugged." He also reported auditory hallucinations described as church bells, sleigh bells, and vaguely heard music. The agent and the investigator also experienced the latter.

6.63 D. Parapsychological Effects.

The ESP-test scores for the three telepathic teams in these experiments were at a chance-expectation level.

The problem posed was whether the extraordinary tension effect on the subject was due to the electrostatic induction on the bodies of the personnel in the cage, or to the charged ion deficiency? It was decided to first explore the effect of enriching the atmosphere inside of Cage B

with charged ions.

Chapter 7

With only minor changes made in the electrostatic dust sampler, and the addition of a candle ion generator, the atmosphere inside of Cage B was enriched with an excess of negative charged ions in Project XII. Otherwise the Faraday Cage Technology remained as described in Project XI. Curiously enough, enrichment of the charged ionic content of the atmosphere was associated with the disappearance of all the unpleasant tension effects observed in Mr. Stone during Project XI.

However, there was no uniformity in the parapsychological effects for the three telepathic teams. Puharich/Stone had chance-expectation ESP-test scores for ON hits, but showed significance at P = .003 level for TSD hits. Narodny/Stone showed very significant ESP-test scores for both TSD hits (17/50) and ON hits (21/50). Jackson/Stone had chance-expectation scores for both TSD hits and ON hits.

The reason for the Narodny/Stone high score was investigated by analysing minutely the procedure used during the experiment by this team. It was found that Narodny (as sender) had allowed his woolen trousers to come into contact with the 10 KV negative D-C charged ion generator screen. This meant that Narodny's body had become highly positive by induction from the high potential negative electrode.

As a control experiment therefore, it was decided to have the sender connect himself directly to the high potential negative electrode, and repeat the experiment of Project XII. Under these conditions the team of Puharich/Stone achieved an ESP-test score of TSD hits 12/50 and ON hits 13/50. Each of these scores was significant for telepathy. The observation was made, quite accidentally, that if the sender pointed his finger at the subject, Mr. Stone would show a sharp withdrawal reaction as though he had received an electrical shock. This was indeed an unusual form of

sensitivity on the part of the subject to finger-pointing by the sender. It was decided to pursue this line of experimentation by trying to maintain the sensitivity of the subject to finger-pointing, but at the same time to eliminate the unpleasant sensation of electrical shock. In order to test this possibility it appeared desirable to place an electrostatic shield around the subject in the form of a Faraday Cage C nested inside of Cage B. See Fig. 25.

Chapter 8

Project XII D consisted of experiments in which the sender, Puharich, placed his stockinged feet on a foot-plate connected to the 10 KV negative electrode. The receiver, Stone, sat in Cage C shielded from the 10 KV negative potential and the sender. The sender continued to use the finger-pointing technique of sending to the subject the correct position of the picture sought in the target row. It was observed that Mr. Stone quietly and accurately responded to the finger-pointing signal without experiencing any sense of electrical shock. In fact, if an electric spark were directed at the walls of his cage without his knowledge (he was blindfolded) he showed no reaction to the electricity. Thus it was concluded that he was well-insulated from any detectable electrostatic interaction with the sender.

The ESP-test scores for Project XII D, Exp. No. 2, was quite remarkable. The team of Puharich/Stone achieved 41/50 ON hits, $P = 5.3510 \times 10^{-22}$. In order to check if the conditions were indeed responsible for the high score, the same experiment was repeated the next day. The same ESP-test score was achieved in Project XII D, Exp. No. 3, namely 41/50 ON hits.

As a further check Narodny/Stone, and Jackson/Stone repeated the experiment of Project XII D. Both teams achieved chance-expectation ESP-test scores. The experiment was repeated many times with these two

teams with the same result, namely chance scores. Yet the team of Puharich/Stone continued to achieve the same high level of ESP-test scoring consistently. No reason could be found why these teams reacted consistently and differentially to the same constellation of Faraday Cage conditions.

A fresh approach to the experimental dilemma was sought by trying to set up a telepathic team in which either person could act as sender or receiver. Such a team was found when Mr. Peter Hurkos and Mr. Harry Stone were brought together. Under normal room conditions they proved that each could score above chance-expectation when acting either as a sender or a receiver. Under the conditions of Project XII D with Hurkos as Sender and Stone as Receiver the ESP-test score was 44/50. This confirmed the findings previously made with Puharich/Stone in Project XII D. With Stone as sender, and Hurkos as receiver the ESP-test score was 13/50, P = .001. This was not a remarkable score. Hence Hurkos was tested as a receiver when Puharich was the sender. The ESP-test score was 40/50. Thus Hurkos proved his ability as a receiver. This group of experiments was repeated many times with the same pattern of results. One could only come to the conclusion that Stone was inhibited by a coupling with the 10 KV negative D-C charge.

It was decided to remove entirely the effects of the high potential negative electrode from inside of Cage B in Project XV. In this experiment the electrostatic sampler was removed from the Cage B wall, and the aperture sealed with copper. The negative D-C charge was then placed on the outside wall of Cage B. Thus Cage B had no electric charge inside of it, and its integrity as a tight Faraday Cage was restored. Stone was again the sender, and Hurkos the receiver. With the very first experiment attempted under these conditions the team of Stone/Hurkos achieved the remarkable ESP-test score of 50/50 ON hits, $P = 1.589 \times 10^{-33}$. The re-

moval of the influence of the high potential D-C field from Stone simultaneously removed the "sending" inhibition, and allowed Hurkos to prove his prowess as a good receiver. See Appendix 2.

As described earlier in this summary the team of Stone/Hurkos also demonstrated in Project XV the ability to achieve significant ESP-test scores by the calling technique. As a result of this finding it was decided to repeat the split-MAT experiments with one subject in Cage C, and the other in the room outside of the cages. The scores in this test was significant with 34/50 ON hits $P = 1.216 \times 10^{-17}$.

It was now possible to put to a crucial experiment the question of whether we were indeed dealing with true telepathic interaction. Mr. Hurkos was placed inside of Cage C, and given only the target row of the MAT. Cage B, surrounding Cage C, was charged to 18 KV negative D-C with respect to ground. Mr. Carl Betz was in Cage B as the agent-investigator. Mr. Stone was taken in an automobile to a distance of one mile away from the cage where Mr. Hurkos sat. When the car stopped, Mr. Stone was handed only the matching row of the MAT by Miss Marianna Rockwell, the other agent-investigator. At a pre-arranged time signal both Mr. Hurkos and Mr. Stone started the matching. Mr. Hurkos as receiver was to try to duplicate the order of the ten pictures set up by Mr. Stone as the sender. The ESP-test score was 36/50 ON hits, $P = 2.248 \times 10^{-19}$. This was the first solid evidence obtained in this laboratory for telepathic interaction between two humans.

Chapter 9

An attempt is made to clarify some of the theoretical and experimental problems raised by the reported findings.

APPENDIX

Appendix 1

What is the effect on ESP-test scores in Project XII D (where sender is at an induced high potential with respect to receiver in Cage C) if Cage C is grounded to earth? To test this question Cage C was grounded to earth, and the induced charge used on sender as in Project XII D.

Sender - Puharich)
) 13 July 1956
Receiver - Stone)

TSD	ON	POST	PRE	$\sum$ TSD ON	Possible score
12/50	16/50	5/50	6/50	28/50	$P = 8.170 \times 10^{-13}$

ON $P = 4.913 \times 10^{-5}$

Sender - Puharich)
) 12 July 1956
Receiver - Hurkos)

TSD	ON	POST	PRE	$\sum$ TSD ON	Possible score
6/50	22/50	3/50	3/50	28/50	$P = 8.170 \times 10^{-13}$

$P = 1.429 \times 10^{-8}$

The scores drop from the Project XII D level of 41/50 to 16/50 and 22/50. There is a loss of accuracy on the part of the receiver as evidenced by the increase in the number of Target Selection Displacements. It was concluded that it is desirable to use Cage C as a floating cage inside of Cage B.

Appendix 2

Repeated tests under the conditions of Project XII D show that Stone is inhibited as a sender by the electrical conditions inside of Cage B. This resulted in ESP-test scores that are either at a chance-level, or slightly above chance. Can this inhibitory effect on sending be eliminated?

Project XV. 16 August 1956

Project XV represents a radical departure in experimental technique over all previous projects. The essential change introduced into the experiment is that all electrical input is eliminated from the inside of Cage B, and its Faraday Cage shielding integrity is restored by sealing the aperture made in Project XI. In addition, a D-C negative potential of 18 KV is placed on the outside of Cage B with respect to ground.

This was accomplished in the following manner:

1. The precipitator gun was removed from the aperture in the Cage B wall.

2. The aperture was sealed with a double thickness of copper plate. This restored the electrostatic shielding integrity of Cage B.

3. The precipitator gun was placed on a glass block on the floor of Cage A in such a manner that the high potential electrode could be led to the copper wall of Cage B without any electrical leakage to Cage A.

4. The wooden track placed between Cage A and B on which the door rolled was removed.

5. All physical arrangements were left in situ inside of Cage B. See Fig. 29.

The essential change introduced into the experiment is that there is no electrical field inside of Cage B, and a high potential negative D-C charge is placed on the outer wall of Cage B.

Sender - Hurkos Receiver - Stone 14 June 56 Proj. XII D Conditions Induced charge on Sender	Sender - Stone Receiver - Hurkos 7 June 56 Proj. XII D Conditions see p. 170 Induced charge on Sender
TSD ON POST PRE 0/50 50/50 0/50 0/50 $P = 1.589 \times 10^{-33}$	TSD ON POST PRE 3/50 13/50 1/50 5/50 P = .00132
Proj. XV Conditions Exp. 1 No charge on Sender 16 Aug. 56 16 KV Neg. charge outside walls of Cage B. TSD ON POST PRE 1/50 43/50 0/50 1/50 $\dot{P} = 5.521 \times 10^{-26}$	Proj. XV Conditions No charge on Sender 28 Aug. 56 16 KV Neg. charge outside walls of Cage B. TSD ON POST PRE 0/50 50/50 0/50 0/50 $P = 1.589 \times 10^{-33}$
It was noted for the first time that Stone could receive symbolic intelligence from Hurkos.	It was noted for the first time that Hurkos could receive symbolic intelligence from Stone.

The use of the conditions cited for Project XV show that Stone's score as a sender go up from 13/50 (Project XII D) to 50/50 (Project XV). It was concluded that the electric field inside of Cage B was responsible for the inhibition as a sender noted in Stone.

Appendix 3

A new finding was made in Project XV. In addition to making highly significant scores by the "arranging" technique, it was found that the telepathic team, for the first time, was able to achieve significant ESP-test scores by the "calling" technique. This means that transmission of symbols was possible by telepathy.

Evaluation of ESP-test results on the basis of contemporaneous recording of Arranging Scores vs. Calling Scores.

Project XV. Experiment No. 17 28 August 1956

16 KV Neg. outside walls of Cage B

Sender - Stone in Cage B

Receiver - Hurkos in Cage C

Run	"ARRANGING" ON HITS	"CALLING" SYMBOLIC TELEPATHY - ON HITS
1	10	8
2	10	2
3	10	6
4	10	2
5	10	0
Totals	50/50	18/50
	$P = 1.589 \times 10^{-33}$	$P = 4.014 \times 10^{-6}$

It is to be noted that the calling scores showed a declining scoring rate from runs one to five. Conversely, the arranging scores were maintained at a high plateau flat curve. The use of the arranging technique is undoubtedly responsible for the very high level of scoring reported in this work and is associated with certain Treated Faraday Cage environmental factors.

Appendix 4 a

As a result of the finding that symbolic transmission by telepathy was possible under the conditions of Project XV it was desirable to repeat the split MAT tests of Project IX D with the sender outside the cage, and the receiver inside the cage. The receiver's cage was used as in Project XV.

PH - In Cage - Receiving)
HS - In Room - Sending)

SPLIT MAT - TWO ROOMS
Free choice of arranging by subjects

RUN	TSD	ON	POST	PRE
1	2	8	1	1
2	0	4	0	0
3	1	4	0	0
4	0	8	1	1
5	0	10	0	0
	3/50	34/50	2/50	2/50

ON HITS $P = 1.216 \times 10^{-17}$

Appendix 4 b

In the split MAT tests cited in App. 4 a, a distance of approximately one mile was placed between the sender and the receiver. The ESP-test score was significant - 36/50. This was the first solid evidence obtained for the existence of telepathy.

J. B.

PH - Receiving - In Cage C)
HS - Sending - 1 mile away)

SPLIT MAT - At a distance
Free choice of arranging by subjects

RUN	TSD	ON	POST	PRE
1	0	3	2	0
2	4	3	0	2
3	0	10	0	0
4	0	10	0	0
5	0	10	0	0
	4/50	36/50	2/50	2/50

S = Subject Sender
-S - in car - .7 mile away
-S - in car - 1.5 mile away
-S - Lab. 2 - .3 mile away
-S - Lab. 1 - 100 feet away
-S - .7 mile away

ON HITS $P = 2.248 \times 10^{-19}$