

to arrive at such conclusions. But these interpretations and conclusions are always done by humans holding beliefs. There is no such thing as perfect neutrality. The debate about the facts merges into a discussion between people holding different opinions. Recognizing that science is always much more a social activity than assumed is not really new and not a surprise, but this special issue of the JCS is an excellent reminder of the important but neglected social impact on science.

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Mind at Large: Institute of Electrical and Electronics Engineers Symposia on the Nature of Extrasensory Perception (Studies in Consciousness) edited by Charles T. Tart, Harold E. Puthoff, and Russell Targ. Hampton Roads, 2002. 256 pp. \$16.95 (paper). ISBN 1-571-743-200.

Mind at Large, edited by Charles T. Tart, Harold E. Puthoff, and Russell Targ, was originally published in 1979 at a time when parapsychology was brought under the scrutiny of conventional science, this following the publication of an article on the "remote viewing" experiments in the respected science journal *Nature*. The collection of articles in this volume were originally presented at two symposia sponsored by Institute of Electrical and Electronics Engineers on the nature of extrasensory perception around the same time. The articles are wide-ranging and multidisciplinary in their approach; influenced by psychology, parapsychology, philosophy and physics. Twenty-five years later, *Mind at Large* has recently been re-released by Hampton Roads Publishing Company, with an animated new preface by Russell Targ and an additional chapter by Robert Jahn appearing as the appendix. The book is an intense and often challenging

read, presenting a cocktail of perspectives, research and theory from a diverse range of authors. The reader is taken on a wide-ranging tour. The history of parapsychology is treated in Chapter 1 and in the appendix. Elsewhere are described various neatly designed and imaginative experiments. Then there are reported revealing and challenging findings that were and are clearly being demonstrated in the laboratory. Finally, there is in-depth exploration of the often complex and radical theories that may accommodate—as mainstream ideas about science and reality cannot—the phenomena that parapsychology is concerned with. It also includes commentary from those individuals who have been studied by parapsychologists; those who perform well at tasks designed to measure extrasensory perception (ESP). A thread running through this work is that parapsychology is as rigorous and methodological as any other science, but it always relates the findings back to the context of human experience. The articles cover a variety of different ways of explaining apparent paranormal phenomena, and in so doing allows for a greater understanding of reality. Psi phenomena are brought under the spotlight of respectability; far removed from the "new age" context.

Parapsychology still holds a strange position in the modern world. It is paradoxical in that it focuses on areas of human cognition and perception that are forbidden by mainstream science but that are simultaneously at the forefront of the new sciences. It is regularly pointed out that paranormal phenomena cannot be true, because they do not fit the current scientific model. But many new theories in physics actually explain these phenomena. The establishment of one unified theory of psi may be beyond us at present, although it seems that much can be explained by modern theories that are described in this volume.

In his preface, Targ makes some interesting points from his perspective as both physicist and parapsychologist in that he doesn't have to believe in extrasensory perception as he has seen it working in the lab. It would be like saying that he doesn't have to believe in lasers as he also worked extensively with them in the laboratory. He compares the work of the modern parapsychologist to other brave and outstanding pioneers of philosophy such as Galileo and Copernicus. He suggests that a great cognitive dissonance exists in modern culture. Surveys demonstrate that half the nation report paranormal experiences, but these are less frequently discussed as they don't fit in with the logical thought system that dominates western culture. Paranormal phenomena, he suggests, are borderland phenomena that challenge the peace and structure of society. But they persist to exist. And this is the case in a variety of forms. The evidence ensuing from the laboratories of parapsychologists indicates that the modern world view is not enough to house that evidence. The evidence from the parapsychology labs indicates that we actually live in an interconnected world full of psi phenomena and all that these imply, rather than the logical world where we are all separate individuals. Against the idea that there will one day be a grand theory of everything, it looks like the end of physics is actually unknowable. It also looks like awareness is not actually restricted by the laws of

space and time and events can happen instantaneously expressing nonlocality. This observation was described by Henry Stapp as the most profound discovery in all of science. It is also apparent that mind can not only affect biological matter, but it is possible to actually heal matter.

The introduction contains information that whets the appetite for the rest of the book. It begins by introducing the lesser known but more impressive experiments undertaken during the years by parapsychologists, particularly in the area of "remote viewing". This is the apparent human perceptual ability to access and describe information that is blocked from normal perception. These experiments are far beyond the stuff of card guessing and dice throwing experiments, which most people associate with parapsychology. Indeed, they span into areas of great interest that allow for the model building and theorising characteristic of other scientific endeavours. The authors suggest that in fact, the study of psi has come of age and is ready to take its place as a challenging interdisciplinary area within the scientific community at large. It seems to be time for parapsychology to fall under the umbrella of the rest of science. This is partially true now in the vast number of academic psychology departments in the UK that include parapsychology.

Most of the chapters are short overviews that are arranged such that they complement each other and flow in a linear manner but allow for a nonlinear approach, just like the phenomena they describe. For any parapsychologist, this is a learning experience and supplements and extends existing knowledge on a very wide field. Indeed, as a nonphysicist, this author found the book to be a great introduction to many of the theories.

Chapter 1 is by Edgar Mitchell, the founder of the Institute for Noetic Sciences and first person to carry out an ESP test in space. Mitchell compares psychic functioning with musical talent and other creative abilities. These are all the talents of the exceptional human mind. It is suggested that we need to understand unusual talents and potentials of the human mind and in so doing we might be able to naturalise many phenomena that have been pushed into the liminal and labelled as unnatural and in some instances psychotic and insane. Mitchell suggests that the label "psychic" is disturbing, but the phenomena are real and allow for a shift in the way that the world is understood. He questions what would happen when the extraordinary becomes ordinary. Our values could be altered such that there would no longer be duplicity and deception, but this might pave the way to increased honesty or paranoia. He suggests overall that the positives might be interconnectedness and interdependence of all matter, but asks "is mankind ready for this?" (p. 9).

Chapter 2 is an article by Puthoff and Targ that was originally published in 1976. The authors review parapsychological research and report particularly on remote viewing experiments with a view to understanding the perceptual channel by which psi phenomena may function. It is apparent that hypothesis testing can now be applied to psi phenomena as with other phenomena. Some fascinating examples are given of the experiments undertaken as part of the

research program at SRI (Stanford Research Institute in California); these were with both experienced and nonexperienced remote viewers, some of whom were government officials. It seems that anyone can do remote viewing, but differences exist in reliability. Indeed "remote viewing might be a latent and widely distributed, though repressed perceptual ability" (p. 57).

People were able to attain information on locations and even laboratory equipment better than chance. This information seemed to arrive in consciousness more accurately through nonverbal means and not analysing or giving meaning to impressions. It is of interest that the information is not at all degraded by distance or by use of a Faraday cage.

The optimisation of psi in the lab was considered to follow on from complex analysis of the information coming in. The efficacy of psi functioning can be increased by maximising the way in which psi seems to work, for example, coding targets in simpler form (e.g., as binary code or in Morse code format). For example, this was done by Ryzl with Delmore and by Carpenter with the word "peace". This way the noise level can be decreased and the overall target signal can be reassembled by its constituent signal parts. Modern physics does not have to stretch very far to accommodate the patterns and observations associated with this type of perception. Quantum theories, for example those of Walker and De Beauregard (revisited in Chapter 6), are very accommodating in that there might be a role of the observer/consciousness on an effect. Properties of certain types of electromagnetism also allow feasible and logical theory on how information may be carried (e.g., as ELF waves). Time is potentially reversible in the equations of potential solutions arising from the electromagnetic field; as such, the authors note that if advanced waves were detected they might sometimes carry information that is precognitive to the event (revisited in Chapter 7).

In Chapter 3, Targ, Puthoff, and May describe additional remote viewing experiments that extend the findings described in the previous chapter. The previously described experiments focused on remote viewing in a local area, whereas this set of data extend the task to distances over 5000 km. One twist on the usual experiment is described, which included a subject in a submarine whilst the outbounder went to the target location. This demonstrated that even under stressful circumstances, information could be significantly detected. The authors conclude that remote viewing effects are robust phenomena, which exceed chance. It is also the case that physical distance does not affect the accuracy of the information that is derived from this remote form of perception. This includes a useful summary table of everything known about the remote viewing perceptual ability. This chapter is self reflective and contains several criticisms on the nature and design of the experiments, which are answered one by one. It also explores the theoretical possibilities of ELF (revisited in Chapter 8) waves and quantum theory (revisited in Chapter 7) that would explain such anomalies.

In Chapter 4, evidence is presented from a different laboratory that extends the findings demonstrated at the SRI labs under Targ and Puthoff. Bisaha and Dunne describe two experiments addressing precognitive remote viewing. In the

first experiment, the target location would be visited 35 minutes into the future, whereas in the second, the target location would be 5000 miles away and 24 hours into the future. The perspective of these authors is one that the ability to perceive remotely is latent and widespread among the population rather than the unusual talent of a select few; as such, their work addressed a mixture of trained and untrained viewers. Even when remote viewing is delayed in time, it seems that there are significant deviations from what would be expected by chance. This is the case even with time delays as long as 24 hours in the future. From this research, remote viewing is not only independent of space, but also of time.

The authors of Chapter 5, May, Targ, and Puthoff, suggest that the psi process comprises at least two steps; one where information arrives in the system, and a second whereby the psi impression becomes conscious or results in an overt behavior(s). This is supported by work in other labs where physiological measures of psi were demonstrated in the absence of conscious psi detection, for example using EEG or a plethysmograph. Here, unconscious psi perception is explored by addressing physiological responses as indices of psi reception using the EEG. Experiments are described whereby a "sender" is exposed to stroboscopic flashes of light and a receiver (located in visually opaque, acoustically and electronically shielded double walled steel room 7 m from sender) is monitored for EEG responses to those remote light flashes. One promising participant was selected for a series of trials, as she showed a consistent alpha blocking effect in the control. Significant differences were found in the alpha power band between experimental and control trials. As such, there appears to be physiological index of remote light detection in this person. This effect did not extend into conscious awareness. Replication work with other participants found statistically significant decreases in the in-band EEG power in the receiver in response to a distant series of light flashes, although a second replication found a slight increase in the alpha band. Because of this, the authors consider the evidence in support of remote light detection to be only suggestive. However, patterns are interesting, and it is also of note that it doesn't seem like a sender is actually necessary to drive the brain of the receiver, this happens in the presence or absence of a sender.

Chapter 6 introduces Tart's theory of trans-temporal inhibition. Trans-temporal inhibition is a theory that makes logical sense and is analogous to lateral inhibition (associated with edge detection) in the human nervous system. It is equivalent to focusing on a psi stimulus in space and time when consciousness is not localised just in the physical present. This involves the discrimination of information in time. This was discovered accidentally in a study that was designed to train good ESP participants by means of feedback. Tart did not originally consider precognition in his data as he was more interested in real-time ESP effects (clairvoyance or telepathy). However, following the calculation of real-time hits, the computer was reprogrammed to look at displacement, which demonstrated that there was significant psi-missing immediately following a psi hit. Tart suggests that the experienced present is altered in psi conducive states, such that time flows

at a different rate and the "bandwidth" includes time from the past and the future as well as the present. To achieve real-time hits, the psi process works by suppressing the past and future information and allowing real-time ESP to be noticed. Some people may have different bandwidths, and their inhibition may be further focused in the future. As such, sometimes it may be that an experiment does not look like there is any ESP going on, but if this theory is taken into account, psi processes are going on and are observable if one considers time displacements.

Following on from experimental observations with precognition and time, Chapter 7, by Costa De Beauregard explores the concepts of time, causality and quantum physics. There is a particular focus on precognition as time may be reversible. It is clear that consciousness proceeds from past to future in the usual understanding of the world, but he challenges that events are actually bound to this direction. It is suggested that causality is fact-like rather than law-like and as such, is reversible. When thinking about information (and information transfer), Beauregard restates Aristotle. Negentropy is considered as information that exhibits two symmetrical procedures of gaining knowledge by decoding a message and emitting a message by means of one's information. In our world, information is also coupled to matter but also to the log of probability. This allows for it to be simultaneously objective and subjective. Indeed, Beauregard suggests that "information is the very hinge around which mind and matter are interacting" (p. 168). This interaction is considered in space-time. It can also be understood as wave forms. Retarded waves reflect information decoding, whereas advanced waves would reflect information emission. The collapse of the wave function is executed by a conscious act; observation. Sometimes it is possible that information from the future can indeed flow to the past or intention can affect something that has already happened (see Chapter 9). He suggests that relativistic quantum mechanics is a conceptual schema where phenomena such as PK or telepathy are far from irrational and in fact should be expected as very rational due to the mathematical symmetries of retarded and advanced waves. This chapter is an in-depth tour through the ideas of quantum physics and how it allows for many of the phenomena observed in the laboratory of parapsychologists.

In Chapter 8, Michael Persinger is concerned with the mechanism of information transfer between person A and person B in cases of telepathy and clairvoyance. He describes how ELF (low frequency) waves, in the range of 3 Hz to 3 KHz, might be implicated in the experience of paranormal phenomena. ELF waves occur in several forms in the natural world, for example, in geomagnetic radiation. It is interesting that many human physiological processes display power spectra within the ELF region, for example, the human heart, the brain and musculature. It may be that the waves carry information and employ a "lock and key" type of mechanism or that they work by resonance. The correlation is supported by increased psi experiences in times where humans are more sensitive to ELF waves. Two possibilities for the role of ELF waves are suggested, the first that waves might be modified by an agent who then influences a percipient some time and distance later. The second is that there

is an illusory transfer of information between the agent and percipient. In the simpler of the two possibilities, geomagnetism is contiguous to a shared experience between two people, which is then reawakened some time in the future by the unconscious presence of geomagnetism simultaneously in the two individuals. A more complex chain of events is also possible involving the influence of geomagnetism on behaviours associated with typical telepathy and clairvoyance experiences, such as accidents and death in the agent. The percipient would unconsciously associate geomagnetism with these behaviours in the person's presence and at a later date in their absence be cued about the agent's distress. It seems that the first scenario is unlikely given that there is little scope for the level of perceptual discrimination that is seen in telepathy and clairvoyance cases. This could be overcome by binary coding, but Persinger suggests that this seems biologically prohibitive and it is unlikely that ELF fields have sufficient information carrying properties. The second scenario involves waves as a trigger and does not require them to carry information, and there is evidence that waves may be involved in learning. This chapter is an interesting assessment of factors we are not usually aware of in the physical world that could help explain anomalies.

Chapter 9 describes the experimental work of Helmut Schmidt addressing mental effects on electronic or quantum mechanical events in electronic random number generators. In such experiments, the noise from a diode noise source or radioactive decay, (such as Strontium 90 being placed near a Geiger tube) is monitored while a subject attempts to alter the statistical properties of the noise distribution. The interface presented to participants was in the form of lamps. In precognition studies there were four, and the participant's task was to try to predict the next lamp that would light up in a random sequence; this was found particularly in one person who reported precognitive dreams in his daily life. In PK studies, the machines mimicked coin tossing and produced binary bits. These drove a nine-lamp display. The light performed a random walk around the lamps. The participant would be asked to influence the random stream in one direction over another, usually to try to increase the number of heads and lamps lighting up to the right more than the left. It was found that there were significant deviations from chance. This was particularly prominent in two participants, one who seemed to consistently gain the opposite to what was intended, whereas the other gained what was desired. PK work was explored with different levels of information streaming and with time. For example, it was found that when the random sequence was generated 24 hours before the experiment, before intention was directed to the number sequence, there was still an effect of intention on the sequence. As such, there is evidence from this work that not only can mind apparently interact with micro-level information streams, but that we live in a noncausal world.

Chapter 10 is written by Ingo Swann, an artist and a psychic subject in many parapsychology experiments. He considers that subjects are often relegated to an unofficial status in the field of parapsychology, but that this unofficial part of the

community is an untapped source for potential advancement of the field. For example, in laboratory experiments, there is a complex interaction going on between the experimenter and the participant. This is more complex than the experimenter effects of other areas of psychology, in that there is an impact of experimenter psi into the equation of success. The Experimenter effect was first described by Pratt and Price in 1938. We still don't understand this today, although it is the focus of several areas of current research. In general there is room for more investigation with regard to a psychic personality; again those who are psychic subjects may be able to give insight into this. In fact, it seems that Swann's personality profile reflects the various findings with different personality measures in lab research. Overall, it is considered that subjective or qualitative information on the part of the subject is neglected, when it is the constructed reality of the psychic individual that seems to have an impact on the psi process. Swann's perspective adds considerable insight and balance to this volume.

Chapter 11 puts parapsychology into a social and cultural context by exploring what is known about the research that went on in the former Soviet Union in the early 20th Century. The Soviet approach was more one that accepted the existence of psi and addressed it from a psychophysiological, materialist stance rather than one of establishing proof. Although the literature varies in terms of sophistication, reflecting the often noninstitution based nature of much research, some of it is more credible. Three authors' work forms the main basis of this chapter: Kogan, Adamenko and Sergeyeu. Soviet work ranges from statistical theories, to electrostatic models of PK, to detection of electromagnetic fields by humans, the production of electromagnetic fields, to hypnosis machines, to training programs, to remote physiological detectors. For example, it is claimed that Sergeyeu could detect an incoming telepathic stimulus by analysing EEG records. It may be that these took the form of antennae for the detection of ELF and VLF waves radiating from a telepathic agent. They may also have tried to generate radiation of the right frequency to interfere with the telepathy signal. Overall, the literature reflects a mixed bag of research that is at times contradictory and inconclusive, perhaps because much of it was government classified.

Jahn has written a review of psi research that did not appear in the original volume but is included here as the appendix. This review encompasses a balanced and interesting view of the field of parapsychology as a science, as well as considering where we go from here. He summarises that psi effects are demonstrated; however they are not replicable in the scientific sense. This interestingly mirrors a recent conclusion by Palmer regarding the Ganzfeld debate (Palmer, 2003). Despite this, the effects demonstrated are a significant challenge to physics and modern science. It is implied that the next stage in human evolution may actually involve expansion and interconnection of human consciousness.

This book is important, and it is well worth persevering through the drier sections. Anyone seriously interested in the nature and rubric of reality, the history of science, philosophy and physics should have a reference copy on

the shelf. The authors of the introductory chapter suggested that it was time for a paradigm revision. The question is, to what extent is this true now? On reading these pages the current author felt that in some manner, the field has not moved much further forward in the 25 years that have passed by, although in many other ways she could see developments based on the technology we now have available, for example in brain mapping techniques and how psi may manifest in psychophysiology (Chapter 5). This has been extended now with work by Don and colleagues who found a greater evoked potential in the gamma band of the EEG for targets compared to nontargets. The presentiment effect, if true, would indicate a greater preresponse to emotional compared to calm targets at a physiological level. Perhaps current concerns in parapsychology are more with the sustainability of the field, where *application* of these effects becomes an issue. From here, healing and prayer research have developed considerably, for example, by Targ's daughter Elizabeth.

Mind at Large is re-released at an interesting time in the history of the field of parapsychology. It is a reminder that the work going on in this field is of great value and importance in the modern world. The present status of parapsychology is growing year by year in European universities, whereas, paradoxically, the American cousins are under-funded and falling outside of university housed academe. This book reminds us that this work has found some fascinating phenomena under laboratory settings and that these findings are real and should be integrated fully into a new science. It allows a parapsychologist to re-embrace the field and become excited about this research.

Publication of works such as Walker's *Physics of Consciousness* may indicate a step toward a paradigm shift, but it is interesting that this book was published without the chapter written on psi phenomena. As such, despite these exciting experiments and theories, society still remains at the edge of a paradigm revision, which was pre-empted by the sorts of research that were going on at the time of the initial release of this book in 1979. It is clear that the variety of theories expounded in this volume are not the stuff of fancy but are cutting edge science, which theories support paranormal phenomena as valid and logical conclusions that are actually expected. Modern parapsychologists should read or re-read this volume and combine this with new knowledge and technological advances to develop thinking for future psi research.

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