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EDITORIAL

The reports in this number of New Horizons fall into two distinct groups—three papers on Extra-Sensory Perception and three on pyramids. What they have in common is that they all deal with the propagation of real or alleged invisible influences or forces.

In the case of pyramids we decided to find out by actual experiments whether the “cosmic” influences, which many people allege can be “focused” both by Egyptian pyramids and hollow models of pyramids, do, in fact, actually exist. This is a proper object of scientific research because, if true, it would be very important. The work which Mr. Alter and Mr. Simmons report on appears to have been done both carefully and imaginatively. Their findings seem quite conclusive, and to demonstrate that model pyramids have none of the occult properties ascribed to them. Although this is a negative result, we think it ought to be published. It is wrong for mistaken beliefs to stand uncorrected; they distract attention from discoveries that are both true and profoundly interesting; their effect is like that of Gresham’s Law in the field of public finance where, “Bad coin drives out good”. There is also the issue of consumer choice; model pyramids are marketed and advertised; prospective purchasers are entitled to adequate information as to what to expect.

The papers on ESP are, however, concerned with aspects of a class of phenomena that are both true and important—the acquisition of information by means which we call extra-sensory perception, because they do not depend on the ordinary human senses.

Mr. Wilkie’s work is interesting because it exemplifies the remarkable accuracy which can be achieved on occasion by a highly endowed “psychic” person. It also raises the question of the nature of the “ESP channel”.

The paper on ESP in relation to distance is self-explanatory. We think that the techniques described may be useful to other experimenters. The results reported tend to support the view that up to great distances “high-powered” ESP is independent of physical separation, and is not propagated broadcast like radio waves, but more resembles contact by telephone, i.e. is concordant with the “network” theory (Osis, Turner and Carlson, 1971). Whether this implies that ESP is “non-physical” is a deduction that we are not yet in a position to make.

Pride of place has been given to the remarkable paper by Dr. D. H. Lloyd. This is a pseudonym; however, the author is a Doctor of Medicine, engaged in medical practice and research in Canada; his bona fides, professional qualifications, and scientific abilities are well-known to the Editor. New Horizons takes particular pleasure in publishing Dr. Lloyd’s paper. We believe it to be one of the most important papers ever to be published in the field of parapsychology.
Dr. Lloyd and his associates have shown that it is possible by deliberately projecting a thought or a mental image at a person, to evoke an electrical response in that person's brain. The evoked response is detected in the cerebral cortex, i.e. the "grey matter" constituting the surface of the cerebral hemispheres of the brain. The method of detection is closely similar to that used to detect the response evoked by an ordinary sensory stimulus, such as a light directed to the eye, or a noise presented to the ears. Thus it utilizes an established technique which has been understood and applied for many years past, so that its validity is not in dispute.

The type of response is very similar to that which occurs in the cortex when a sound is heard. The technique used can therefore be best illustrated by describing what happens in audition. Soundwaves impinging on the eardrum cause vibrations of its membrane which, via the middle ear, communicates motion to the fluid of the inner ear. This induces vibration of the cochlear partition where nerve fibres are stimulated. These fibres proceed in a bundle — the auditory nerve — to a region called the cochlear nucleus situated in the medulla in the lower part of the brain, whence the "message" in the form of nerve impulses is conducted through various other organs of the brain to the auditory cortex in the temporal lobe. Presumably it is at this final stage that (provided the sound is consciously noticed) the electrical stimulation of the cortex is, in some totally mysterious way, "translated" into an auditory perception.

According to circumstances, the occurrence of the sound may or may not be registered in the consciousness of the hearer. Or, as with some infants, it may register in the consciousness but not be recognized as a sound. In this case, it will be "perceived" but not "apperceived", i.e. the experience is not understood in relation to its source, or fitted into the general pattern of surrounding events. However, provided the ear and the auditory portions of the nervous system are complete and healthy, the resulting electrical stimulation of the cortex can be exhibited, even though it is not perceived or apperceived. This is because electrical activity on the cortex of the brain produces a small electric voltage on the scalp of the head. This voltage is very minute; its typical peak value is 50μV (i.e. 50 microvolts = 50 millionths of a volt), but it can be measured by attaching two electrodes to different regions of the scalp and connecting them to the input of an amplifier. The output of a series of such amplifiers is sufficient to move the pen of a chart-recorder so that we obtain a graph (the celebrated EEG, i.e. electroencephalogram) of the voltage difference between the two regions of the scalp plotted against time. Alternatively, (or simultaneously), this voltage can be displayed on the screen of a cathode ray oscilloscope.

It has been proved that when the "messages" relating to a sound finally emerge on the temporal cortex, a characteristically formed "wave" of electrical activity results. For instance, a machine known as a tone generator can be arranged to give out a note of any desired pitch (e.g. an
audio-frequency of 2000 Hz = 2000 cycles or vibrations per second) for a short time (such as 200 milliseconds = 0.200 seconds = 1/5 of a second). Shortly after the commencement of the sounding of the tone generator the cortex develops a positive voltage, which increases to a few microvolts and then declines to zero, becoming negative until it reaches a negative peak of the order of 50 μV. This is the peak N1 shown in Figure 1 of Dr. Lloyd’s paper. Thereafter the voltage becomes positive again attaining the peak P2. It then executes two or three more oscillations between positive and negative values, declining finally to zero about half a second (i.e. 500 millisecond) after the commencement of the sounding of the tone generator, i.e. about 300 msec. = 0.3 sec. after the sound ceases.

Now this evoked response of the cortex cannot easily be separated from its spontaneous electrical activity which continues meanwhile irrespective of the auditory response. In order to separate the response from the spontaneous activity, the tone generator is sounded repeatedly at regular intervals of half a second (500 msec.). Before being fed to the chart-recorder the amplified EEG signal is passed through an instrument known in the trade as a CAT (computer of average transients). The purpose of the CAT is to add together the signals occurring at regular intervals of 500 msec. In a typical experiment it will add together the signals occurring at 0, 500, 1000 . . . up to 29,500 msec., and divide the resulting sum by 60 which is the number of items, in order to get the average. Similarly, it will average the signals at 1, 501, 1001, . . . 29,501 msec., and in fact, if t is any number of msec., the CAT will average the signals at t, 500 + t, 1000 + t . . . 29,500 + t msec., and it is this averaged signal which is registered by the chart-recorder. Now the averaged signal consists of two parts; one is the average of the spontaneous activity of the cortex (alpha waves and such), which is sufficiently irregular to average effectively to zero. However, in consequence of the repeated sounding of the tone generator the cortex has also produced 60 times what is substantially the same wave-form. The average of this constitutes the other and non-zero part of the averaged signal. The averaged signal therefore reproduces the typical form of the cortical response to an auditory stimulus. It is therefore called the average evoked response as it represents the response of the brain, evoked by the stimulus and not the spontaneous cortical activity which has been “scrubbed off” by the averaging process.

As will be seen from Dr. Lloyd’s paper, he and his colleagues had the brilliant inspiration of replacing the repeated sounding of a tone generator by repetitious projection of a thought at an experimental subject hooked up to EEG apparatus and a CAT in a manner very similar to that employed for displaying cortical response to sound. They showed that the thought also produced an average evoked response in the brain cortex of the subject. In duration and form the telepathically induced response is
very similar to that evoked by an auditory stimulus. The magnitude of the response is slightly less than that of the response to sound but of the same order of magnitude.

As many readers will be aware, this result is unique in psychical research. For the first time it has been shown that there is a physically observable event in the brain which correlates with a telepathic stimulus. As Dr. Lloyd points out, it does not tell us by what route the message arrives at the cortex, or even which part of the cortex is electrically activated. However, this result, even as it stands, opens up so many exciting prospects for objectively based researches of many kinds, that it may legitimately be recognized as signifying the advent of a new era in psychical research with potential repercussions on the behavioural and other sciences.

The demonstration of telepathically evoked response is, we think, entirely new, and derives nothing either of method or of inspiration from observations attributed to Russian scientists (Ostrander and Schroeder, 1970). So far as we can ascertain, Soviet investigators have merely paid attention to gross changes in the overall spontaneous electrical activity of the cortex while subjects are engaged in telepathy experiments, and have not succeeding in exhibiting any specific cortical excitation evoked by telepathic communication. The discovery made by Dr. Lloyd and his associates must therefore be rated as a Canadian “first”.

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New Horizons Research Foundation 23 May, 1973
Objective Events in the Brain
Correlating with Psychic Phenomena

D. H. Lloyd, M.D.**

ABSTRACT: A new phenomenon is reported. A pilot experiment, using well-established techniques, is described, in which images transmitted telepathically are found to evoke responses in the EEG which are similar in form, and comparable in magnitude, to those evoked by physical stimuli such as sounds.

Remarkably, in this experiment, although the response is demonstrably present in the cortex, the recipient, though aware of the nature of the experiment, does not consciously register the content of the message or consciously recognize when it is sent.

**Pseudonym. See Editorial.

1. Apologia

This paper is a report of an experiment performed in September 1970 by the author, and two other physicians who wish not to be identified. The experiment is unique being the first investigation that the author is aware of to objectively and directly suggest the capacity of the human brain to respond to psychic stimuli. It demonstrates a new phenomenon. For this paper psychic stimuli is defined as transmitted thought from one brain to another with no known means of communication. Subsequent experiments have refined the techniques in this early work, and will be published at a later date. Because of lack of controls, this early experiment is not conclusive, but has stimulated further more statistically extensive research by the present author into objective correlates of psychic phenomenon.

2. Method

The method and instrumentation is not simple and considerable detail will be presented to allow the reader a full understanding of the techniques applied.

(i). Averaged evoked response (AER). Within every living brain there is extensive and complex electrical activity, which is continuous and ongoing. The process which measures this electrical activity on the scalp is electroencephalography (EEG).
If a subject is stimulated with an acoustic tone, an evoked response may be seen in the ongoing EEG. This evoked response usually cannot be visualized in the greater amplitude of the ongoing EEG, but is normally present. The response is time-locked to the stimulus, that is, it occurs at a specific time after the onset of the stimuli. This is called the latency of the response. The evoked response is multiphasic, (see Fig. 1), and the latency of each wave has been established. (5, 6, 7, 8, 11.)

The significance of each component is still controversial, but this does not concern us in this first report.

Now, the problem is that the response is too small to be readily identified in the ongoing EEG. A well established technique to extract a time-locked signal from background noise is therefore used. (2, 4, 5, 6, 12.) The technique produces in this instance an average evoked response (AER), and is as follows.

A subject is stimulated with a tone and a time segment (say 500 milliseconds) of EEG data is gathered and stored. If this is repeated 60 times, there 60 segments of EEG data each 500 msec. long. If these 60 segments are then algebraically added on a time point-to-point basis, one 500 msec. segment results. This segment is the algebraic electrical sum of 60 segments, and can be considered proportional to the average of the 60 segments.

If no stimulus is applied, at any point of the EEG segment the electrical activity is random in its amplitude around zero units; thus there are theoretically as many +4.5 units as there are —4.5 units, and so on. The average in the infinite (theoretical) case is zero units for each point in the 500 msec. EEG segment. In the finite case of 60 segments the theoretical average of zero for every point is not attained and there are minor voltage fluctuations around zero volts.

Now, as the cortex response to a stimuli is time locked and constant in its pattern (i.e. not random), an average of 60 EEG segments each containing an evoked response will produce an average evoked response.

The time-locked response patterns will not average to zero as will the background random EEG (whose amplitude in this experiment never exceeds 50 microvolts negative or positive).

The pattern of the AER appears to be characteristic for each sensory mode. (2, 3, 5, 9.)

The acquisition and storage of EEG segments and the averaging process is performed by a computer of average transients (CAT). The presentation of the stimuli and simultaneous initiation of EEG acquisition is synchronized by a device which also signifies by means of a light flash, unseen by the subject, when the process starts.

(ii). Equipment. The instrumentation is block-diagrammed in Fig. 7. Standard EEG electrodes placed on the vertex of the skull and mastoid process were used. The output from the CAT is to a chart recorder and is reproduced in Figs. 2 to 6.
To help eliminate muscle and noise artifacts usually the voltage differential is measured between two points on the scalp; and an amplifier, called a differential amplifier, is used to increase the minute voltage differential to a usable level.

To further reduce noise, a filter is inserted to block non-meaningful myogenic artifacts (less than 3 Hz i.e. 3 cycles per second) and background atmospheric and industrial artifacts (greater than 30 Hz). This filter is thus called a bandpass filter and usually is set to pass 3 to 30 Hz, the usual EEG frequencies seen from the upper brain cortex layers on the scalp in an awake subject. (10.) A tone generator is required to synthesize a reproducible, accurate acoustic stimuli which is presented to the subject in an electromagnetically shielded and soundproof enclosure.

The ideal or classical AER from an acoustic stimuli is represented in Fig. 1. Each peak is identified and has a known latency. (5, 6, 7, 8, 11.) In the practical case not every peak is always present, but the general pattern is reproducible.

(iii) Procedure. The experiment was performed in 2 parts. In the first instance, three tones with a duration of 200 milliseconds and a rise-fall of 20 msec. were presented to the subject and the respective AERs were obtained. Fig. 2 represents the AER from 60 samples to a tone of 500 Hz at 60 dB hearing level (a dB, i.e. a decibel, is a measure of loudness, and 60 dB HL is reasonably loud for a person with normal hearing). (1.)

In the second part the tone generator was turned off. A sender watched the flashing light on the synchronization device. When this light flashed on, it indicated that a tone was presented to the subject (if the tone generator was on) and that at that moment the CAT was gathering an EEG segment. In the second part when the light flashed the sender created a mental image and attempted to psychically communicate this image to the receiver, that is, to transmit his thought image. In essence the mental image and attempted thought transference represented a stimulus, and substituted for the acoustic tone. The image used was a "cup of coffee". Fig. 5 and Fig. 6 represent the response obtained from this second part of the experiment. Each figure represents the AER from 60 samples.

For the sender, an attempt was made as soon as the light flashed to visualize a cup of coffee and to send that image to the receiver. This technique requires considerable practice. In each case whether the stimulus was a tone or a thought, the period between stimuli was 1 second.

Each EEG segment was 500 msec. following a stimulus, and for each test 60 segments were obtained. An observer was always present. The receiver knew that telepathy would be attempted, but did not know the content, nor the period of repetition.

3. Results

The results of five tests are seen in Fig. 2 to Fig. 6. Observing the responses from acoustic stimuli, it can be appreciated that the early part
Figure 1: Ideal AER

Figure 2: AER, tone 500 Hz, 60dB

Figure 3: AER, tone 500 Hz, 60dB

Figure 4: AER, tone 2000 Hz, 60dB

Figure 5: AER, psychic stimulation

Figure 6: AER, psychic stimulation

Scale: vertical 4 mm. = 50 microvolts, horizontal 1 mm. = 1 millisecond
SOUND-PROOF AND ELECTROMAGNETICALLY SHIELDED ROOM

ACOUSTIC TRANSDUCER

Differential Pre-Amplifier

Subject (Receiver)

EEG Amplifier 10^6 Gain

Bandpass Filter 3-30 Hz.

Computer of Average Transients

Output to Chart Recorder

Tone Generator

Thought

Synchronization Light

Observer

Sender
of each AER is similar. All three have an initial high amplitude negative peak with a latency of approximately 120 msec, followed by a positive peak of 200 msec latency. This would correspond to N1 and P2 respectively on the ideal AER in Fig. 1.

The response obtained when the stimulus consisted of thought patterns is similar to those obtained using an acoustic stimulus. The amplitude is lower but a N1 and P2 with the expected latency are present.

4. Discussion

The results of this experiment would suggest that the brain cortex of the receiver responds to acoustic stimuli and to what is believed to be transmitted thought in a similar manner. It does not imply that the same areas of brain tissue are used in each process. For example, the electrodes as used here were over the auditory cortex centers, but would have detected responses from the more posterior visual cortex if light flashes had been used as stimuli. (2, 7.) This is because, although each mode of sensory response is generated in a unique cortex area, the electrical response spreads over the cortex to involve other association areas. Each known sensory mode has a fairly unique pattern, but in this experiment no attempt was made to correlate the psychic response to known patterns.

The difficulty not dealt with in this experiment is assessing if the obtained response is a psychokinetic phenomenon. It could be suggested that the sender's thoughts may be influencing the equipment directly to produce the patterns, an equally important conclusion.

5. Summary

This report describes in outline how an established technique devised for a different purpose can and has been newly applied to investigate the brain's response to a telepathic message. Although the results as presented from this experiment are not conclusive, if further research does establish the validity of the application, then the AER to psychic stimuli will be the first truly objective primary correlate of psychic phenomenon, and will suggest the human brain does indeed respond to psychic phenomenon.

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New Horizons Research Foundation 1 February, 1973
Experiments on ESP in Relation to (a) Distance, and (b) Mood and Subject Matter

A. R. G. Owen, M.A., Ph.D.

ABSTRACT: Existing evidence does not permit the formulation of any mathematical law describing the decline, if any, of ESP with distance, but suggests that any decline is much less abrupt than that implied by any obvious physical model.

A technique for distance experiments is described.

Experiments are reported which seem to show that there is no ascertainable decline in ESP for distances up to 350 miles.

1. Introduction

1.1 ESP in relation to distance

The effect on ESP of distance, considered as a factor in isolation from others such as mood or genetic endowment, is one of the most intriguing unsolved problems in psychical research. Spontaneous cases, as well as a few experiments conducted over distances of a few hundred miles suggest that there is little diminution of effect with distances of that order. On the other hand, Dr. Karlis Osis (1965) correctly emphasized that such evidence as there is, does not fully support the assertion (which is often made) that ESP is quite independent of distance. In the paper cited, he showed that when all experiments reported in English prior to 1965 were considered they testified to little reduction, if any, for distances of up to one mile, but thereafter manifested a steady decline with increase of distance through the range 500-3500 miles. Dr. Osis' later experimental work (1968, 1971) leaves this conclusion substantially unaltered. Hence it cannot be asserted that ESP is independent of distance. However, it must be admitted that the scoring rates for all the experiments quoted over distances in excess of 500 miles are rather low and correspond to low values of $\Psi$, the frequency of intervention of Psi as defined by Owen and Quittner (1972). Hence we cannot claim to know what kind of distance law would be found if we could compare the highest $\Psi$ values obtainable at various distances, i.e. if we were in a position to compare the best with the best.

However, this question apart, Dr. Osis' summary of 1965 is extremely informative and suggests that $\Psi$ falls off with distance considerably more slowly than does any quantity propagated by a known physical field. In a gravitational or electromagnetic field emanating from a point source the
field intensity diminishes inversely as $R^2$ and the potential inversely as $R$, where $R$ is the distance. With other physical fields, such as those based on “exchange” forces or multiple sources, both field intensity and potential diminish inversely as higher powers of $R$. However, both Dr. Osis’ summary and experience based on experiments at various distances up to 200 miles suggest rather strongly that any decline with distance is distinctly milder than even the law $1/R$ (i.e. as the inverse distance). In thinking about this problem the writer has found it convenient to work numerically not in terms of $R$ but to measure distance as log miles or lm. The log miles between two places is $\log R$, where $R$ is in miles and the logarithm is to base 10. Thus, for separations of 0.1 ml, and 1000 ml, the log miles are respectively $(-1)$, zero, and 3 lm.

In order to derive a simple empirical law fitting the 1965 data, and embodying the properties of $\Psi = 1$ when $R = 0$ and $\Psi$ approaching zero when $R$ is large, the writer plotted the logarithm of the ratio $(1 - \Psi)/\Psi$ against logmiles. This revealed that the data could be represented approximately by the law.

$$\lg(1/\Psi - 1) = (1 + 1m)/2,$$

which is equivalent to

$$\Psi = 1/(1 + \sqrt{10}R),$$

expressing $\Psi$ as a bilinear function of $\sqrt{10}R$. According to this “law” $\Psi$ is unity at very small distances and at great distances falls off effectively as the inverse of $R$ to the power 1/2. No physical or other analogue of this law suggests itself; nor does the writer seriously propose it as correctly representing the “law” of ESP with distance. (Many mathematical laws can be found to give equally good fits to a limited set of data as we have here; e.g. Dr. Turner in 1965 fitted a law of entirely different form to Dr. Osis’ data.)

The writer’s present opinions can be summarized as follows.

(a) no data now available enable us to infer the general character of such laws as relate ESP to distance.

(b) Present evidence suggests a falling off of ESP with distance in excess of a mile.

(c) The rate of decline with distance is much less pronounced than even the inverse power law $1/R$, and if there is a decline it is related to log R or to a fractional power of $R$.

(d) Present evidence for distances of more than a few hundred miles relates entirely to relatively weak ESP performances with $\Psi$ at 1% or less. None of the foregoing conclusions might apply to high scoring performances if obtainable.

1.2. ESP in relation to mood and subject matter

It is the writer’s impression, based on study of the literature and some personal experience with ESP experiments, that, broadly speaking, some of the factors influencing ESP performance can be listed as follows:
Conducive to ESP
(a) individual make-up (i.e. constitutional or genetic factors),
(b) personal involvement (especially characteristic of spontaneous cases),
(c) certain states of mind such as “dreaminess”, abstraction, falling asleep, and the dream state itself,
(d) vivid, dramatic, or emotive targets,
(e) open-mindedness, as to the possibility of ESP, with lack of excessive scepticism on the part of both subjects and investigators.

Repressive of ESP
(a) boredom (as occurs in long drawn out experiments with emotionally or intellectually neutral subject matter),
(b) mental concentration on intellectual or practical tasks,
(c) excessive scepticism on the part of subjects or bystanders,
(d) excessive desire to perform well.

The writer therefore generally does not take subjects at random but tends, so far as is possible, to select persons with some claim to manifest ESP abilities at least sporadically. He has also developed an experimental format which he thinks is appropriate for distance experiments in which there is no possibility of sensory clues so that the conduct of the experiment admits of a degree of informality. The images to be mentally transmitted are not prearranged. This reduces the likelihood of fraud; but more important still is the fact that the agents are encouraged to select their own subject matter, which tends to ensure that the chosen topics are ones which genuinely interest them. We aim also at creating an atmosphere of cheerfulness without flippancy, with the participants hopeful of success but not buoyed up to high expectancy. We seek, somewhat paradoxically, to bring the group into a state which is simultaneously one of relaxation and of involvement with the subject matter. This is hardly attainable with a single agent or percipient isolated with the experimenter but can be achieved with a small group of interested and congenial persons. It was especially successful in the experiment described in section 4, when the group, talking freely amongst themselves, “inadvertently” selected the target topic for mental transmission.

2. An experiment with Mrs. Theresa Marmoreo
This subject on a previous occasion, while giving free verbal responses on persons in the same room (distances of the order of 10 feet, or minus 2.7 lm), had achieved an estimated $\Psi$ value of 30.90% with ample statistical significance, (Dixon 1972). On 24th February 1972, a group at the writer’s home attempted to transmit a randomly chosen two digit number (namely 23) to the subject at her home in Don Mills, Ontario.
(distance about 7 ml or 0.9 lm). It had been previously agreed that the number would be chosen a little prior to 9.30 p.m. and transmitted from 9.30 p.m. to 9.40 p.m. and that the subject would record any additional "psychic impressions" that she might have. At 9.45 p.m. the subject was telephoned and her impressions taken down by four witnesses on extension telephones. She said that she first got the number 36, then 23, then visualizations of an ESP card with wavy lines, 36 in a circle of light, and finally 23 with its digits brighter than any of the numbers she had previously "seen". It seemed fair to the writer to score this as a hit with p = 1/90. She then mentioned the impression of coldness and reluctance about going to the basement, which was scored as a hit with reference to one of the members of the group. Another impression (the name Johnson and a connection with home economics) was correct, but not scored as the subject had met the person concerned on other experimental evenings.

The subject then mentioned a cut middle finger on the right hand. This applied to one of the telephone witnesses so the writer asked the subject to associate to this person, which she did, producing impressions mainly correct, and at a very fast pace. There was no "fishing" or feedback and, in the writer's opinion, no communication of information via sensory clues. Whether any psychic conductivity is to be ascribed to the telephone wire is a question at present outside the reach of rational speculation.

When the results as a whole were scored, there were 8 hits and 3 misses out of 11 calls. After attaching a priori p-values, the likelihood method (Owen and Quittner 1972) gave the estimate $\Psi = 64.74 \pm 19.45\%$ with C.R. = 3.33 and odds in excess of 2083 to one.

3. An experiment between Toronto and Montreal

An experiment with Mr. Jan Merta as percipient was arranged for the evening of 11 November 1971. It was agreed that Mr. Merta would give descriptions of three persons who were to be chosen by a random process out of a group assembled at the writer's home. At 8.45 p.m. a lottery was held among the ten persons present. It was agreed that the target persons would be those who drew the lowest numbers, and would be presented as targets according to the natural order of their "winning" numbers. In the event the target persons were Mrs. Helen McNally, Mrs. Theresa Marmoreo, Mrs. Dorothy Johnson. Mr. Merta had met Mrs. Marmoreo very briefly in a large gathering in Toronto six months previously, but there was no reason to believe that he had acquired any appreciable amount of information about her. The other two ladies were totally unknown to him. At 9.00 p.m. the writer telephoned Mr. Merta at his home in Montreal, and with his agreement, invited Mrs. McNally to say over the telephone "Hello, Jan, How are you?" Witnesses on extension telephones were able to certify that nothing else was said or names. Mr. Merta then hung up, saying he would call again in fifteen minutes, which he did, providing a description of Mrs. McNally and her
personal tastes, interests, etc., which was taken down by three witnesses. The procedure was repeated exactly with the other two persons.

The statements made by the subject may be tabulated as follows. (H = hits, M = misses, U = unscored because of indefiniteness or unavoidable subjectivity.)

<table>
<thead>
<tr>
<th>Target</th>
<th>Physical description</th>
<th>General attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Mrs. McNally</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Mrs. Marmoreo</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Mrs. Johnson</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Totals</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

The statements were scored on the spot (as well as being checked later at leisure by the target persons). It seems fair to record that everyone present was genuinely impressed and felt that the subject had indeed (even allowing for the misses) actually described the targets, and that real communication had taken place. Out of 113 statements Mr. Merta had 94 hits as against 19 misses. On reading through the hits the writer formed the view that all, or almost all, of the correct statements had a probability not in excess of 0.5 of being true of a person indicated at random. It would therefore not be unjust (except perhaps to the perciptent himself) to score the hits each at the p-value 1/2. In such a situation we are not required to attach p-values to the misses, and the likelihood estimate of $\Psi$ is simply (excess of hits)/(H + M)q. The S.D. is got from the weight W = M(H + M)/ H (1 — $\Psi$)^2 where $\Psi$ is the estimate (94 — 56.5)/113(0.5) = 37.5/56.5 = 66.37%. Thus W = 201.95 and S.D. = 1/√W = 7.04% so that $\Psi = 66.37 \pm 7.04\%$.

It will be noticed that the largest number of statements and largest proportion of hits were obtained on the general attributes of Mrs. Marmoreo whom the subject had actually met, even though the physical description was the most meagre and least accurate of the three. In the writer's opinion this is unlikely to represent normally acquired knowledge, but raises the possibility that the "ESP channel" is more "open" between people who are actually acquainted with one another even though only slightly.

The experiment had an interesting sequel. On Saturday 27 November 1971 Mr. Merta visited Toronto and the group who had been present on 11 November were invited to meet him, but carefully instructed to give no clue as to which of them had been target persons. The latter were asked not to speak when joining the gathering in case Mr. Merta recognized their voices. Mrs. Marmoreo was unable to attend. Mrs. Johnson was the sixth person to arrive. The moment she entered the room Mr. Merta said "This is the one, the third". Mrs. McNally was the tenth to arrive and Mr. Merta said "This is the one, the first". In the writer's
opinion no one present gave Mr. Merta any silent clue on either occasion. There were also present several other people who had not been present at the initial experiment, and were not aware that Mr. Merta was hoping to identify any particular persons.

4. A distance experiment with four sites

4.1. The Plan of the Experiment

The writer’s home (site T1) was used as a base for an experiment on 19 Sept. 1972. A group consisting of Mr. Attin, Mr. R. W. Cumming, Mrs. P. J. Hurlburt, Mrs. D. Nasmith, Mrs. I. M. Owen, Mrs. H. M. Sparrow, and the writer, convened at 8 p.m. The other participants were Mr. Jan Merta who was in Montreal, at 350 ml, 2.54 lm), Mr. Robert Neilly at another house in Toronto (site T2 at 2.7 ml, 0.43 lm), and Mr. R. Probyn and Mrs. N. Probyn at their Toronto home (site T3 at 4 ml, 0.60 lm). It had been agreed in advance that the experiment was to take the following form.

Between 8 and 9 p.m. the group were to discuss the objects they would seek to transmit later to the outside participants.

Between 9 and 9.15 p.m. Jan Merta in Montreal was to act as sender, concentrating on objects or actions of his choice. The group and the three other participants would, during this interval, attempt to receive his thoughts.

At 9.15 p.m. Jan would stop sending, and from then until 9.30 p.m. the group would together send the images they had already discussed. Jan and the other three participants would try to receive them.

At 9.30 p.m. Jan was telephoned for information as to what he had sent, and also for his impressions. Then Mr. and Mrs. Probyn were telephoned and gave their impressions, both of what had been sent by Jan and by the group. Later Robert Neilly telephoned in to give impressions received from both sources.

4.2. The Experiment

The group convened at about 8 p.m. and the proposed experiment was described to them. General conversation then ensued, and quickly centred around the phenomenon of Unidentified Flying Objects. Someone remarked that Ezekiel was the first person recorded as having seen U.F.O.s and this fact was unfamiliar to some of those present. The group were very interested and two copies of the Bible were produced. Bob Cumming read aloud the first chapter of Ezekiel, which relates to this. The group continued in animated and interested discussion of what exactly was being described, and Bob Cumming then went through the chapter, phrase by phrase, and attempted to reproduce in the form of a drawing on the blackboard Ezekiel's description of what he had seen. There was a great deal of discussion, stage by stage, as the drawing progressed, particularly in respect of the "fire", swirling sand, and the effect of light on sand. Sandstorms were discussed. Much consideration was given to the form of
the beings visualized by Ezekiel — their four faces and four wings (two joined, two folded in front), and the manner in which the beings advanced together. Just before 9 p.m. the writer suggested that when transmitting later they concentrate on these topics.

On the coffee table around which the group were sitting, were the following articles set out as objects for the experiment: a long metal and glass box (actually a World War I periscope), a pack of playing cards, a pack of Zener cards, a small metal skull, a silver “god of plenty” from Bolivia, two quills. On the settee was a large fluffy panda toy bear with a circular rush basket (like a large pill-box) on his head.

The experiment was carried through as described above.

4.3. Results of the first half with Jan Merta sending

Jan Merta in Montreal was in a sound recording studio. There was a blue rug on the floor, and the interior of the room was mostly red. He was dressed in a multi-colored shirt, grey and white trousers, and brown shoes. He concentrated on objects on the table in front of him — an empty coke bottle and a packet of Rothman’s cigarettes. He moved his hands on paper as if writing a letter. He struck a book of matches. Trying to think of a movement, he thought of dancing. He looked into a book — the *New Horizons Journal*. He was smoking, and sitting cross-legged. There were many records about.

The recipients’ impressions were as follows. The figure in brackets after each statement is the estimated chance probability of the statement being true.

**Hits**

P. HURLBURT

1. Cigarette burning away (0.5)
2. Himself sitting crosslegged (0.5)
3. Grey suit (0.5)
4. Music, classical record (0.3)
5. A cat walking on a narrow wall or on a chesterfield (0.1)
6. Gets up and stands at fairly large desk touching papers on it (0.2)
7. Navy and red oriental rug (0.2)
8. Brown shoes (0.5)
9. Black telephone (0.8)

(Hit 5 was most impressive; on the wall of the studio is a series of cartoon pictures showing a cat jumping off a chesterfield. Call 7 was judged to be a hit because of the blue rug and red wainscoting.)

**Misses**

1. Eiffel Tower (0.2)
2. Picture of elephant (0.2)
3. Mathematical equation (0.1)
4. Geometrical picture (0.1)
A. R. G. Owen
10. Shaking hands and dancing (0.5)
11. Walking on a tightrope or narrow line or "catwalk" (0.1)

(Hit 11 may have been derived not from Jan at Montreal, but from Mrs. Hurlburt, who was sitting next to A.R.G.O.)

M. H. Sparrow
12. Reading New Horizons Journal (0.1)

Mr. and Mrs. Probyn
13. Tall (0.4)
14. Aged about 30 (0.2)
15. Slim (0.5)
16. Thick eyebrows
17. Intense eyes (0.2)
18. Unusual person (0.3)
19. Intellectual face (0.3)
20. Stands out in a crowd (0.3)
21. Shirt, no coat (0.5)
22. No tie (0.5)
23. Older part of town (0.5)
24. Heavily draped windows (0.3)
25. A box of matches (0.2)
26. Writing (0.2)
27. Cards, King of Spades (0.1)
28. Friend with him of same age (0.5)
29. Felt body spinning (0.2)

(Hit 27 was so counted because Jan said that prior to the experiment he had considered using the King of Spades as a target. Hit 29 relates to the fact that while sending he had thought of himself spinning round.)

R. Neilly
30. Man aged about 34 (0.5)
16. Crashed, unhurt, while driving white car (0.1)

(His other impressions appeared to be hits in the second half of the experiment. Miss 16 was not counted a hit although Jan said he had been reading New Horizons Journal 1, 1, p. 61-62 which related to the accidental death of a motorist.)

D. Nasmith, I. Owen, H. Attin and R. Cumming obtained no distinct impressions.
4.4. Results of the second half with the group sending

Jan Merta (He said his impressions were very mixed and that he felt nervous.)

31. A telephone call, a chiropractor, aged about 45, but looks younger (0.1)
32. Discs, many circles (0.1)
33. A metal box but not metal, metal and glass (0.2)
34. Relaxation (0.8)

(Hit 31 appeared to relate to a telephone call received about 9.12 p.m. from a chiropractor answering the description. Hit 33 was awarded on the periscope. Hit 34 could be taken to refer to the group most of whom deliberately relaxed themselves during the experiment.)

Robert Neilly

35. The group thinking of one crazy idea — one train of thought and emphasizing all the points in connection with it (0.2)
36. Sandstorm in a desert (0.1)
37. Hot sun, burning sensation (0.2)
38. Running away and encountering a bear, the bear flees (0.1)
39. The group had been trying to remember something (0.3)
40. Not knowing how to do something (0.3)
41. Going on a voyage in a large ship (0.2)

(Hit 35 agreed with the concentration of the group on the Ezekiel story. The drawing showed a spaceship in a desert, which was thought of as beneath a hot sun. It showed fire from the exhaust, which visually could equally have represented a sandstorm, as well as conveying the idea of heat — Hits 36, 37 and 41. The group had difficulty in constructing the picture from Ezekiel's description and resorted to drawing it line by line — hit 40. Some time had been spent trying to recall where the passage occurred in the Bible—hit 39. Hit 38 was allocated to the panda bear. It is a family joke that he is excessively timid.)
4.5. Analysis of the Results

Out of 75 calls, 44 were judged to be hits and 31 to be misses, so that the percentage of hits is 41.33%.

The total excess of hits over expectation is 23.7, and the summation of items $C_{pq}$ is 12.73, whose square root yields an S.D. equal to 3.5679. A crude test of overall significance may be based on the C.R. calculated as $23.7/3.5679 = 6.64$. Table 11 of Soal and Bateman (1956) gives 500 million to one as the odds against a C.R. exceeding 6.0. Although the test is not fully efficient there can be no doubt of the statistical significance of the result of the experiment, provided that the p-values attached to the calls are sufficiently conservative, which the writer thinks to be the case.

A test based on the exact probabilities of the calls (grouped according to p-values) and transformed into chi-squareds for two degrees of freedom (Owen and Quittner 1972) gives an aggregate chi-squared for 12 degrees of freedom equal to 52.13791, which is beyond the range of tables and confirms that the statistical significance is very high.

The method of likelihood scoring applied with the starting value $\alpha = 0.4256$ gives a score $S = 0.021617$ and a weight $W = 173.497$. The adjustment is therefore 0.01276%. The likelihood estimate of $\Psi$, the frequency of intervention of Psi, is thus $e = 42.57\%$. Since $\sqrt{W} = 13.17$, the S.D. of $e$ is 7.59%. The C.R. = $42.47/7.59 = 5.6$ which shows that the odds against the result occurring by chance are more than 26 million to one.

The three locations in Toronto are within five miles of one another, and about 350 miles from Montreal. The distance factor is therefore at least 70, which should be sufficient for any gross effect of distance on GESP to manifest itself. To make the comparison the data were pooled in two batches, Toronto-Montreal and Toronto-Toronto, and scored by the likelihood method using 42.57% as the starting values, which gave:

<table>
<thead>
<tr>
<th></th>
<th>Estimate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto-Montreal</td>
<td>45.33 ± 9.27</td>
</tr>
<tr>
<td>$S$ = 3.445983</td>
<td>$W$ = 116.49454</td>
</tr>
<tr>
<td>Toronto-Toronto</td>
<td>36.52 ± 13.27</td>
</tr>
<tr>
<td>$S$ = -3.439929</td>
<td>$W$ = 56.88471</td>
</tr>
<tr>
<td>Combined data</td>
<td>42.57 ± 7.59</td>
</tr>
<tr>
<td>$S$ = 0.006054</td>
<td>$W$ = 173.37925</td>
</tr>
</tbody>
</table>

The difference between the two sets of data is not statistically significant. This may be seen by calculating $S^2/W$ for each of the two sets, adding the resulting values together and subtracting the value of $S^2/W$. 

85

MR. AND MRS. PROBYN
42. Ornament from Peru with soldered arms (0.1)
43. A fluffy animal (0.1)
44. The Bible (0.2)
27. A Violin (0.2)
28. Mary (0.1)
29. Article like a compact (0.3)
30. A ring (0.3)
31. Book open at page 296 (0.1)
for the combined data. As each item \( S^2/W \) is a chi-squared for one degree of freedom, the final figure is a chi-squared for one degree of freedom which tests the homogeneity of the data (i.e. the agreement of the two sets with each other). We have, correct to five decimal places:

<table>
<thead>
<tr>
<th>Location</th>
<th>Chi-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto-Montreal</td>
<td>0.10193</td>
</tr>
<tr>
<td>Toronto-Toronto</td>
<td>0.20802</td>
</tr>
<tr>
<td>Combined data</td>
<td>zero</td>
</tr>
</tbody>
</table>

The resulting chi-squared is 0.30995, which is quite insignificant. It is clear therefore, that this experiment, while furnishing evidence of ESP between locations several miles apart and between locations 350 miles apart, gives no hint that ESP transmission is a function of distance. The results in fact were in all respects on a par with those got in favourable circumstances between ESP sensitives in the same room. The only reasonable conclusion would seem to be that ESP reception is, so far as is ascertainable, substantially independent of physical separation up to distances of 350 miles.

The average percentage \( \Psi \) values for individuals were:

<table>
<thead>
<tr>
<th>Individual</th>
<th>( \Psi ) ± Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurlburt</td>
<td>50.75 ± 18.75</td>
</tr>
<tr>
<td>Merta</td>
<td>35.38 ± 22.02</td>
</tr>
<tr>
<td>Neilly</td>
<td>37.91 ± 17.00</td>
</tr>
<tr>
<td>Owen</td>
<td>13.59 ± 29.97</td>
</tr>
<tr>
<td>Probyns</td>
<td>66.03 ± 15.05</td>
</tr>
<tr>
<td>Sparrow</td>
<td>16.67 ± 36.00</td>
</tr>
</tbody>
</table>

General average \( \Psi \) 42.57 ± 7.59

The averages for sites were:

<table>
<thead>
<tr>
<th>Site</th>
<th>( \Psi ) ± Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 - T2 (0.43 lm)</td>
<td>37.91 ± 17.00</td>
</tr>
<tr>
<td>T1 - T3 (0.60 lm)</td>
<td>28.40 ± 20.59</td>
</tr>
<tr>
<td>T1 - Montreal (2.54 lm)</td>
<td>54.19 ± 12.14</td>
</tr>
<tr>
<td>T2 - Montreal (2.54 lm)</td>
<td>0 ± 31.65</td>
</tr>
<tr>
<td>T3 - Montreal (2.54 lm)</td>
<td>66.22 ± 13.19</td>
</tr>
</tbody>
</table>

These may be compared with results of experiments mentioned in this paper and in Owen and Owen (1972), namely:

<table>
<thead>
<tr>
<th>Location</th>
<th>( \Psi ) ± Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marmoreo (same room)</td>
<td>30.90 ± 11.35</td>
</tr>
<tr>
<td>Milne (same room)</td>
<td>48.72 ± 14.72</td>
</tr>
<tr>
<td>Marmoreo (7 ml, 0.9 lm)</td>
<td>64.74 ± 19.45</td>
</tr>
<tr>
<td>Merta (T1 - Montreal)</td>
<td>66.37 ± 7.04</td>
</tr>
</tbody>
</table>

REFERENCES


New Horizons Research Foundation
Toronto Society for Physical Research

10 May, 1973
An Experiment with Mr. James Wilkie
Involving Handwriting Samples
A. R. G. Owen and I. M. Owen

ABSTRACT: The subject gave personality sketches of nine persons totally unknown to him, on glancing briefly at anonymous specimens of their handwriting. The descriptions were sufficiently detailed and accurate to be matched blind to the names of the persons presented in random order. It was concluded that ESP ability of a very high order had been demonstrated, and that the speed of delivery of the readings was incompatible with handwriting analysis.

1. The Experiment

On 30 Sept. 1971 Mr. James Wilkie, who was visiting, happened to mention that he could usually get a good psychic impression of a person from a quick glance at that person's handwriting, even though he was quite ignorant of handwriting analysis, and made no attempt to analyze the handwriting. With his agreement, therefore, an experiment was arranged in which Mr. Wilkie would give readings on nine anonymous specimens of handwriting which had been deposited with the authors for use in handwriting analysis. Each specimen was a copy of the same text, which had been adopted on the advice of a qualified handwriting expert. It was:

"It is our own vanity that makes the vanity of others so intolerable to us"—De la Rochefoucauld (French Moralist).
"Be just before you're generous"—Richard Brinsley Sheridan.
"There is no one like me, and I know and you know and God knows that one of us is enough"—Ralph Waldo Emerson.

The specimens were presented one at a time to Mr. Wilkie by one of us (A.R.G.O.), the other author not being present or participating at all in the experiment. At the beginning Mr. Wilkie was given the sex of the writers of the specimens but no other information. However, after giving four readings Mr. Wilkie said that he could also give the sex, which he did correctly for each of the remaining five specimens, three males, and two females. The chance probability of this result is about 1/32. The readings themselves were dictated at great speed, and A.R.G.O. had the impression that the subject looked at the specimens only very casually and was not actually analyzing the form of the handwriting. Mr. Wilkie had never met any of the persons concerned who were totally unknown to him and could not have been described to him by other intermediaries.
2. Results

The readings were not analyzed immediately. In fact they were put aside until 5 March 1973. They were then given in random order on separate sheets without indication of identity to I.M.O. as the only person other than A.R.G.O. who knew all of the persons sufficiently well to attempt to match Mr. Wilkie's readings to their names. The names were written on cards which were presented to I.M.O. in a random order differing from the random order of the sheets.

The descriptions contained in the readings varied somewhat in "depth" and amount of detail as between specimens. However, I.M.O. had very little difficulty in matching them exactly to the names, the operation being completed in about 5 minutes. The only problem arose with specimens F2 and F6 whose descriptions had a certain amount in common. However, further inspection by I.M.O. showed that several facts were given in the F6 description which identified her unambiguously. The probability of correctly matching the three males by chance is 1/6, and that of matching the six females is 1/720. The odds against Mr. Wilkie's readings being appropriate descriptions by chance only are therefore 4320 to one. Combined with the determination of sex the odds are 138,420 to one.

The above method of assessment is possibly an underestimate of the statistical significance because it neglects the particular acuteness of some of the readings. For example, concerning F1 the subject said "her psychic impressions and visions tend to be of disasters because of her sorrows, so that her psychic energy tends to select this kind of presentiment. She could change this and get pleasant precognitions if she became more secure and happy herself. At present she is fearful of her gift." We have quoted this (with the permission of F1) because it is remarkably accurate. F1 had exactly the somewhat specialized psychic talent and attitude to it, characterized in this reading. Also the occurrence of pleasant precognitions consequent on a greater happiness, which had the status only of a prediction at the time of the reading, now appears to have become a fact. This particular reading is also of interest because in specificity it would seem to surpass anything that can be provided by handwriting analysis unsupplemented by ESP.

Some statements in the readings were not used in making the matching, which was based on the general personality sketches that emerged. These may legitimately be scored separately from the odds attached to the matching. In seven cases the subject correctly specified whether the persons were married or unmarried. Applying a crude test we can safely treat this as six hits on unmarriages with a chance probability p, and one hit on married with a chance probability q = 1-p. The combined probability of the 7 hits can easily be shown to be a maximum when p/q = 7, i.e. when p = 6/7. In the absence of a reliable p value for "unmarried" we can nonetheless estimate the minimum odds as the reciprocal of the
probability calculated for $p = 1/7$, namely $17.651$ to $1$. (This method, which can always be applied in this kind of context, appears to be new. It has the advantage of being absolutely reliable, but is very likely to seriously underestimate the odds.) In six cases Mr. Wilkie characterized the persons according to their degree of psychic ability, ranging from “non-psychic” to “natural psychic”. In the opinion of the authors these were all hits. Scoring them conservatively at a common $p$-value of 0.5 gives odds of 64 to one. In one case the subject spoke correctly of the person not being Canadian but born in the U.S.A. The other persons in the sample were all born in Canada or England. It would seem reasonable to count this a hit at odds of 9 to 1. Combining the odds for the three sets of additional hits gives odds of about $10167$ to $1$. Combined with the odds on matching we finally get as a fairly conservative estimate for the odds against Mr. Wilkie’s performance occurring by chance as about $1407$ million to one.

These odds would be increased if the individual hits were separately scored, but this is hardly necessary. However, to give a fair picture of the subject’s achievements, it may be said that, when those statements that were scorable from the author’s knowledge were listed and reduced in number by combining those that were not clearly independent of one another, they comprised 70 hits and only 2 misses. This proportion of hits is effectively as high as any that the authors have encountered even among the professional sensitives of best repute, and is remarkable as exhibiting what may be expected of the highest grade sensitives when “on form”.

3. Discussion

As mentioned, the readings were given so swiftly and with such minimal visual concentration on the handwriting specimens that we are unable to believe that Mr. Wilkie was applying any handwriting analysis. In addition, we have his assurance that he has never studied the subject. Nor did Mr. Wilkie regard the sample as a psychometric object in the ordinary sense, where it is assumed that touching an object which has been in physical contact with a person puts the sensitive in rapport with that person. The paper on which the handwriting samples were written had been supplied by A.R.G.O. and had had only fleeting contact with the persons concerned. In several cases Mr. Wilkie did not handle the specimens himself, they were held in front of him by A.R.G.O. Of course, a great deal of the information was known to A.R.G.O. who was present, and to I.M.O. who was not, though little of it was consciously in their minds at the time. The possibility of Mr. Wilkie obtaining the information by psychic “memory-raiding” can therefore not be excluded. Mr. Wilkie’s own opinion however, is that handwriting specimens are among the forms of “link” to the person concerned that he finds particularly felicitous for establishing rapport, and the present experiment does nothing to contra-
dict his belief that the handwriting sample constitutes a functioning segment of "the ESP channel".

It should be remarked that (in addition to his trance work) Mr. Wilkie, while in the normal fully conscious state, has several modes of apprehension of ESP knowledge. He gives readings on sitters in their presence, does psychometry in the usual sense on objects other than handwriting, and has spontaneous ESP messages regarding friends (see Wilkie 1971). Sometimes his information seems to come, as he says, "by ESP". On other occasions he says, "Rama tells me". (Rama is Mr. Wilkie's famous guide.)

REFERENCES


New Horizons Research Foundation 22 March, 1973
The Pyramid and Food Dehydration

ALLAN ALTER, B.Sc., PHM.

ABSTRACT: Extensive tests involving controls show that pyramidal containers are no more effective than those of other shapes in preserving and dehydrating organic material.

1. Experiments

In April 1972 a research team (Mrs. D. A. Henwood, Miss Karen Perry, Mr. Dale Simmons, and the author) was organized to investigate various statements concerning the "secret powers" or "biocosmic energy" to be found within a pyramid.

To test if these claims were viable, cardboard pyramids were built according to specifications said to reproduce the proportions of the Cheops Pyramid; i.e. a base length of 99/8 inches and edges 89/8 inches long. As well, a commercially produced pyramid of the same size, purchased from the Equinox Book Store, Toronto, was used. Two major claims were to be studied:

(a) that food would dehydrate rather than spoil when placed in a pyramid at a certain level and in line with the true north,

(b) that dull razor blades would regain their sharpness under these conditions.

This report deals with the first claim only. The investigations on razor blades are the subject of a separate paper (Simmons, 1973, this Journal).

Several test materials were used: hamburger, potato, bean sprouts, banana, apple, liver, and bone marrow. In all cases the test material was supported on a rigid platform of thin cardboard and placed with its centre below the apex of the pyramid which was oriented to the true north. Bean sprouts were laid in a small bunch, randomly oriented on the platform. Specimens of other material were used in slices ¼ inch thick laid horizontally on the platform. Whenever the specimen was other than circular (as it was with bananas) the major axis was aligned to true north. The experiments were first done with the top of the platform at the ½ level in the pyramid, i.e. one third of the height of the pyramid above the base. They were then repeated with the specimens at various other levels ½, ¾ etc. and also with the specimens in the bottom right hand corner. Specimens were inspected at 48 hour intervals over a period of two weeks.

In each experiment a specimen of test material as similar as possible in
composition, dimensions and age to that in the pyramid was placed in each of various shaped cardboard containers, of volume equal to the pyramid, in the forms of rectangular paralleloipeds, cubes, triangular prisms, and cones. This use of control groups seems to have been omitted in testing done by other groups.

In all tests, the members of the research team, who performed their experiments independently in their various homes and offices whilst following the same agreed protocols, were quite unable to discover any significant differences between material placed in a pyramid and material placed in the control containers. If anything, we had only rediscovered the "Cookie-Jar Principle", that is: any substance placed in a container which keeps out air currents does not spoil as quickly as in the open air.

Specifically, we learned that hamburger and steak were bad test materials. A butcher explained to us that most commercial hamburger has preservatives added to it to prevent rotting, and good steak meat can be left at room temperature on a kitchen table for one week and still be good enough to eat.

Potatoes at first appeared to show less deterioration under a pyramid than in the other containers, but when the test was repeated with more care no difference could be noted. The explanation appeared to be that one slice of potato was somewhat thicker than the others. When care was taken to make all slices of equal quarter-inch thickness, there were no detectable differences. Results with apples and bean sprouts were also identical as between pyramids and other containers. Notably, bean sprouts are the easiest material to work with, as they dry out within twelve hours.

The tests with bananas carried out at various levels within the pyramid gave typical results as follows.

In the bottom north corner; some light areas, not completely sticky.
Half way up; more light areas than in the north corner, not completely sticky.
Half way up; some light areas, very sticky.
Control (in open air); dried out and sticky.

In the cases of liver and bone marrow the control and pyramid specimens were tested twice; oriented to the magnetic north pole and then oriented to true north. In every case the results were basically the same; the liver was hard and shiny with only slight odor; the marrow had no odor or change of color in either sample.

As a separate experiment potato slices were tested at different phases of the moon. Again no difference could be detected. (This experiment was conducted by Mrs. D. Kimber.)

2. Conclusions

There may, for all that is known to the contrary, be a mysterious force within the Great Pyramid itself, possibly because of the geomagnetic field at the site (Tomkins, 1971). However, our group unanimously concluded
that the statement made by supporters of the pyramid theory, that anyone can produce this effect in their own home, cannot be supported by our investigations.

REFERENCES


Toronto Society for Psychical Research 8 March, 1973
Experiments on the Alleged Sharpening of Razor Blades and the Preservation of Flowers by Pyramids

DALE SIMMONS, DIP. ENGR. TECH.

ABSTRACT: Photomicrographs of razor blades kept in the open air and in pyramids for a week show that there is a natural tendency for jagged points on the edge to be slightly rounded off. No effect of the container can, however, be observed.

It was also found that flowers kept in pyramids and in cubical containers of equal volume are preserved better to a very slight degree than those in the open air. The effect, which is in any case small, seems unrelated to the shape of the container.

It is concluded that model pyramids have no effects which can be related to their particular shape.

1. Razor Blades

This experiment was performed in a metallurgical laboratory at Ryerson Polytechnic Institute, Toronto, with the aid of a metallurgical microscope and Polaroid Instamatic camera combination. Two types of pyramid were used:

(a) one manufactured by the Toth Pyramid Company of New York with base 6.125 ins. and edge 5.875 ins. (height about 3.75 ins.) and purchased from the Equinox Book Store, Toronto.

(b) one built out of cardboard with a height of about 6 ins., base 9.375 ins., and edge 8.875 ins. as specified by Ostrander and Schroeder (1970).

On 7 Feb. 1973 the pyramids were set up according to instructions (i.e. oriented to the magnetic north) with a platform one-third of the height of the pyramid situated directly under the apex. During the experiment, which continued until 16 Feb. 1973, the pyramids were situated on the top shelf of a closet away from sources of temperature variation, and from any electronic or high frequency generating devices.

The razor blades selected for the experiment were GEM blades of the older type without any edge coating such as platinum or stainless steel. Three blades were used, blade A on the platform under the Toth pyramid, blade B on the platform under the home-built pyramid, and C sat in the open air as a control. Immediately prior to the experiment each blade was dulled by ten strokes of medium pressure through the bristles of a toothbrush, and a picture taken of its working edge with the aid of the microscope-camera combination. The blades were then laid in the locations mentioned and left undisturbed for seven days. All were oriented to...
BLADE WHICH SAT UNDER PYRAMID WHICH WAS BOUGHT

Before Conducting Experiment (A.1) (100x)

(A.2) After Sitting under Pyramid for 1 week (100x)
magnetic north. After the seven day period the blades were removed and a photomicrograph of the end and side of the working edge of each blade was taken again. A picture was also taken of a Wilkinson Sword blade which had been used for shaving several times, as a standard of comparison to show that the blades in the experiment had been dulled to about the same extent as a used razor blade, but not too severely.

Plates A1 and A2 (taken with 1 sec. exposure and 100x magnification) show blade A before and after its sojourn under the Toth pyramid. Referring to points (i), (ii) and (iii) of the edge it will be seen that there occurred a definite levelling or rounding effect at each of these points after the blade had been under the pyramid for a week. Photographs of Blade B show a similar levelling effect operating on projections and notches. Plate C1 (taken with 1 sec. exposure and 100x magnification) shows the control blade (the one left in the open air) before the experiment. Plate C2 was taken after the experiment with 1 sec. exposure and a 400x magnification in order to achieve a closer look. It will be seen that, just as in blade A under the Toth pyramid, there was a levelling or rounding effect e.g. the small peak at point (ii) in C1 has been levelled off in C2.

To complete the study, end views of the blades (not shown here) were taken with 400x magnification some at 1 sec. and some at 2 sec. exposure. Focussing of the microscope was nearly impossible to achieve. However, the photographs, when obtained, showed very little difference between the before and after states of the blades.

2. Conclusions concerning razor blades

Any changes in the blades which were under pyramids were mimicked in type by the control blade, the one kept in the open air. This would leave an impartial commentator to believe that the discernable changes in the blades were not caused by the pyramids. All the instructions prescribed for the use of pyramids were followed to the letter in the conduct of the experiment. As an overall conclusion the writer feels he must say that the pyramids did not affect the blades in any physical way and as such were a failure.

In all the literature which the writer has encountered describing the capacities of pyramids to preserve meat, re-sharpen razor blades, etc. (c.f. Owen 1973, this Journal), no statistics or circumstantial data concerning experiments, or examples of control experiments have been cited. The writer therefore feels it legitimate to draw attention to two important aspects of the pyramid fad.

(a) Subjectivity; the psychological aspect. How dull is dull when a person considers a blade too dull to shave with? Also, how does one tell whether a blade is really sharper or not after it has been in a pyramid for restoration? Judgement on either of these points is inevitably highly subjective, and liable to manipulation by underlying wishes, desires and
BLADE WHICH SAT UNDER HOME-BUILT PYRAMID

Before Conducting Experiment (B.1) (100x)

(B.2) After Sitting under Pyramid for 1 week (400x)
CONTROL BLADE (WHICH SAT IN AIR ON SHELF TOP)

Before Conducting Experiment (C.1) (100x)

(C.2) After Sitting in Air for 1 week (400x)
expectations, so that it cannot be equated in any way to an assay made by a scientifically based objective method. In addition, these subjective tests of sharpness are rendered imprecise by the unquantifiable factor of acuteness of memory, because the “before” and “after” tests are separated by a considerable lapse of time.

(b) **Natural equilibrium; the homeostatic aspect.** There is a tendency in Nature which though not universal is widespread, for things when disturbed to return to the previous state of equilibrium. In physics this is exemplified by Le Chatelier’s Principle, in biology by homeostasis. It has long been known that a used razor blade tends to feel sharper if it is used after a period of rest. This can be ascribed to the motion of the air molecules around and against the blade which helps to wear down the weakest parts (which are, in fact, the jagged peaks or points). Also when a blade is used the stress upon its cells is changed, some being compressed and others stretched. During a period of disuse the forces of compression and tension will tend to restore the internal stresses to an equilibrium state.

Since, so far as the writer is aware, not a single scientific experiment on pyramids and razor blades has ever been published, he feels it is a legitimate inference that pyramid enthusiasts who testing their hypothesis have neglected to take adequate account of factors (a) and (b) or to do parallel control experiments.

3. **Dehydration and preservation of flowers**

Two experiments were performed between 16 Feb. 1973 and 26 Feb. 1973.

Four roses, small and evenly matched for size were distributed as follows: one in the open air, one under the Toth pyramid, one under the home-built pyramid, and one in a cube of volume equal to that of the latter pyramid. Each rose was placed on the shelf itself and not on a raised platform, but with its main axis pointing to the magnetic north. Each rose that was under a pyramid or cube was placed with its centre directly below the geometrical centre of the figure. The figures were oriented to magnetic north.

Three chrysanthemums were similarly distributed; one in the open air, one under a home-built pyramid, and one under a cube of equal volume. The flowers under figures were directly below the centres of the figures; flowers and figures were all oriented to the true north.

Both experiments were set up on a closet shelf away from temperature variations and high frequency or voltage generating devices, and left undisturbed for seven days before being inspected.

None of the roses differed appreciably in colour. It was found that the roses under the pyramids were more resilient and pliable than the one which had remained in air. However, there was no difference between the roses under pyramids and the rose under the cube. Any other differences
which there may have been between the roses were so slight as to be quite imperceptible, even to careful examination.

No differences whatever could be seen between the chrysanthemums, except that the one which remained in air was less brittle than the ones under the pyramid and cube. The condition of these was, however, identical.

4. Summation

With flowers, as with the razor blades, there was no effect which could be attributed directly and solely to the shape of the pyramid. The lack of air circulation in both cube and pyramid could have been the agent responsible for such differences as there were between the enclosed and unenclosed flowers.

If there is any validity in the “Pyramid Hypothesis” the effects are minute and therefore not so easily provable scientifically as, it appears, some people believe. The variety of prescriptions put forward for pyramids, their dimensions and orientation, (Owen, 1973, this Journal), coupled with the frequent admonition that instructions must be followed very precisely if the desired effects are to result, are sufficient to cause wonder as to the validity of the claims, especially in the absence of any theoretical basis for the Pyramid Hypothesis.

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The Shapes of Egyptian Pyramids

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ABSTRACT: The dimensions of the Great Pyramid are considered in relation to Pyramidal figures constructed according to various geometrical principles and compared with those which advocates of “pyramid power” recommend for model pyramids.

1. Pi and the Great Pyramid

So far as can now be ascertained, the dimensions of the Great Pyramid built about 2570 B.C. at Giza for Khufu (i.e. Cheops), probably by his cousin Hemon, were as follows. The average length of the four sides of the base was 755.79 feet and the height was 481.4 feet (Edwards, 1961). The ratio of the base length to the height was therefore b/h = 1.56998, and the ratio of the length e of a sloping edge to the base length b was e/b = 0.95169. The angle of the pyramid, i.e. the inclination of any face to the horizontal base, was 51° 52’ 10”.

It will be seen that the builders of the Great Pyramid were not concerned with relating its form to one of the regular solids. Such a relationship could easily have been achieved by making each sloping edge e equal to the base length b. Each face would then have been an equilateral triangle. The Pyramid’s base/height ratio would have been b/h = 1.41421, and its angle steeper than that of the Great Pyramid being 54° 40’ 10”.

Another method of incorporating a degree of geometrical regularity would have been to make the meridian section (i.e. the vertical one through the apex and parallel to two sides of the base) equilateral. This would yield a pyramid with b = 1.15470h and e = 1.11803b. The angle would be exactly 60°. Instead, the principle diagonal sections could be made equilateral so that a diagonal of the base equals any sloping edge. Then b = 0.81650h, e = 1.41421b, and the angle is 67° 47’ 8”. Curiously enough, one Egyptian pyramid did approximate to this form; it is the “Layer Pyramid” at Zawiet el Aryan, 276 feet square at the base, which was built about 2700 B.C. and whose angle was about 68° (Fakhry, 1969). High angles between 65° and 70° are characteristic of the small pyramids built in the satellite kingdoms, such as Meroe, to the south of Egypt. However, the typical angle for all the classical pyramids in metropolitan Egypt approximates to 52°, the only real exception being the northern Stone Pyramid of Dahshur with b = 2.10020h, e = 0.85248b and an angle of 43° 36’ 0”.

The Greek writer Herodotus, who visited the Great Pyramid about 455 B.C., made a statement which seems to imply, erroneously, that its
height equalled its base, in which case the angle would have been 63° 26' 5".

If its height had been half the base length, the Pyramid would have had an angle of 45° and constituted exactly one sixth of a cube, thus achieving a degree of regularity. Pyramids of this shape are the ideal ones for packaging commodities if pyramidal containers are desired, because they can be packed in sets of six without lost space.

A pyramid is a figure with five corners (the four at ground level and the apex). Therefore it cannot, no matter how it is proportioned, be a regular solid; the best that can be accomplished is the pyramid described above with equilateral faces. Such a pyramid is exactly a half of a regular octahedron. More than two millennia after the building of Cheops' Pyramid, Greek mathematicians, who, it seems, originated the concept of regular solids, proved that besides the cube and the octahedron there are only three other such figures. The simplest of these is the tetrahedron, which has four corners. There is no evidence that the concept of a tetrahedron was known to any pre-Hellenistic Egyptian. If any Pharaoh had decided to make a name for himself by ordering a tetrahedral pyramid for his eternal home, its three faces would have been inclined at an angle of 70° 31' 47" to its triangular base whose length on the side would have been 1.22474h.

As noted, the angle of most of the classical pyramids is in the neighbourhood of 52°. Consequently, these pyramids, either by accident or design, embody a certain mathematical approximation to the value of Pi, the ratio of the circumference of a circle to its diameter. Correct to ten places of decimals $\pi = 3.1415926536$. Its value to this accuracy (and in fact to 35 decimal places) was first determined in the sixteenth century.

If one constructed a pyramid, of a type which may for convenience may be termed a Pi-pyramid, having the property that the total perimeter $4b$ of its base was equal to the circumference $2(\pi)h$ of a circle whose radius was equal to the height $h$, then the angle of the pyramid would be 51° 51' 17", and the ratio of base to height would be $b/h = \frac{1}{2}(\pi) = 1.5707963268$ to ten decimal places and 1.57080 to five decimal places, while $e/b = 1.49456$.

Many writers have assumed that the architects of the Great Pyramid aimed at proportioning it in this way either for aesthetic reasons based on a mathematical theory of perspective and proportion, or to embody in stone the numerical value of Pi. If this was in fact the intention of Cheops' architects and if Edwards' figures for its original dimensions are correct, then the Great Pyramid testifies to a value of Pi equal to $2b/h = 2 \times 1.5699833 = 3.1399666$ to seven decimal places, which is to be compared with 3.1415927. The error is only 5.2 parts in 10,000 or 0.052 per cent. If intended, this approximation was, for its time, a remarkable feat, because even at much later periods both Chinese and Hebrews (who had many contacts with Egypt) used 3 as an approximation to $\pi$.
The coincidence between the true value of Pi and that embodied by luck or judgement in the Great Pyramid, is even more remarkable if considered in the light of the engineering tolerances involved in such a massive structure. Supposing that the result was intended, the error in the ratio b/h could result from quite minute errors in h and b. For instance, with no error in h, the error in h/b corresponds to making b too short by 0.391348 of a foot, which is only 4.7 ins. Now, the actual errors made by the architects are in fact of this order, the lengths in feet of the four sides of the base being: N, 755.43; S, 756.08; E, 755.88; W, 755.77. The deviations from the average 755.79 are numerically 0.36, 0.29, 0.09, and 0.02, the standard error being 0.272 feet. Clearly the dimensions of Cheops’ Pyramid are perfectly consistent with the dual hypothesis; (a) its builders intended it to be a Pi-pyramid, (b) were working to a value of Pi very close to the modern one 3.141593.

There is no direct evidence such as a manuscript or an inscription, to suggest that the architects of the Fourth Dynasty either sought to build Pi-pyramids or knew the approximation 3.14. The first indication of an Egyptian value for Pi, other than the crude approximation 3, occurs in the Ahmes (or Rhind) papyrus, a thousand years after the building of Khufu’s Pyramid. The value given (which relates to the area of a circle and not to the circumference) is equivalent to 256/81 = 3.160494, and differs from Pi by 0.6% or 60 parts in 10,000, an amount twelve times in excess of the Great Pyramid value. It is puzzling therefore that, if Cheops’ architects were building a Pi-pyramid incorporating the value of 3.14, this knowledge became lost, unless, as is supposed by some writers on Egyptian antiquities, the sages of the Fourth Dynasty had relatively advanced mathematical knowledge which was guarded as arcane and esoteric lore. Against this, it has to be said that there is absolutely no evidence of it, except for inferences from the pyramids themselves.

According to Thom (1967) the megalithic builders of stone circles and alignments liked to work in distances that were multiples of 1MY or 2½MY, where MY is a megalithic yard equal to 2.72 feet. At Avebury they set up two slightly distorted circles with diameters of 125MY and circumferences adjusted to be 392.5MY. This was equivalent to using for Pi the approximation 157/25 = 3.14 exactly. The same value occurs in a circle at Brogar, Orkney. Other sites indicate the approximations 22/7 (Aubrey Holes, Stonehenge), 3.139 (Stanton Drew) and 25/8 (represented in a number of small circles). These monuments were probably erected some time between the building of Cheops’ Pyramid and the writing of the Ahmes papyrus.

One possibility which seems never to have been discussed is that the pyramid builders had a good empirical value for Pi. It would still remain a mystery why, apparently, this value was still unknown a thousand years later. However, there are various ways in which quite a good determination could have been made experimentally as, for example, by rolling a
The wheel was not in common use in Fourth Dynasty times, but was certainly known in Egypt; military scaling ladders were wheeled, as were various military wagons; sledges with heavy loads such as masonry were sometimes put on rollers (Hodges, 1970). Alternatively, the Egyptian savants could have measured the circumference of a carefully marked-out circle. They need not necessarily have used a rope to measure the actual arc but have approximated to its length by laying a measuring rod (perhaps equal to the Royal cubit, 20.62 or 20.63 inches in length) along consecutive chords of the circle. In so doing they would have carried out empirically a process rather like the one Archimedes performed mathematically about 225 B.C. He compared the area of a circle to the areas of inscribed and circumscribed polygons of 96 sides, and thus proved that Pi lies between the limits $\frac{223}{71} = 3.140845$ and $\frac{22}{7} = 3.142857$. Shortly afterwards the approximations $\frac{22}{7}$ and 3.1416 became current in the Greek world. The pyramid builders could in principle have laid off chords of the length of a cubit-stick on a semi-circle of about 100 cubits in length. If no additional errors came in, the value for Pi would be close to 3.1414, the theoretical error being less than 2 parts in 10,000. The practical error would of course be greater, but in view of the statistical tendency for random errors to compensate one another, it need not have been very great. If an empirical determination of Pi was made, it is surprising that it was not commemorated in an inscription, unless however it became a trade secret of the master architects. No ancient source connects Pi with the Great Pyramid. Any inscription on the white limestone casing of the Great Pyramid has, of course, disappeared together with the casing. The numerical coincidence was first noted by John Taylor in the nineteenth century (Taylor, 1864).

More recently (see Tompkins, 1971) a connection has been postulated between the Great Pyramid and the number Phi whose value to eight decimal places is 1.61803398 and 1.618034 to six places. This number is wellknown as it occurs naturally in very many problems of algebra and geometry, and in architecture corresponds to the famous "Golden Section", a rule sometimes used in designing rectangular structures for aesthetic effect (Gardner, 1961). Unlike Pi the value of Phi can be expressed exactly in an elementay arithmetical formula, because twice Phi less unity equals the square root of five. There is a passage in Herodotus (perhaps the same as that alluded to above), which apparently can be interpreted to mean that the Great Pyramid was designed so that the area of each triangular face should be equal to that of a square h on the side. It can be shown for such a pyramid that the slant height (i.e. the distance of the apex from the mid-point of a side of the base) is $\frac{1}{2}$ (Phi) times the base length, and that $b/h = 1.57230$, which differs from the ratio for the Pi-pyramid by 9.5 parts in 10,000. Twice the ratio is 3.14461 which is a tolerable approximation to Pi. One school of thought therefore suggests that the Pyramid builders built not a Pi-pyramid, but a Phi-pyramid, and
were aware that Pi is approximately equal to $4\sqrt{(\Phi)} = 3.14461$. A Phi-pyramid would have an angle of $51^\circ 49' 40''$ with $e/b = 0.95106$. (The Great Pyramid is, so it happens, closer to being a Pi-pyramid than a Phi-pyramid, from which it deviates by 15 parts in 10,000.) It is also suggested that the architects of the Great Pyramid knew a much better approximation to Pi, namely $6(\Phi)/5 + 6/5$, which to eight places is $3.14164079$.

Michell (1972) has drawn attention to a geometrical construction — the *vesica piscis* — which yields a triangle approximating in shape to the meridian section of the Great Pyramid. With any chosen radius $r$ and centre C draw a circle. With the same radius $r$ draw a circle centred on any point B of the circumference of the first circle. Let A and D be the points of intersection of the circles. Prolong the straight line BC so that it meets the two circles again in points E and G. With centres E and G draw two circular arcs HGK and HEK of radius $3r$. These arcs will meet in points H and K which lie on the prolongations of the line DA. Through D draw a line LF perpendicular to this line HADK, meeting the arcs HGK and HEK in the points L and F. Then AFL is the triangle approximating to the meridian section of the Great Pyramid. DA corresponds to the height and LDF to the base. An elementary calculation shows that the ratio $b/h$ is given by $(\sqrt{33} - 3)/\sqrt{3}$.

This formula is something of a mathematical curiosity as the only digit appearing in it is 3. Numerologists may be interested in the fact that the four 3’s total 12 which numerologically is $1 + 2 = 3$ once more. Arithmetically $b/h = 1.58457$, corresponding to the approximation $\pi = 3.169144$, an error of 87 parts in 10,000 as compared with 5 parts in 10,000 for the Great Pyramid itself and worse than the value in the Ahmes papyrus. Incidentally it may be remarked that the dimensions preferred by Michell for the Great Pyramid are $b = 277.5$MY and $h = 280$ cubits. Using the conversion factors given by Michell, namely, 2.72 feet = 1MY and 20.6 inches = cubit, these give $b = 754.8$ feet and $h = 480.67$ feet, which may be compared with Edwards’ dimensions $b = 755.79$ and $h = 481.4$. Michell’s dimensions correspond actually to $b/h = 1.57032$, which differs appreciably from the value given by the *vesica piscis* construction, but deviates from the Pi-pyramid by only 3 parts in 10,000.

2. Pyramid Power

It has been claimed in recent years that hollow pyramids of cardboard, wood or metal, have the ability to inhibit putrefaction of organic material and to re-sharpen razor blades. It is interesting to compare the dimensions recommended by various advocates of “pyramid power”. According to Ostrander and Schroeder (1970), the Czechoslovakian investigator
Karel Drbal prescribes a ratio \( b/h = 1.5708 \) as appropriate for the hollow experimental pyramids, this value being derived from the dimensions of the Great Pyramid. As this ratio, to the number of decimal places specified, is identical with 1.57080, the theory is clearly based on the Pi-pyramid. Ostrander and Schroeder give a prescription for a homemade pyramid intended to be 6 inches high with \( b = 9.375 \) ins. and \( e = 8.875 \) ins. This results actually in a height of 5.900874 ins., an angle of 51° 32' 14" and a \( b/h \) ratio of 1.58875 which represents an error in the Pi value of 114 parts in 10,000 as opposed to 5 parts for the Great Pyramid. A specification for a pyramid of height 4 ins. quoted by Ross (1973) has \( b = 6.125 \) ins., \( e = 5.875 \) ins. which gives a height of 3.96961 ins., an angle of 52° 21' 46" and \( b/h = 1.54297 \), deviating from the Pi-pyramid by 177 parts in 10,000.

Another recipe for pyramids (Flanagan, n.d.) sets \( e = 0.95b \) corresponding to the angle 51° 42' 31" and \( b/h = 1.57622 \), a deviation of 34 parts in 10,000. None of the above specifications appear to relate to the Phi-pyramid.

As the practical errors of cutting, folding, and gluing cardboard are very considerable it would seem that the advocates of pyramids contemplate imperfections of more than 2 percent and possibly as much as 5 or 6 percent, as admissible without seriously diminishing the efficacy of the models. In this connection, it is worth remarking a statement occurring in what appears to be an editorial article in The Pyramid Guide (Sept. 1972). “The Mysterious Power produced within these structures [i.e. scaled down models of the Great Pyramid] relies on the builder’s strict adherence to the Great Pyramid’s true degree and angle”.

Most writers on pyramid power recommend that the model pyramids be oriented to the true north like the Great Pyramid, whose N, S, E and W sides deviated from the cardinal points respectively by only 2'28", 1'57", 5'30" and 2'30". However the underlying theory is rendered somewhat uncertain by the recommendation made by Ostrander and Schroeder, and which presumably represents the Czechoslovakian view, to the effect that the pyramids should be oriented to the magnetic north. If both these prescriptions are valid, it would imply that the effect, if real, is not sensitive to orientation within several degrees of arc.

In this connection it is interesting to note that sometime prior to 1940 a letter appeared in The Times of London signed “Colonel Musselwhite”, which advised that the performance of a razor blade could be improved if it were kept on a north-south axis so as to pick up the earth’s magnetic field. It is now known that this letter, which was one of a series on various scientific topics, was composed as a hoax by Dr. Reginald V. Jones, now Professor of Physics at the University of Aberdeen, Scotland (Moss 1973).
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