

current is presented in Fig. 4. These single avalanches had peak currents from 0.25 to almost 10 amps and typically 12 nanosecond duration. The lower limit on sensitivity was set by the triggering threshold of the scope, which was $\sim 0.1 - 0.4$ amps.

With a high triggering threshold, the electrical current generated in a WBH avalanche was generally larger than that generated in a WOH avalanche by factors of $\sim 2 - 10$. However, with a low triggering threshold and data taken using scope pictures with a high speed film, the situation is a little different. When exposures were made for both situations (WOH and WBH) such that the same number of counts are registered on the counter in each case, the photographic results appear to be the same; i.e., the average discharge profile appeared to be the same for both situations. Of course, for the WBH case, the exposure time was considerably less than for the WOH case. A large microavalanche probably creates a train of average microavalanches which register predominantly on the film and wash out the initiator. The stop and start nature and the higher trigger threshold of the charge storage scope favor the recording of the large exceptional microavalanches compared to the average. The foregoing experiments seem to indicate that the enhanced counting rate largely reflects a greater number of microavalanches rather than a larger average microavalanche for the WBH case compared to the WOH case.

D. Discussion

The typical current pulse of Fig. 4 is triggered from an initial microavalanche or parallel set of microavalanches. From the pulse times involved, one presumes that only electron transit times of the gap are possible, as

ion transit times for the gap are much too long. This electronic charge is deposited on the dielectric adjacent to the anode which lowers the applied voltage across the gap. Some of these electrons moving in the conduction band of the dielectric are captured and drop to the valence band and emit photons of at least band gap energy. Some of these photons travel across the gap and are absorbed in the dielectric at the cathode and some of these events cause photoelectron emission to occur from the dielectric surface. This gives rise to a set of new propagating avalanches which deliver a new current pulse across the gap that is somewhat less than the first pulse because the net applied voltage is reduced by the previously deposited wall charge. The new avalanche deposits more wall charge leading to new photon emission, etc., so the process repeats and repeats with ever smaller current pulses until the total wall charge is sufficient to diminish the net gap voltage to the point where negligible electron multiplication occurs in the overall process. This occurs in negligible time compared to the duration of a half cycle of the A.C. applied voltage.

Such a condition maintains until the ion cloud collides at the cathode, further lowers the net gap voltage and emits some secondary electrons. These secondary electrons may initiate a new set of current pulses depending on the magnitude of the net gap voltage. Such current pulses from this source would have a periodicity of ~ 10 microseconds whereas the pulses in Fig. 4 have a periodicity ~ 10 nanoseconds. Continuously with these processes, we can expect lateral surface diffusion of both electrons and ions to regions exterior to the electrodes and can also expect ion-electron recombination events

to occur. Both of these processes will reduce the surface charge concentration and tend to restore the gap voltage.

From a calculation of the opposing wall voltage developed (up to ~ 600 V) by the wall charge deposited during an average breakdown event like that of Fig. 4, probably only one such burst can occur per half-cycle. This has been confirmed by oscilloscope observations. It is this event which the pulse counter quantifies as a count of one and even then only on positive-going half-cycles.

As the applied voltage diminishes towards zero, it falls below the wall voltage created by the wall charge and the net gap voltage changes sign. As this opposite sign voltage builds up, the gap field exerts a force on the positive ions to pull them off the dielectric wall. Depending on the ion-dielectric surface adsorption distance, the field needed to desorb the ions from the wall may be large or small. For N_2^+ ions, as an example, the desorbing field should be $\sim 10^5$ V/M. At such a small field, the ions will move across the gap in $\sim 10^{-5} - 10^{-4}$ seconds to recombine with the electrons bound at the old anode and to produce secondary electron emission. If the recombination events dominate, then perhaps no new electron avalanches will form during the second half-cycle and the next major pulses must be triggered by other means; e.g., ^{cosmic} ray events. On the other hand, if the recombination events do not dominate, then the secondary electron emission will initiate a set of opposite sign current pulses from those in Fig. 4 but similar in character.

On time-average, the buildup of wall charges on one half-cycle allows easier avalanche formation on later half-cycles. Thus, the presence of the

dielectric covering over the electrodes diminishes the applied voltage needed to produce breakdown; i.e., V_{BD} is reduced for dielectric-covered electrodes compared to bare metal electrodes having the same value of secondary ionization coefficient. Further, any process which is capable of reducing the electron-ion recombination rate will further lower the apparent breakdown voltage of the gas and will give an enhanced counting rate at a given applied voltage. Thus, we may deduce that, in the present experiments, the B.E. emitted by humans somehow decreases the recombination rate of electrons and ions. Also, we may deduce that mental intention is a key part of this process. The initial delay in the enhanced counting rate can be ascribed to either a necessary rapport period between subject and device or to a minimum integral threshold level of the B.E. for influencing the ion-electron recombination process. The run-on behavior would be ascribed to retained B.E. in the device at a level above the minimum threshold level.

The data of Fig. 3 exhibits a strong bimodal character for both subject A and the other subjects. At this point it is not clear whether this is primarily due to a characteristic of the B.E. of the subjects or to a characteristic of the device. More experimental data is needed to clarify this issue.

Although the Soviets have always claimed that Kirlian photography was a technique for revealing bioplasmic energy⁽⁹⁾, to date serious investigations in the West have only found evidence for conventional corona discharge effects⁽⁵⁻⁷⁾. The present experiments constitute the first direct evidence that something besides conventional electromagnetism effects may

be operating in some Kirlian experiments. The two drawbacks suggested by the present experiments are that (a) the experiments must be run long enough to pass the "start up" or device rapport building phase and (b) the nonconventional effects may arise as a result of the experimenter's B.E. rather than the subject's B.E., or a combination thereof, when more than one person is involved in the Kirlian photography operation.

The present experiments also point up another factor that must be taken account of in all psychoenergetic experiments; i.e., the investigator's B.E. may be a crucial part of the experimental protocol for reproducing a given effect⁽⁶⁾. We are so accustomed to the protocol procedures of objective science that when an effect of a psychoenergetic nature occurs, like the interaction between humans and plants discovered by Backster⁽¹⁰⁾, the experimental protocol listed in the published work leaves out the B.E. field requirement. Thus, efforts to reproduce the same effects by following the listed protocol may be successful⁽¹¹⁾ or unsuccessful⁽¹²⁾. When a careful experimenter follows the stated protocol and does not reproduce the stated effects, he or she is inclined to think that the original experimenters were either sloppy with their techniques or deceitful with their statements. However, in reality, it may well be that the unstated B.E. requirement was a crucial part of the protocol and that the reported phenomenon belongs to that category of natural phenomena more appropriately listed under the heading of subjective science rather than to the more familiar objective science category. Clearly, to make a subjective science a reliable science, new devices for monitoring, measuring and categorizing these new energy fields are needed. The present work constitutes a beginning step in that direction.

E. Conclusions

From the experiments reported here, it seems reasonable to propose that a biological energy (B.E.) exists, may be directed by conscious mental intention and is capable of detection by perturbing a delicately poised system such as the plasma discharge cell described herein. To date, it has not been possible to categorize this B.E. as a part of the known electromagnetic spectrum.

Acknowledgements

We would like to thank Ms. Frances Farrelly for timely and helpful discussions during the design and development phase of this work. Her contributions greatly aided our understanding.

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TABLE I

Repetitive Sequences with One Operator (Subject A)

Voltage (Volts)	Frequency (Hz)	Time Duration (Minutes)	Hand Condition	Counts	Date	Special Features
4250	475	5	WOH WBH	2,499 75,606	11/8/78	Crown glass Dielectric
4350	475	5	WOH WBH	0 35,719	1/15/79	High lead glass Dielectric
4350	475	5 + 0.1 + 0.4 + 0.8 + 1.0 + 3.0	WOH WBH	0 18,243 27,043 32,049 41,071 46,134 46,134	1/20/79	High lead glass Dielectric Run-on
4400	475	5 + 1 + 2 + 3 + 4	WOH WBH	4,741 31,453 36,674 46,305 49,646 49,646	1/23/79	Magnetic shield on ground side Run-on
4300	475	5	WOH WOH WBH	0 0 29,747	2/12/79	Faraday Shield around detector
4300	475	5 + 1 + 2 + 3 + 4 + 9	WOH WOH WBH	0 0 48,721 86,927 126,062 148,948 164,479 164,479	2/12/79	Faraday Shield around detector Run-on

TABLE II

Sequence with Several Operators (high lead glass dielectric, 2/9/79)

Voltage (Volts)	Frequency (Hz)	Time Duration (Minutes)	Hand Condition	Counts	Subject
4350	475	5	WOH	0	A
			WOH	0	
			WBH	3,609	
4350	475	5	WOH	0	B
			WOH	0	
			WBH	20,035	
4350	475	5	WOH	0	C
			WOH	0	
			WBH	32,435	

TABLE III

Mental Intention Sequence (high lead glass dielectric, 2/14/79)

Voltage (Volts)	Frequency (Hz)	Time Duration (Minutes)	Hand Condition	Counts	Subject	Intention Condition
4350	475	5	WOH	0	C	Focus on detector
			WOH	0		
			WBH	53,725		
4325	475	5	WOH	0	C	Focus on addition
			WOH	0		
			WBH	0		
4325	475	5	WOH	0	C	Focus on detector
			WOH	0		
			WBH	16,931		

Figure Captions

1. Schematic of detector cross section, power supply (inside dashed rectangle) and monitoring system for counting mode and oscilloscope mode. Equipment: oscillator and preamp - custom made (precision); power amplifier - Crown DC 300A; H.V. step-up transformer - custom made; H.V. Probe - Tektronix P-6015; frequency counter - Fluke 1900A; digital voltmeter - Fluke 8600A (4 digit); storage oscilloscope - Tektronix 7834; counter - Hewlett Packard 5328A.
2. Photograph of operational detector from the high voltage side.
3. Histogram of event population versus the counts ratio WBH/WOH for subject A (hatched) on 251 runs and 11 other subjects (blank) on 60 runs. [Conditions: cell gas - air or N_2 ; frequency - 475 to 750 Hz; applied voltage - 50 to 100 volts below V_{BD} .]
4. Typical oscilloscope trace of electron avalanche current versus time; 200 mA/vertical division and 10^{-8} sec/horizontal division.

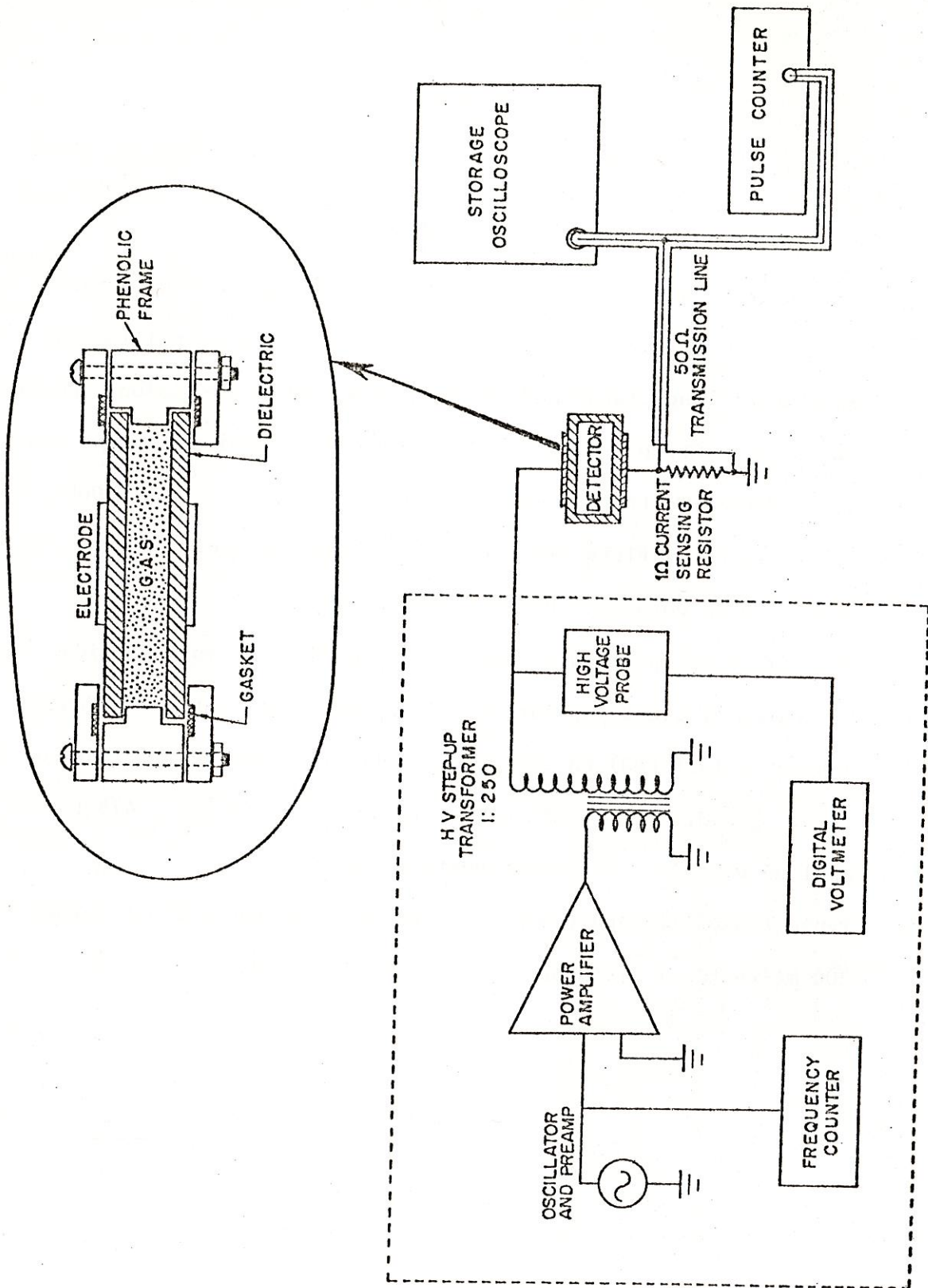


FIGURE 1

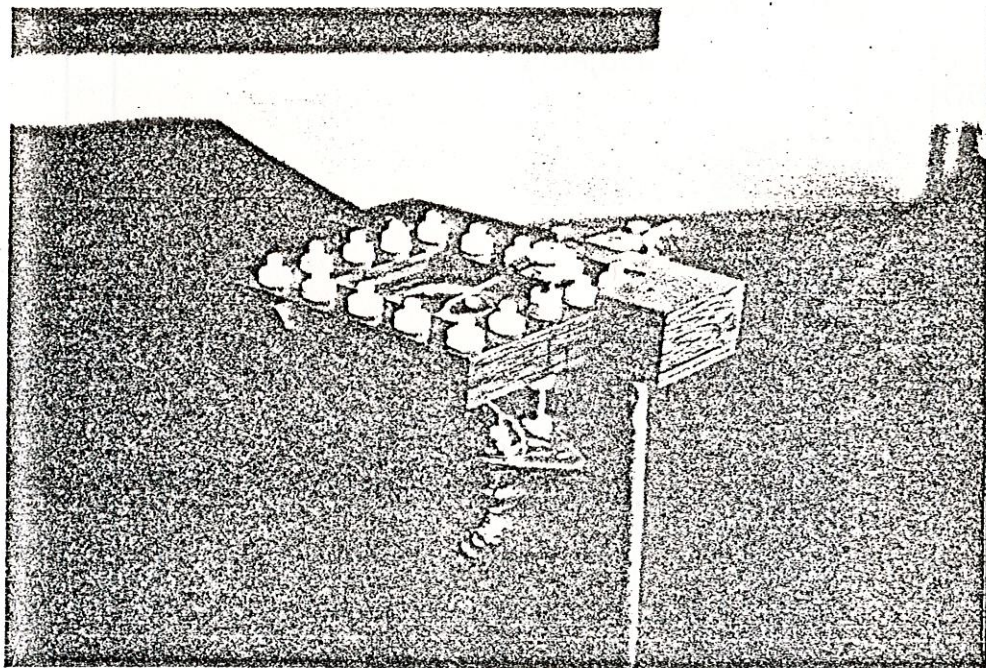


FIGURE 2

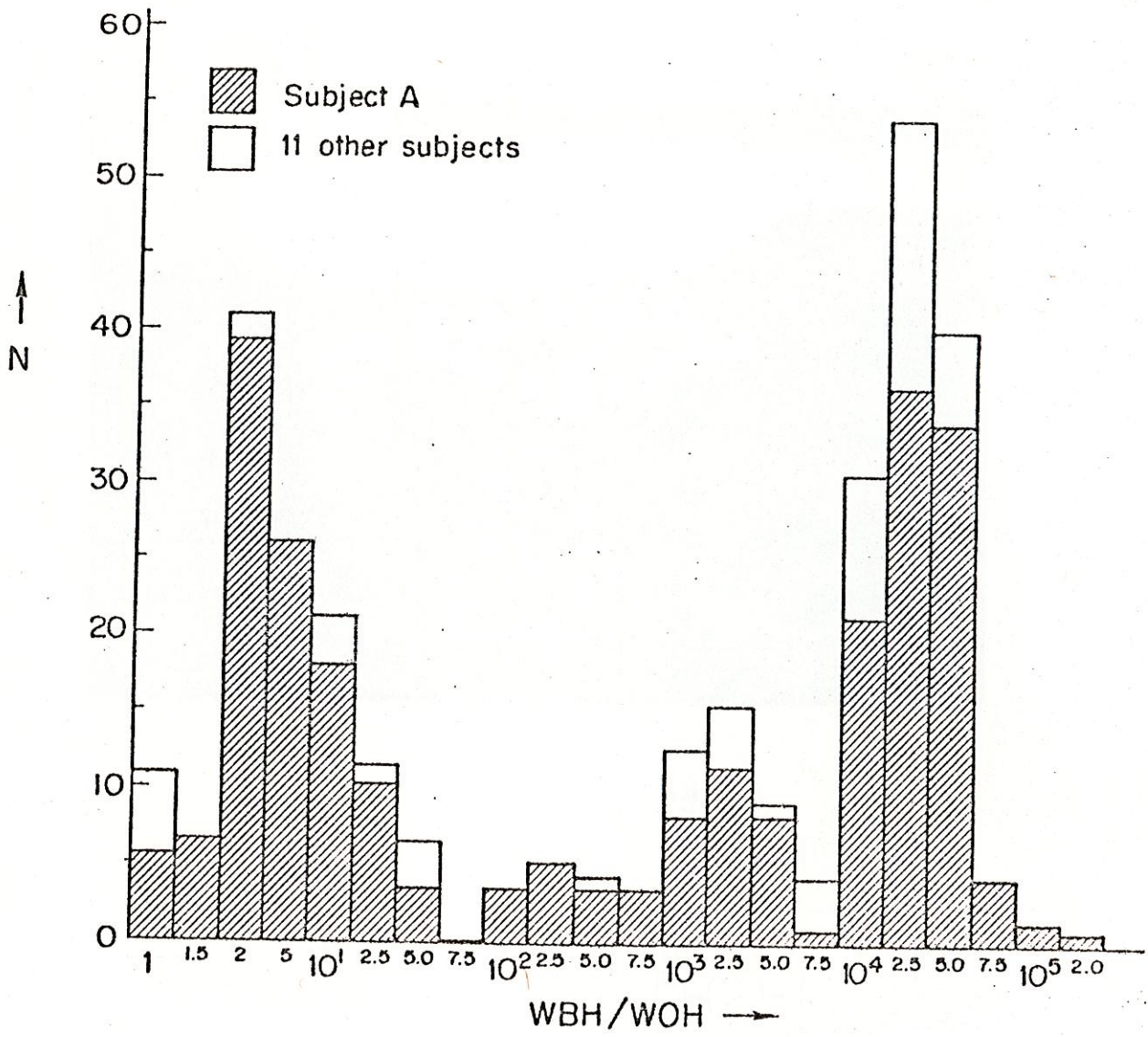


FIGURE 3

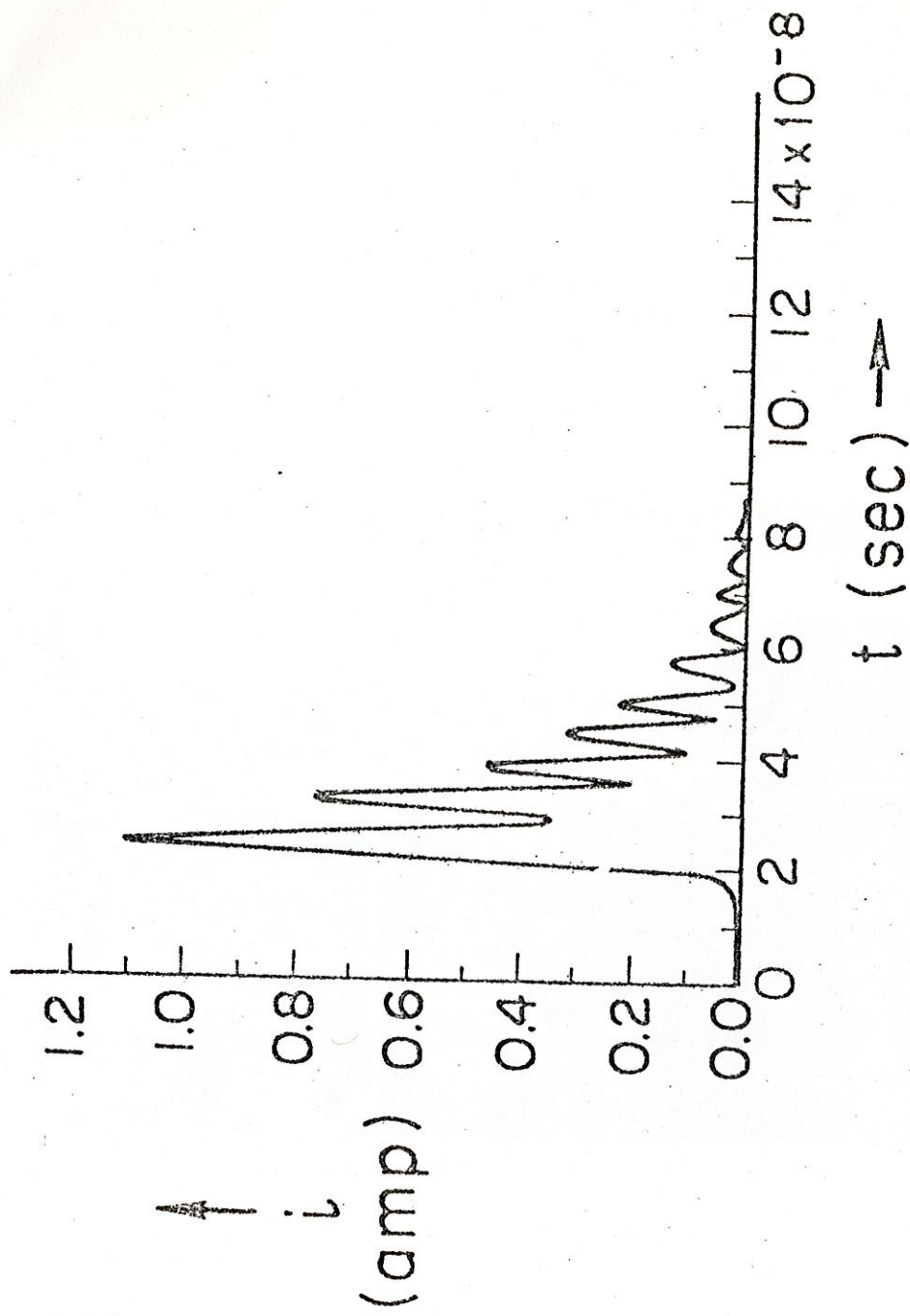
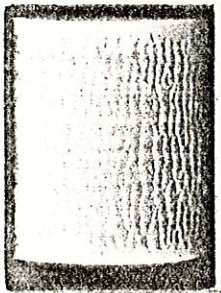
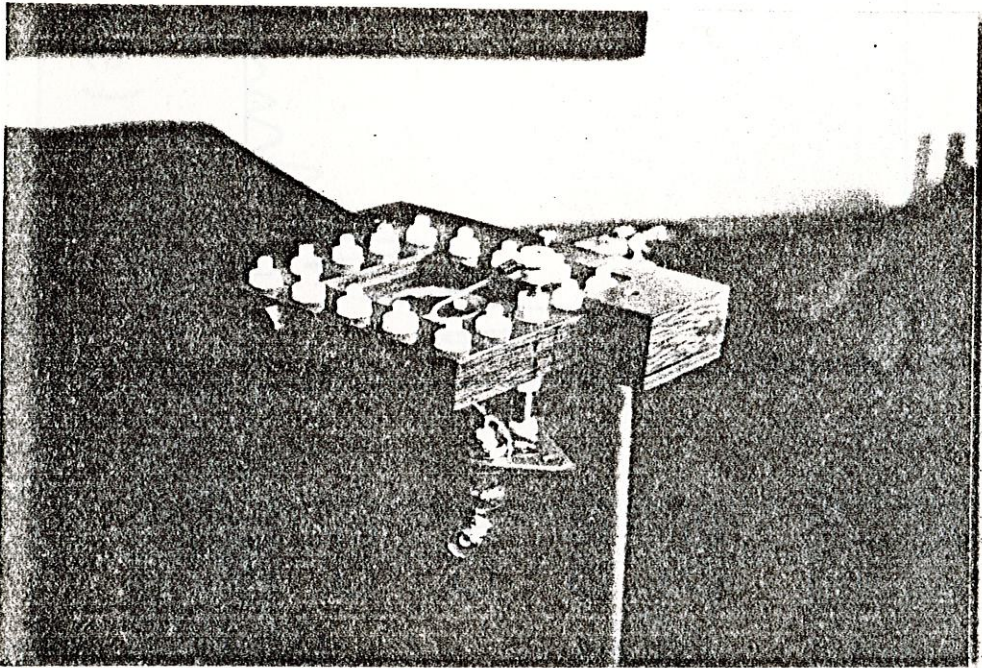
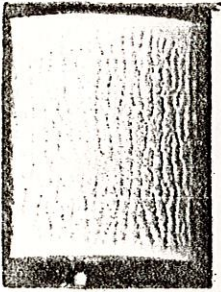


FIGURE 4



The behaviour of scientists who destroy, distort, or simply ignore the very facts they are supposed to investigate, has never been satisfied. Scientists are not the only ones to blame for the unfortunate stigma (the press) that is still attached to the subject of; but that such a gap has appeared between official beliefs and the beliefs of millions of people that a reexamination of the entire problem is now necessary. We have, on one hand, the facts 6 thousands of unexplained observations by reliable witnesses. They stand as a monument to the limitations of our understanding.

Every human activity has a secret side. Science does not escape this rule. Beyond the dry, humorless reporting of experiments in the pages of technical magazines there is the reality of research as it is lived by many men and women. Much of their existence is spent gathering data and observing facts. Not all the data they gather see the light of day. Not all the facts they observe become public knowledge. More and more of the materials that researchers discover fails to be published because it fits into no convenient, pre-existing framework.

We must look into the chaotic reaction of our official levels confronted by psychic things.

p. 112. The Hilltop Theory could be summed up in the statement that the type of data collected by an investigator is a function of his image (the beliefs about him) among his audience. It implies that scientists can only obtain a certain type of data (a biased sample). Similarly, the military and the amateur groups each perceive a different angle of the phenomena. One can only learn more by changing one's own projected attitude.

absurd

~~xxxxx~~ bizarre concepts; magical devices. I think there is a general shifting of man's belief patterns, his entire relationship to the concept of the invisible. It is happening outside of any established structure, and science is not immune to it.

to observe the reluctance of those who had spent all their lives studying poltergeists, ~~xxx~~ it psychic things, to consider the possibility of the psychic man.

I regard it as a cultural artifact that only rational phenomena are respectable. Science magazine reports two experiments revealing that we are unsufficiently aware of the degree we are moulded by our cultural taproots and our environment. see p. 188. Our culture, education and training lead us to see the world in a certain way and, apparently, lead us to comfortably ignore or reject those aspects of reality that don't fit.

psychic

It is impossible to review and compare/impressions ~~xxxx~~ until a framework is created that permits individuals to come forward ~~witxxx~~ with their testimony without fear of ridicule.

Just as there can be a matter_antimatter interaction, there could also be a ~~x~~ psi_nonpsi interaction; psi occurrences, or the part thereof we do observe and register, may represent surface processes (in analogy to surface chemistry's interface phenomena) at the "boundary" surfaces of two or several worlds. This is somewhat related to interpenetrating universes. It is only through metatheories that an established Weltbild can be ~~xx~~ reiterated so that new observation_experimental findings will be fitted in.

Meeting behind closed doors, scientists and military men, press, swap scary absurd stories. The real phenomena go on, unstudied, unconcerned. unidentified.



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Mail Stop 264-738
June 21, 1979

Russell Targ
Stanford Research Institute
Menlo Park, CA 94025

Dear Sir:

In reading your book, "Mind-Reach," I was struck by the concept of the remote-viewing experiments involving Jupiter and Mercury.

For the next month or so, there is another unique opportunity: The first spacecraft visit ever to the planet Saturn will start this coming August: Pioneer 11 will fly by the planet on Sept. 1.

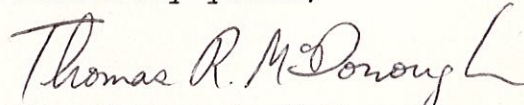
If you try such a remote-viewing experiment, I would recommend the following:

1. Concentrate on phenomena at or above the visible clouds, since the spacecraft cannot verify claims made about things happening below the clouds.
2. What are the visible rings made of? What do they look like up close?
3. Ask for information on the magnetic field, plasma, gases, dust, energetic particles, and any other phenomena outside Saturn, extending to a distance of the order of 100 times the diameter of the visible rings of the planet.
4. Ask for descriptions of the many moons of Saturn, especially of its only large moon, Titan, which is the only satellite in the solar system that has a thick atmosphere. (An example of what would have been a very impressive prediction: If someone had predicted that Jupiter's satellite Io had seven active volcanoes.)
5. Ask if there are any rings of dust, gas, or rocks around Saturn besides the visible rings, especially at much larger distances from the planet.

I would be willing to evaluate the accuracy of such remote

viewing. If you do such an experiment, I could serve as an independent witness if I received transcripts or tapes of the viewers' testimony before Sept. 1.

Sincerely yours,



Dr. Thomas R. McDonough
Lecturer in Engineering (CIT)
Astrophysical Consultant (JPL)
Phone (213) 795-0147

TMCD:sd

cc: Harold E. Puthoff