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Editorial Office: *Journal of Scientific Exploration*, Society for Scientific Exploration,
Kathleen E. Erickson, *JSE* Managing Editor, 151 Petaluma Blvd. So., #301, Petaluma, CA 94952
EricksonEditorial@gmail.com, 1-415-435-1604

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EDITORIAL

Lately I've been reviewing the issues concerned with what's usually called the "super-psi hypothesis." Very roughly, that hypothesis is the claim that psychic functioning is considerably more extensive and controllable than its seemingly modest experimental manifestations suggest, so much so that it might even play a pervasive role in everyday affairs and operate on a large scale.

I've already tackled this topic at some length, in order both to clarify the hypothesis and to evaluate the arguments pro and con (see, e.g., Braude 1997, 2003). Here, I want simply to reconsider a suggestion I made in 1997, and which I now think may be more interesting than I appreciated at the time.

Some like to protest that the super-psi hypothesis is unfalsifiable, because it seems that we can never prove or demonstrate that psychic functioning did *not* occur, no matter what the evidence turns out to be. If (as proponents of the super-psi hypothesis suggest) our psychic functioning can be sneaky or naughty—that is, if it can be inconspicuous and pervasive and be triggered by unconscious needs and desires, and if we can't specify clear or useful limits to its degree of magnitude or refinement, then we can't, strictly speaking, falsify hypotheses positing its operation. So for example, we can never know for certain whether a particular car crash was caused normally or by virtue of somebody's PK. In the absence of something like a PK meter, the only difference between those two scenarios would be in their unobservable causal histories. (And even if we had a PK meter, we encounter the nagging problem of a regress of confirmation: Whatever we observe happening to the meter could also be the result of operator or onlooker PK—or seemingly random PK from some other source. So how do we determine for certain what caused the meter fluctuations?)

I've argued, however, that this alleged problem may be of little significance, so long as we're willing to appeal to higher-level theoretical criteria for choosing one hypothesis over another. For example, even if a car crash caused by sneaky psi is observationally indistinguishable from one caused normally, we could still have reason—although never a conclusive reason—for choosing one explanation over the other. As with many conspiracy theories, we might have to string together a cumbersome and convoluted array of facts to support the sneaky-psi alternative, but in principle it could be done. We'd have to find plausible links to the needs and interests of the presumed aggressor and tell a reasonable story about

(say) conflicts of interest between that person and the driver of the car. We could also look for revealing patterns in the data (e.g., accidents befalling people the agent doesn't like). Of course in many cases, we'll have too little information to know whether the super-psi explanation is a live option rather than a mere possibility in logical space. But in those cases where we can make educated guesses of the aforementioned sort, we can look for the story that makes the most sense systematically and which appeals to our instincts about explanatory simplicity. And although the process is undoubtedly more fallible and uncertain than we would wish, it's essentially the procedure we follow any time we explain human behavior.

Indeed, we frequently find ourselves weighing rival, but strictly unfalsifiable, hypotheses—in fact, nearly every time we speculate about the mental lives of ourselves and others. Consider the hypotheses "*S* is angry with me" and "*S* is not angry with me." In many real-life situations, there may be no way to decide conclusively between them—at least not with anything like the certitude many feel we should aim for with legitimate scientific hypotheses. For example, even if *S* says he's not angry, one can always interpret that remark as (say) a sign of *S*'s reluctance to admit his anger, or a sign of self-deception or lack of self-awareness. Similarly, in many cases there's no way to distinguish evidence suggesting the absence of anger from evidence suggesting veiled anger. Nevertheless, that doesn't mean that deciding among such hypotheses is a mere crap shoot. Indeed, some people obviously have a "nose" for making such choices. That is, it's clear that some people are much better than others at selecting among these sorts of rival hypotheses, and accordingly they make less of a shamble of their lives than those who are more explanatorily challenged.

In fact, our psychological survival depends on our ability to weigh rival hypotheses about others' mental states. It's by means of such a process that we reliably determine whom to confide in, how to speak to other people (e.g., which issues to avoid, what "tone" to take), whom we can rely on in times of stress, etc. And clearly, the ability to do this requires a mastery of a certain kind of theoretical activity: something at least very similar to generating hypotheses about people's intentions, desires, needs, interests, capacities, etc. And even though these hypotheses (or conjectures) may not be falsifiable, many are highly justifiable on pragmatic grounds. That's demonstrated by the way they successfully guide our dealings with other people.

No doubt the uncertainty of hypothesizing about sneaky or naughty psi is generally greater than the uncertainty of our everyday conjectures about others' mental states. There may not even be many psi-regularities, or they may be far less conspicuous than ordinary psychological regularities.

Or perhaps very few of our psi efforts successfully negotiate the complex underlying network of competing interests and interactions in which all such attempts would be embedded.[1] Nevertheless, in both cases, the information needed to choose one hypothesis over another requires a certain amount of digging. Of course, in the case of psychic functioning, the process is more daunting, and in many cases we'll simply have to conclude that we don't know what to say. But that's not unprecedented, or a sign that we're entertaining hypotheses that are empirically defective. Many times in the case of acceptable everyday attempts to explain human behavior, we likewise don't know what to say.

So how might we hope to detect the operation of extensive or refined under-the-surface psi in the face of the various obstacles to doing so confidently (much less conclusively)? I've often suggested that we should look at people who are remarkably lucky or unlucky. Of course, many cases of exceptional luck or misfortune can be explained easily by reference to familiar processes. But other cases seem to have no obvious explanation, especially when streaks of luck or misfortune continue for a while. Similarly, some people seem consistently to have a knack for making highly profitable speculative business or investment decisions, whereas others seem regularly to fail at this activity, perhaps more than would be expected if the process were random. Some (but not others) seem repeatedly to operate within a surrounding maelstrom of chaos or disaster, and of these some always seem to be victims, while others seem always to escape unharmed. Why are these sorts of regularities sometimes strikingly long-term? Why is it that the lives of certain people are regularly filled with annoyances and difficulties, apparently not of their own making, while those of others are relatively trouble-free in the same respects? Why do some people repeatedly have difficulties with the postal service, mail-order companies, bank computers or personnel, or automobiles, appliances, or other purchases (including items noted for their reliability), while others seem never to have any such problems?

We needn't assume that there are simple answers, or any conclusive answers, to these questions, and we certainly shouldn't take it for granted that psi is operating in these cases. After all, streaks of good or bad luck might still be fortuitous, or (in the case of bad luck) the result of ongoing unconscious efforts to sabotage our own lives. But if psi functioning does operate in the world on a day-to-day basis, one might reasonably expect it to manifest in these ways, even if it doesn't do so consistently or often. And in that case, it might be worthwhile to carry out depth-psychological studies of lucky and unlucky people. We could look for connections between their good or bad fortune and such things as their self-image, hidden agendas, and

relations with others. Of course (as already noted), no definite conclusions about the presence of psi will emerge from such studies. But occasionally a psi hypothesis might be particularly enlightening or suggestive in the way it systematizes an otherwise motley array of unconnected occurrences, or in the way it makes sense out of otherwise seemingly paradoxical features of a person's life.

Another possible stage of operation for everyday psi is the scientific laboratory. In fact, a disturbing aspect of acknowledging the possibility of even modest psi in life is that it might contaminate ordinary and otherwise ostensibly clean experiments in science. After all, there's no reason to think that PK on machines or quantum processes operates only in the context of parapsychology experiments. It would be foolish to suppose that the only machines susceptible to PK are those designed to test for PK. So for all we know, PK might play a role in the everyday gathering of scientific data. That's especially plausible when we consider the possibility of experimenter-psi, and also the fact that in conventional areas of science, a great many scientists jointly expect or hope for certain specific kinds of results. In fact, orthodox scientists are at least as motivated as parapsychologists to get their desired results. And because they are not engaged in parapsychological experimentation and are probably not thinking about psi (or seriously entertaining its possibility), they probably don't suffer from the inhibiting fear of psi that arguably keeps results in parapsychology at relatively non-threatening levels of significance. Indeed, it wouldn't be surprising if the resistance of some scientists to parapsychology stems (in part, at least) from the unacknowledged fear that unchecked and uncontrollable psi could cast a shadow of doubt over centuries of accepted scientific results.

Anyway, this brings me to the suggestion I made some time ago, and which I'm now entertaining once again. Let's suppose that psi might have influenced experimental outcomes throughout the history of normal science. Although there's probably no way to demonstrate that this occurred, it might still be possible to lend confirmatory weight to the supposition. For example, the following intriguing line of inquiry might be fruitful, given enough time and patience. Suppose our scientific theories evolve in such a way that what were formerly considered to be crucial experiments are now seen as comparatively peripheral. Or suppose that technological advances reveal that earlier crucial measurements or experimental results were crude and misleading. Suppose, in other words, that we come to view formerly important experiments as relatively unimportant or flawed, so that their results no longer matter for scientific theory. If this reassessment of earlier experiments became widely accepted, we could then conduct those experiments as they had been conducted initially, to see if they yield the

same results as before. Presumably, the experimenters in this new round of tests would lack the emotional investment (e.g., level of interest, or desire to see a certain result) of their predecessors. So if the current results are more consistent with currently prevailing scientific beliefs than with those that prevailed when the tests were originally conducted (e.g., if our current employment of the earlier methods of measurement yields the distinctly different sorts of results we would now expect), that might suggest that the results have all along been at least skewed by experimenter expectation and possible psi influence.

Almost certainly, the usual procedures and criteria for supporting scientific research probably work against this ever being funded. Moreover, I'm not prepared yet to suggest how this proposal might actually be implemented. Instead, I hope that some clever *JSE* readers might have ideas about how to take the proposal to the next level.

Note

[1] For details about that presumed underlying causal nexus, see Braude (1997, 2003).

—Stephen E. Braude

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RESEARCH ARTICLE

What Can Consciousness Anomalies Tell Us about Quantum Mechanics?

George R. Williams

grwilliams@gmail.com

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Abstract—In this paper, I explore the link between consciousness and quantum mechanics. Often explanations that invoke consciousness to help explain some of the most perplexing aspects of quantum mechanics are not given serious attention. However, casual dismissal is perhaps unwarranted, given the persistence of the measurement problem, as well as the mysterious nature of consciousness. Using data accumulated from experiments in parapsychology, I examine what anomalous data with respect to consciousness might tell us about various explanations of quantum mechanics. I examine three categories of quantum mechanics interpretations that have some promise of fitting with this anomalous data. I conclude that explanations that posit a substratum of reality containing pure information or potentia, along the lines proposed by Bohm and Stapp, offer the best fit for various categories of this data.

Keywords: quantum mechanics—consciousness—parapsychology—psi

Introduction

Quantum mechanics is arguably the most successful theory in physics. Yet it remains the most mysterious one as well. The heart of the mystery is the measurement problem, the transition from the evolution of subatomic particles described by the Schrödinger equation to the results observed in experiments. After nearly a century of experimentation and debate, no consensus among physicists has emerged, and virtually all interpretations depart from classical physics, as well as from common sense reality. And yet the standard (Copenhagen) interpretation fits the data so well, with no apparent anomalies, that making a breakthrough in understanding may be very difficult.

One relatively early class of explanation (which never achieved much

traction) was that somehow the consciousness of the observer played some role in the transition from the standard waveform to observed results. A number of the early founders of quantum mechanics, including Schrödinger and Pauli, were at various times sympathetic to some view of this sort. This line of thought took a more formal turn through Von Neumann's analysis, and was made more explicit by Wigner (1967). Stapp (2007) is a more recent advocate, building on Von Neumann's framework. Nevertheless, most physicists have been reluctant to embrace this possibility, and the field has continued to search for explanations that can be framed in more objective terms. However, alternative theories, such as Everett's "many worlds" interpretations, also have unattractive features.

Usually the possibility of some link with consciousness is dismissed without much argument or serious consideration. This might seem odd, given the persistence of the measurement problem as well as the radical nature of some of the alternatives. However, one obvious problem is that this explanation, at least in the consciousness collapses the waveform version, implies that distant stars beyond human perception might exist in a superposed state. Thus the theory would predict that there are some waveforms representing objects or systems in our universe that never collapse.

A more fundamental objection is that the word *consciousness* has no precise definition (Albert 1992:p.82). Hence our ability to construct a precise theory of how physical systems behave using a theory of consciousness would appear to be very difficult, if not impossible. Of course, the implications of this argument spill over into areas beyond quantum mechanics. If consciousness cannot be given precise meaning in ordinary language (or formal equations), then how can we have a theory of consciousness at all? This of course is an aspect of the well-known "hard-problem" that currently vexes the philosophy of mind field. We cannot doubt our subjective experience, yet how do we account for it within our current physical laws and frameworks (Nagel 1974, Chalmers 1995). Moreover, the fact that establishing a theory of consciousness is difficult (even impossible) does not eliminate the possibility that consciousness might be involved with quantum mechanics in some subtle way. And given the persistent mystery of quantum mechanics, it might be unwise to simply dismiss out of hand the possibility that something else that is mysterious, such as consciousness, may be involved.

While most scientists embrace the idea that consciousness is solely a product of brain processes, there is currently no consensus theory on how consciousness emerges. Currently, there is nothing we know from classical physics—from Newtonian laws of motion, Maxwell's equations

for electromagnetism, to Einstein's laws of relativity—that suggests how complex collections of non-conscious particles can become conscious. Consciousness remains something of an anomaly to classical physics. None of the theories of consciousness currently on the table are in some sense truly grounded within these more basic laws of physics. This being the case, can we truly afford to casually dismiss interpretations that commit the sin of hinting at a link between consciousness and physical systems?

The paradoxical nature of quantum mechanics virtually assures that any explanation invokes a theoretical construction that clashes with our accustomed view of the world. As a result we have Schrödinger's Cat or Everett's interpretation that every possibility implied by the standard waveform is manifested. Against these sorts of alternatives, an explanation that posits links between consciousness and matter may not appear so radical. And while many of the hows and whats of consciousness remain unanswered, it nevertheless possesses a significant virtue that other alternatives lack: It is not merely a theoretical construction. The existence of consciousness, however mysterious, cannot be doubted.

Perhaps most importantly, there is a considerable amount of data that imply the existence of mind–matter links. Some of these data have developed from experiments intimately connected with quantum mechanics, such as the double-slit experiment. There is also a strong literature on other aspects of consciousness anomalies that suggests nonlocal connections between minds. While controversial, the anomalous features of these data provide some interesting possibilities for assessing alternative theories of quantum mechanics that are lacking from more conventional sources of evidence.

Thus closing the door on the possibility that our consciousness is involved in the transition from the standard waveform to observed experimental results might be premature. The primary focus of this paper is to consider which theories or explanations of quantum mechanics are most consistent with the psi data. I begin with a short review of the history of quantum mechanics, which includes a brief review of some of the alternative explanations. Next, I give a brief review of the empirical literature for some categories of psi, including mind–matter interactions. Because of the controversial nature of the psi data, I rely heavily on studies that have been grouped and analyzed in large numbers of experiments via meta-studies. I then examine what these data suggest for the various possible explanations of the measurement problem.

Later in the paper I argue that there are three classes of quantum mechanics explanations that appear to be consistent with at least some of the various psi categories that include telepathy, clairvoyance, precognition, presentiment, and mind–matter interaction. These three classes include

1) the consciousness collapses the waveform theory, usually associated with Wigner, but also recently advocated by Stapp; 2) Hameroff and Penrose's quantum theory of consciousness; and 3) frameworks that posit a fundamental level of reality as potentia or pure information.[1] The key question I pursue is to what degree each of these theories can account for these categories of psi.

A Brief Overview of Quantum Mechanics

Arguably, the various explanations for quantum mechanics can be grouped into three categories: collapse explanations, relative states (or many worlds) interpretations, and theories that depend on hidden variables or orders. The best-known collapse model is the conventional or Copenhagen interpretation, developed primarily by Bohr and Heisenberg. Numerous experiments have confirmed the validity of its mathematical rules. The Copenhagen interpretation frames a given quantum system as a wave function that represents a superposition of possible vector states of the system. Unlike classical systems, quantum systems are essentially probabilistic, with no way to predict which possible state will eventually manifest. According to Copenhagen, the wave function evolves smoothly in time until a measurement leads to the collapse of the waveform into the state that is observed.

This standard interpretation has been successful in describing the behavior of subatomic particles, but it remains unpalatable in a number of respects. The superposition of vector states suggests an ontology radically different from our common sense view of the world, as Schrödinger famously illustrated with his theoretical cat that is simultaneously alive and dead. Another problem is that a measurement changes the state of a system in a way that is not described by the theory itself. Because whatever measuring apparatus we choose is also composed of particles like those within the system under investigation, there is nothing to suggest how a physical measuring apparatus can somehow instigate a collapse of the wave function.

However, the special role that measurement plays in quantum theory has opened the door to an interesting, albeit controversial possibility: that the consciousness of the observer plays a role in the collapse. Marin (2009) describes that as early as the 1927 Solvay Congress, the early pioneers of quantum mechanics discussed ideas about quantum theory, mysticism, and consciousness. While Bohr was sympathetic to the need for quantum mechanics to accommodate additional laws that might accommodate consciousness, he nevertheless distanced himself from views that consciousness played an operative role in the waveform collapse.

Heisenberg and Pauli, who were influenced by Eastern philosophy, believed that a full understanding of quantum mechanics demanded a pragmatic path between opposing poles of rational science and mysticism. Schrödinger was also influenced by Eastern views and at a later point in his life appeared to embrace a view that consciousness had some influence on the quantum mechanical results. However, Einstein and Planck remained strongly critical of arguments that invoked consciousness involved in transition from waveform to experimental results.

Von Neumann's (1932) formal analysis of the measurement problem acknowledged the crucial role that the observer played with the waveform collapse. More explicit arguments that consciousness itself causes the waveform collapse were made by Wigner (1967). Stapp (1993) invoked Von Neumann's framework to investigate waveform collapse within the brain. Stapp proposed that the microscopic dimensions within neurons create quantum uncertainty, leading to a cloud of possible neurological states within the brain. According to Stapp, consciousness selects from possible brain states the one that is congruent with personal experience.

However, attempts have been made to remove the special role measurement has in the waveform collapse. Ghirardi, Rimini, and Weber (1986) attempted to achieve this by introducing nonlinear terms to the Schrödinger equation in a manner to help the waveform collapse spontaneously. The model specifies probabilities such that collapses are rare events for individual subatomic particles; however, objects with large numbers of particles undergo collapse very quickly. Overall, their rather ad hoc approach has led to other technical difficulties because the nature of the designed collapses does not provide a good match for the type of collapses implied by the data (Albert 1992:92–111).

Penrose (1989, 1994) also explores a theory of objective collapse, which in this case requires substantial innovation across a number of challenging areas, including quantum gravity, consciousness, and the neurological structures within the brain. Collaborations with Hameroff have led to a proposed model (Hameroff & Penrose 1996) in which conscious experience emerges from a sort of quantum computing within the brain's microtubules. That is, the brain's microtubules sustain coherent superposition of quantum states. Consciousness results through the gravitation-induced collapse of these states. Tegmark (2000) has argued that the brain's warm temperatures do not allow a sustained quantum collapse for the duration of time required for neural processing. However, Hagan, Hameroff, and Tuszynski (2002) have replied that under reasonable conditions, the superposition within microtubules might be sustained within the brain. In addition, theoretical arguments have been introduced that describe conditions where entanglement

is supported in relatively warm and noisy environments (Hartman, Düer, & Briegel 2006, Li & Paraoanu 2009). Further, recent observations within the light-harvesting processes of photosynthesis have demonstrated quantum coherence between molecular structures (Hildner et al. 2013, Chin et al. 2013).

The second category of quantum mechanical explanation is generally associated with Everett (1957), whose interpretation dispenses with the collapse of the waveform altogether. That is, Everett argued that the standard wave function provides a complete description of the physical state of the world. The considerable appeal for many is to obtain a theory of quantum mechanics that is consistent and complete, without ill-defined notions of measurement or observers outside of the quantum system. However, the implication this raises is that the world is in a superposed state, even at the macroscopic level. Thus Everett's many-worlds proposal postulates that the world is in a superposition of states that are continuously evolving in different ways. The natural objection is that a theory that uses multiple worlds, rather than one world, to account for experimental observations is "ontologically extravagant." In addition, since all states are assumed to continue to exist and evolve simultaneously, it is unclear how to interpret the probabilities associated with the standard waveform.

The last category of quantum mechanics interpretations also attempts to avoid the superposition and waveform collapse style interpretation, however using an approach that has the appearance of greater congruence with our more familiar ontology. This includes hidden variables or processes that invoke deeper realities comprising information. Bohm (1952) followed up on De Broglie's pilot wave theory to provide a deterministic theory of quantum mechanics. Within this framework, subatomic particles such as electrons have definite positions and trajectories and are guided by a quantum potential function in a way that conforms to the statistical predictions of the standard theory. Thus the Schrödinger's Cat paradox is avoided and a more classical ontology is retained. Bohm derived the statistical uncertainty observed in experiments from the uncertainty of the particle's position. Despite its attractive features, Bohm's hidden variables theory has not developed traction, perhaps due to Von Neumann's argument that hidden variables is incompatible with quantum mechanics.[2]

Bohm and Hiley (1993) expanded on Bohm's earlier work with the quantum potential function. They argued that the quantum potential, as well as the Schrödinger equation, functioned in a higher-dimensional reality, which was responsible for the nonlocal and holistic features of quantum mechanics. Instead of a waveform collapse, Bohm and Hiley described how "active information" guides subatomic particles to "select" various possible

states or events over others. Further, this "active information" depends on the features of the whole system, which encompasses both the measuring apparatus and the object under study, and cannot therefore be analyzed in terms of individual particles. Thus the system of observation and the objects under investigation compose an undivided whole, which simply cannot be reduced to an analysis of component parts.

Bohm and Hiley (1993) also incorporated what Bohm (1980) termed the "implicate order," an enfolded or hidden, organizing source of information existing within a higher dimensional "space" through which the physical world emerges. Bohm described the implicate order as the source of the "active information" for the quantum potential function and thus may be understood as the ground of all existence. According to Bohm, everything in our physical world (what he terms the explicate order) emerges from this underlying ground, which provides the bridge between mind and matter. Bohm and Hiley (1993) conjectured that mind and matter are two sides of an overall process:

> Active information can serve as a kind of bridge between these two sides. These latter are however inseparable, in the sense, for example, that information contained in thought, which we feel to be on the mental side, is at the same time a related neurophysiologic, chemical, and physical activity. (Bohm & Hiley 1993:384)

Aspects of this later work retain a deterministic flavor through his choice of metaphors to describe the implicate order.[3] However, in other work, Bohm clarifies that the implicate order was a realm of possibility:

> we are saying that the implicate order will have to contain within itself all possible features of the explicate order as potentialities, along with the principles determining which of these features will become actual. (Bohm 1987:41)

Bohm has not always been consistent in whether or not probability within quantum systems can be understood in some sense to be intrinsic or fundamental. Reflecting Bohm's earlier work, Bohm and Hiley (1993) state that probability is "clearly not essentially different from that used in statistical ensembles. Thus in no sense is probability being regarded as a fundamental concept." (p. 42) However, in his later work, Bohm appears to seek a flexible framework that can accommodate both deterministic and indeterministic processes, and his notion of the implicate order certainly appears to embrace potential at a metaphysical level. As Pylkkänen (2007) notes, "Bohm assumes in an Aristotelian fashion that there exist potentialities

in the holomovements (implicate order) . . . that 'actualizes' when it unfolds to the explicate order." (p. 26). Of course, any bridge between mind and matter must in some sense possess intrinsic probability if mind possesses free agency.

Stapp (2007) has also attempted to incorporate a notion of pure potential as an underlying reality within quantum mechanics. To be more precise, using his own terminology, Stapp terms potentia as a domain of "real tendencies" that are associated with subatomic particles and that actualize when observation occurs.[4] He utilizes this concept of potentia within a framework that borrows heavily from Whitehead's process philosophy (Whitehead 1929), which he sees as possessing key parallels with Tomonga–Schwinger's quantum field theory. The foundation of Whitehead's process philosophy consists of the distinction between "continuous potentialities" and "atomic actualities." Stapp proceeds to sketch reality as an unfolding process with physical events interacting with potentia, which in turn causes new events to emerge. In Stapp's words: "This basic autogenetic process creates the new actual entity which, upon the completion of its creation, contributes to the potentialities for the succeeding actual entities" (Stapp 2007:90).

In a number of ways, Stapp's exploration resembles Bohm's (as well as Bohm and Hiley's). Stapp borrows from Whitehead's ontology the notion that reality or "actual occasions" comprise psychological and physical aspects. Like Bohm's implicate order, the potentia which precedes actual occasions is neutral with respect to mind and matter and represents a mode of existence where the two are unseparated. In addition, this potentia possesses nonlocal and wholistic features that provide the foundation of such quantum features as entanglement.

However, unlike Bohm's interpretation, Stapp retains the more traditional interpretation of waveform collapse. Also, according to Stapp, we need not think of this potentia as a substance distinct from mind and matter within this framework of process; thus he argues that dualism suffices, instead of neutral monism or dual aspect, which has been used to characterize Bohm's (1980) work, as well as Bohm and Hiley's (1993).

The Evidence for Psi

Currently psi data remains controversial even though for many cases the evidence meets or exceeds the levels of acceptable statistical significance attained for more conventional subjects (Utts 1991). Meta-analysis, which combines diverse studies from numerous experimenters and laboratories, is available for a number of categories of psi, including telepathy, clairvoyance, precognition, presentiment, and some types of mind–matter interaction. The

available meta-analyses strengthen the power of the data at hand for these categories of psi. Here I will give a brief overview of the evidence.[5]

Meta-analysis available on remote viewing as well as various categories of telepathy shows highly significant effects. On surveying the evidence for remote viewing, Utts (1996) concluded that the statistical effects were so overwhelming that the probability that chance alone could account for the effects is 10−20%. The cases for telepathy include J. B. Rhine's method of "forced-choice" card guessing, which employed the earliest uses of statistical analysis on laboratory experiments.[6] In addition, telepathy occurring during the dreaming state was extensively studied by Ullman and Kripner from 1966 to 1972. A meta-analysis by Radin (1997) found an overall success rate at 63% (where chance would be 50%), with odds at 1 in 75 million that the results could be attributable to chance.[7] Perhaps the strongest evidence for telepathy is provided with the ganzfeld method, which uses a technique of inducing a mild altered state of consciousness to facilitate a link between sender and receiver. Tressoldi, Storm, and Radin (2010) recently examined all the ganzfeld evidence reported in 108 publications and conducted from 1974 through 2008 and found an overall hit rate across all of the data of 31.5%, above chance expectation of 25%, with a p value of 1.0×10^{-11}.

Meta-analysis also confirms some forms of precognition and presentiment. Honorton and Ferrari (1989) analyzed forced-choice precognition experiments between 1935 and 1987 and found a small, but highly significant effect ($p = 6.3 \times 10^{-25}$). Bem (2011) conducted nine precognition experiments, which essentially "time-reversed" well-known psychological effects so that the individual's response was obtained before casual stimulus occurred. He reported that all but one of the experiments yielded statistically significant results, and the corresponding statistic across all of the experiments yielded $p = 1.34 \times 10^{-11}$.[8] Another psi effect suggesting sensitivity of future events is presentiment, which focuses on physiological effects indicating emotional arousal. Recently, Mossbridge, Tressoldi, and Utts (2012) conducted a meta-analysis of reports published between 1978 and 2010 and found evidence of shifts in physiological activity prior to stimulus, indicating an "unexplained anticipatory effect."[9]

The possibility that human intention can influence physical processes has been investigated using random number generator (RNG) devices. These devices, which incorporate quantum processes in their design, produce true random streams of 1s and 0s. Recently Bosch, Steinkamp, and Boller (2006) gathered 380 known mind–matter experiments using RNG devices and confirmed small, but statistically significant effects. However, the authors were cautious in drawing their conclusion, highlighting the heterogeneous nature of the studies. After noting the overall high quality of

the studies, they suggested that publication bias might be the most plausible explanation. However, Radin et al. (2006) argued that invoking publication bias would require an implausible number (1,500) of unpublished studies.[10]

Another category of experiments considers the influence of group emotions or shared consciousness on RNG devices. Typically, these experiments have tested whether groups of individuals via some sort of shared experience or group emotion can influence RNG devices with no intention or awareness of such devices. Thus shifts in emotions shared across large groups might affect the underlying tendencies governing physical processes in the environment of those populations. Nelson and others have developed the Global Consciousness Project (GCP) to monitor the effects of populations, responding to important world events, affecting a global network of devices. Nelson and Bancel (2008) reported the results of the GCP, recording random streams generated during 256 events in its first nine years of operation. The results strongly support the hypothesis of coherent attention or emotional response corresponding to deviations in network output; the combined statistic exceeds what chance would predict by 4.5 standard deviations, with a corresponding p-value of 3×10^{-6}.

Overall, we have meta-analysis across diverse experimenters and laboratories confirming significant results for telepathy, clairvoyance, precognition, presentiment, and mind–matter interaction. As discussed, this includes two categories of mind–matter experiments: 1) those that test the effects of mental intention on an inherently random process; and 2) those that test the effects of shared experience or group emotion on RNG output. I will proceed to explore what these various psi data might tell us about the competing interpretations of quantum mechanics.

What Can the Psi Data Tell Us?

What implications do the psi data have for the various interpretations of quantum mechanics reviewed previously? Let's begin with the theories that appear most at odds with the psi data and then proceed to examine more closely those that hold at least some promise toward fitting the data. The class of explanations influenced by Everett's interpretation of many worlds appears to be the least consistent with the psi data. This is because the implications of the mind–matter data are that, either through mental intentions or through shared emotional resonance, the underlying probabilities governing quantum mechanical systems can be affected. Of course, the role that probabilities play in the Everett world is an unresolved question and problematic even for advocates of that interpretation (Sebens & Carroll 2014). However, if some kind of mental or emotional impulse can affect those probabilities, then the problem grows considerably. Whole

parallel realities cannot simply be shifted or made less likely due to the contents of someone's mind.

The results of mind–matter experiments also cast doubt on the GRW (this author) style collapse models, which engineer waveform collapse to be exclusively dependent on the density of subatomic particles. Such models also cannot account for experiments where mental intention can influence quantum-based random number generators. Other collapse models that rely only on physical processes also appear inconsistent with experimental findings that suggest mind has an effect on such quantum processes. This argument also applies to versions of the Copenhagen interpretation, which rely on the measurement apparatus itself rather than a conscious observer. The results of these experiments suggest that consciousness plays some role.

There remain three classes of explanation of quantum mechanics from the ones reviewed previously:

1) the quantum waveform is collapsed somehow as the consciousness of the observer participates in measurement
2) the objective reduction model by Hameroff and Penrose; and
3) hidden variables or hidden order type models.

Each of these allows links with consciousness that the other possible explanations do not. Further, each of these three has already been invoked to explain some aspect of psi phenomenon. It is important to note, however, that none of these are ad hoc constructions developed to explain some aspect of psi. Each is a theory or framework developed to help us account for the measurement problem of quantum mechanics. We'll explore each of these in some depth to determine which one might best provide an understanding of psi.

My strategy in dealing with these three remaining theories is not to focus on whether they supply a satisfactory explanation of the measurement problem. Much has already been written about the relative advantages and shortcomings of these theories. Here, I will instead concentrate on the degree to which these theories or frameworks are consistent with the categories of psi we've reviewed in the previous section.

1) Consciousness Collapses Waveform Theories

Explanations that invoke consciousness as a primary agent that triggers the collapse of the waveform (through some unspecified means) are perhaps the best known of the three classes of explanations that we explore here more fully. This is probably due to its close association with the Copenhagen

interpretation, as well as its prominence in popular media. This class of explanation has been cited in the psi literature, especially in association with mind–matter interaction experiments.[11]

The usual idea is that somehow conscious attention on a quantum event triggers a collapse of the standard waveform into the results of the experiments observed. Traditionally, this explanation has been invoked to describe how an observer affects the waveform of a physical process, such as an experiment. As we've discussed, Stapp's framework applies within the neurobiology of the brain. In all cases, the collapse occurs as consciousness or mind interacts with the waveform. This description invokes an explicitly dualistic view of the mind–body question, and advocates may argue that this explanation helps to resolve two problems that confront dualism: 1) how the two disparate substances of mind and matter can possibly interact and 2) how this interaction might occur without committing a violation to the conservation laws of energy and matter.[12]

However, the mind–matter interaction experiments reviewed in the previous section require something else: that a conscious intention directs the collapse in a particular direction. This would imply that a conscious intention might bias the Born probabilities associated with the waveform in the direction congruent with the intention.[13] Thus a waveform collapse theory that incorporates consciousness might provide a serviceable explanation for such mind–matter experiments as Radin et al. (2013) and Jahn et. al. (1997). What exactly this implies when conscious attention is present but without a particular intention is unclear. Presumably, such a condition would lead to a collapse without biasing the probabilities for certain outcomes in a particular direction.

This theory does have the unpalatable shortcoming that it inherits from all versions of collapse stories, which invoke an observer. That is, what are we to make of events such as distant galaxies? Are such objects in a state of quantum superposition? Do they require an observer to have the definite, tangible features that objects we perceive typically have? This undesirable feature of collapse theories is likely an important factor in why cosmological physicists are drawn to the Everett framework, which avoids invoking waveform collapse.

A puzzling characteristic of this explanation is that while consciousness appears to have considerable power in collapsing the waveform, its corresponding ability to bias the underlying probabilities within the waveform is rather weak. That is, the ability of consciousness to reduce the wave packet to observable particles is very substantial, to say the least, since for this class of explanation, no object or event remains in quantum superposition once it is observed, no matter how far away. However, our

review of the accumulated evidence on mind–matter experiments suggests that mental intention affects random outcomes with a much smaller effect. This curious feature is not necessarily fatal to the case for this type of explanation, but such observational styled theories must evolve to explain the disparity between the two effects.

In addition to mind–matter interaction, this class of explanation, with its dualistic framework, suggests how anomalous transfers of information might occur in ganzfeld and other telepathy experiments. Dualism suggests that mind is not simply a product of physical processes within the brain. If we take another step and conjecture that consciousness possesses a nonlocal aspect (as quantum mechanics appears to exhibit), then we may have a framework that supports some anomalous communication between minds.

However, clairvoyance, the ability for minds to access anomalous information from the environment, is more problematic. Examples in remote viewing suggest that minds can perceive representations of the environment, even at great distances. Do we count such anomalous transfers of information as observations that are inducing the collapse of a waveform associated with some distant object? If so, how do we interpret misses that also occur in the experiments? Counting misses as some type of observation would seem nonsensical. Perhaps we should not treat anything regarding clairvoyance as an observation, hits or misses. But the evidence does suggest anomalous information transfer at a rate above chance (Bem & Honorton 1994). Is it reasonable to think that accessing information in the form of clairvoyance should be associated with some sort of waveform collapse?

It might seem curious that clairvoyance appears to be a harder fit in this quantum mechanical framework than telepathy is. Telepathy and clairvoyance appear to have a close relationship to one another. Disentangling the effects of clairvoyance from telepathy has proven to be very difficult (Radin 1997:93). The problematic differences that this explanation has in accounting for telepathy and clairvoyance can be attributed to the asymmetric relationship between mind and matter posited by this framework: The physical world remains in quantum superposition until it is observed by a mind.

Precognition and presentiment also present difficulties for this interpretation. One challenge here is that these categories of psi imply a flow of information backward in time, which has troublesome implications for causality. For example, suppose I have precognition of a future event where my front tire blows out on a long trip away from home. Using this information, I replace my worn out tire with a new one and prevent the blowout from occurring. But now my precognition has no basis.

Could we apply this 'consciousness causes the waveform collapse' interpretation against precognition or presentiment so that an observation of a future event collapses the waveform of that event? Recall that this interpretation suggests that the waveform collapse occurs instantaneously. Imposing this condition on future events seems problematic. However, some psi researchers have suggested that the operation of time may be symmetric (that is, time flows both forward and backwards). Bierman (2010, 2015) argues that while we are generally not aware of physical processes that move backward in time, most equations in physics do not impose such constraints as time symmetry. According to Bierman, precognition and presentiment represent cases where consciousness allows awareness of a more symmetric time flow, thus allowing perception of information regarding future events. Perhaps using this argument we might fit precognition and presentiment into a "consciousness collapses the waveform" framework. However, Bierman (2015) acknowledges that such a theory does not yet resolve time paradoxes such as the one I just described. Further, we should note that the collapse of the waveform described in the Copenhagen interpretation does appear to be inherently time-asymmetric (unlike most equations in classical physics). Thus integrating a theory that posits consciousness restoring time symmetry within an explanation where consciousness reduces the wave packet of probabilities for a quantum event appears extremely awkward, to say the least.[14]

Perhaps we might get around the problems raised by clairvoyance and precognition by somehow extending the framework. One way we might proceed is to posit that these types of psi involve accessing some representation of the waveform, some shadow reality that contains information about it and which we can access without triggering a collapse. If somehow our accessing this underlying level of reality meant that we could perceive the probabilities associated with the waveform, we might be able to accommodate such phenomenon as clairvoyance and precognition. In this case, clairvoyance would involve accessing the probabilities about events or facts about the environment, and precognition would involve perceiving current probabilities about future events. Unfortunately, this requires an additional underlying substance or stratum of reality that appears to be outside the dualistic framework of the 'consciousness collapses the waveform' explanation.

One last psi category for us to consider is the effects of group emotion or resonance on random number generators, such as the Global Consciousness Project. This appears to be another psi category that gives a strong challenge to this brand of explanation. The results of these experiments suggest that participants in the experiments (through experiencing common emotions)

are influencing changes in random number devices that they have no knowledge of. These experiments are especially relevant for our purposes because the devices used incorporate technology that is based on quantum mechanics. Unlike more conventional mind–matter experiments, direct (or indirect) observation of these devices by the participants plays no role. The 'consciousness collapses the waveform' explanation does not appear to provide the right framework for this type of psi phenomenon.

2) Hameroff and Penrose Objective Reduction (OR)

Recall that the theory developed by Hameroff and Penrose builds on Penrose's earlier work, which conjectures an objective collapse of the waveform, resulting from the interaction of quantum gravity with quantum superposition. A conscious observer plays no role in the waveform collapse. Conscious experience emerges in their model as organized networks of quantum superposition, sustained within microtubules, collapse within the brain.

At the moment, it isn't clear how the authors would explain psi in their work. However, Hameroff and Penrose (2014) have suggested that their model is consistent with presentiment experiments reported by Bem (2011). The authors have recognized features of quantum mechanics where the quantum state of various particles within a given system depends upon the state of other particles within that system. While not completely understood, such entanglement has been verified empirically and suggests a nonlocal connection between particles within a quantum system. Hameroff has suggested that that their theory is consistent with most kinds of psi phenomenon and that quantum entanglement likely plays a central role, providing a link between their model and anomalous information transfer that psi suggests.[15] Thus the proposal by Hameroff and Penrose that invokes a process of quantum superposition holds a possibility of our minds accessing nonlocal information via quantum entanglement with distant particles in the environment.

It is well established, however, that entanglement between particles cannot be utilized somehow to allow virtually instantaneous transmission of information. This might appear to prevent us from using entanglement as a mechanism for nonlocal transfer of information that psi represents. But given the psi data that we've reviewed, let us explore the possibility that entanglement can be used to account for psi.

Perhaps unconscious processes within the brain might access nonlocal correlations between networks of superposed microtubules quantum entangled with other particles in the environment. An explanation for clairvoyance could proceed from such a possibility. Thus nonlocal

information, collected within this organized network of structures, and perhaps associated with the unconscious processes within the brain, could become accessible to the mind with orchestrated objective collapse. Remote viewing of a building hundreds of miles away would presumably require quantum entanglement between the particles that compose the building and groupings of mictrotubules in coherent quantum superposition prior to orchestrated objective reduction that leads to the conscious experience of a clairvoyant perception of the building. A central assumption here is that somehow structures within the brain are able to collect, process, and create meaning from this information accessed via entanglement.

However, there are additional problems that invoking entanglement as a theory of psi must address. Perhaps the first one is whether entanglement between particles as we've described can be sustained over long distances in the rather hot and noisy world we inhabit. As I've suggested, some theoretical work suggests that quantum entanglement can persist in relatively warm and noisy environments. However, the authors I've cited above posit conditions that our world outside the laboratory fail to meet. And currently all quantum theory agrees that entanglement between a quantum superposed system with large, macro scale objects in the environment instantly triggers decoherence. Unless such decoherence is accompanied by the nonlocal transfer of information required to explain something like clairvoyance, entanglement as we understand it is unlikely to help us understand psi.

However, let's suppose that entanglement to some degree can be sustained in the warm and noisy environment of our world, and that the decoherence associated with interaction between groupings of superposed microtubules in the brain and the environment is accompanied by some nonlocal transfer of information from which unconscious processes within the brain construct some meaning. Another question that arises is whether entanglement exists in our macro world to such a degree to support something like the ability to remote view a building many miles away. Away from the physics lab, entanglement doesn't appear to play a role in our experience whatsoever. It's difficult to see how Hameroff and Penrose's model, where objective reduction continuously occurs everywhere due to the interaction of quantum superposition with gravity, would provide a sufficient level of quantum superposition to support the necessary entanglement required for psi to operate over large distances.

If we somehow get past this problem, another concern arises: how do we extract meaningful information from such an entangled world? Hameroff and Penrose developed a sophisticated model within the brain describing networks of microtubules in coherent superposition, through which our conscious experience emerges. However, no such coherent control of

entangled particles exists outside the brain. The entanglement of the physical world, assuming that a sufficient portion remains in superposition, would presumably entail highly complex relationships across vast numbers of tiny particles. How would the mind sift through this inherently noisy field and access coherent and meaningful information? Further, presumably extracting meaningful information would grow in difficulty with the distance separating minds (objects).[16] However, the experimental data on telepathy and clairvoyance do not show distance effects.

Thus, while their model demonstrates considerable sophistication toward the process of generating and processing meaningful information within the brain, this requires a controlled and coherent collection of superposed structures that does not exist outside the brain. Even allowing for considerable entanglement between brain structures and the environment, it's difficult to see how meaningful and coherent information can be transmitted across great distances. Perhaps Penrose's Platonic world can be used to supplement the role of entanglement and provide a channel for nonlocal information. However, Penrose has not suggested that his conception of a Platonic world allows for this. Overall, the problem of invoking quantum entanglement without some additional modification to their model appears to be a significant hindrance for Hameroff and Penrose to explain psi phenomenon.

3) Theories of Hidden Order or Potentia

The remaining class of explanations includes theories that posit an underlying order or stratum of reality that might be described as potentia or active information. This includes Bohm and Hiley's (1993) framework, which incorporates Bohm's (1980) implicate order, as well as Stapp (2007) invoking a notion of potentia within Whitehead's process reality. Ullman (2006) has speculated that Bohm's implicate order may be useful for explaining his work on dream telepathy. Talbot (1992) has invoked Bohm's implicate order as well as his use of the hologram as a conceptual tool in order to explore an ontology capable of explaining several different psi phenomenon.

We can recall that Bohm (1980) proposed an implicate order functioning in a high dimensional reality and exhibiting nonlocal and holistic features. This underlying ground, the source for what Bohm terms "active information," is the foundation for consciousness as well as subatomic particles composing matter. Departing from mechanistic approaches, Bohm describes a holistic process of unfolding from potentialities of the implicate order to our familiar world (explicate order).

I'll proceed with something close to Bohm's implicate order that emphasizes the notion of a potentia underlying the standard waveform, which therefore incorporates an important element in Stapp's model as well. For our purposes here, I'll attempt a relatively simple framework that incorporates the work of Bohm, Hiley, and Stapp, but which may depart from those frameworks in small ways.[17] For our purposes here, I posit a neutral foundation underlying mind and matter as active information, which possesses the nonlocal and holistic properties exhibited in quantum mechanics. This more fundamental level of reality also possesses the precursors of our consciousness as well as the potentia, the real tendencies or probabilities underlying physical reality, which the standard waveform reflects.

I submit that this framework fits well with the psi categories we've reviewed. First, let's consider telepathy and clairvoyance. As I have proposed, this hidden, foundational level of reality is a realm of information supporting the world we experience. With our minds in contact with this neutral bridge, we can share, to a small or modest degree perhaps, information that influences other minds, as well as features of the environment. The intrinsic probabilistic nature of this foundational level of reality fits well not only with the quantum mechanical literature, but also the psi empirical literature. Probabilities are inextricably linked with all of the psi data obtained through laboratory research. This is usually understood as an inevitable result of extracting information from a noisy process. This framework of active information suggests another interpretation: Probabilities, as quantum mechanics suggests, may be intrinsic to the underlying reality that binds us together.

Recall my effort to solve the problem that the 'collapse the waveform' theory had with clairvoyance (as well as with precognition and presentiment). This involved extending the model to allow for perceiving underlying probabilities about the state of the world (or future events of the world). While the effort floundered with the 'collapse' framework, it fits perfectly well here. What apparently is required is a deeper or more fundamental level of reality comprising information, which includes the probabilities underlying the phenomenon of our experience. Thus precognition and presentiment can be understood as involving a perception of current probabilities of future events. Note that no time or causal paradoxes arise with such an interpretation.

Bohm noted that his framework suggested interesting implications for thinking about time (Bohm 1980:211). That is, time may be understood to be more derivative with respect to the higher-dimensional ground of the implicate order. Thus what we have been describing as active information

may be sourced or functioning in an order of reality outside of time in some sense. While this multi-dimensional reality may be difficult for us to comprehend, perhaps some aspect of our perception can access it in ways that result in precognition or presentiment.

We have noted that the nonlocal nature of this foundational stratum supports a mechanism of information flow that does not diminish with distance. The question arises, however, what is different here from the situation of using entangled particles to convey information as we explored with Penrose and Hameroff. In that case, it appears that encounters with unrelated particles is unavoidable, so the level of noise must ultimately overwhelm the information we are attempting to extract. Accounting for the lack of distance effects reported in telepathy and clairvoyance requires something else. I presume a field of pure, nonlocal information provides a better explanation.

This framework suggests that mind–matter interaction can be explained by exploiting the intimate relationship between conscious experience and a nonlocal proto-conscious field containing the probabilities underlying physical systems. The framework suggests that intention can affect those probabilities. Indeed, Jahn and Dunne (2011) explored various experiments that demonstrated such a link between intention and random processes rooted in quantum mechanics. Other random experiments, such as throwing dice, might be explained through intrinsic randomness that is nevertheless involved. Essentially, an individual's intention must be linked with the underlying probabilities residing within the proposed proto-conscious field that is associated with the event. This interpretation linking conscious intention with the probabilistic world of quantum mechanics may help place testable restrictions on observations for future mind–matter experiments.

Let's finally consider the influence on random number devices from group emotions or shared consciousness. Recall the unusual nature of this particular sort of psi: groups of individuals sharing a common emotion influencing the outputs of random number generators with no intention or awareness of such devices. Our framework suggests that changes in emotions shared by relatively large groups may influence the proto-conscious foundation of mind and matter. Thus shifts in emotions shared across large groups might affect the underlying tendencies governing physical processes in the environment of those populations.

Table 1 summarizes my arguments on how well these various explanations of quantum mechanics fit with the categories of psi. The objective collapse theory proposed by Hameroff and Penrose fared worst on this score; the explanation doesn't appear capable of explaining any psi, due to the difficulties we discussed invoking entanglement. Theories

TABLE 1
How Consistent Are the Three Explanations of Quantum Mechanics with the Psi Data?

Psi Category	Consciousness Collapses the Waveform	Hameroff and Penrose Objective Collapse	Theories of Hidden Order or Potentia
Telepathy	X		X
Remote viewing			X
Precognition			X
Mind–matter	X		X
Group resonance			X

that posit that consciousness collapses the waveform perform better. This class of theory holds promise, accounting for telepathy and mind–matter interactions. However, as we discussed, this type of theory appears to be an awkward fit with respect to remote viewing, precognition, and shifts in RNG devices due to group resonance. Explanations such as Bohm's implicate order, which posit an underlying strata of pure information or potentia, appear to hold more promise in accounting for these various categories of psi.

Discussion

One surprising result here is that our arguments regarding these last three explanations ultimately did not depend so much crucially on the mind–matter interaction data often invoked to justify explanations invoking consciousness playing some role in waveform collapse. Once we moved beyond the Everett and GRW objective collapse theories, the evidence from mind–matter experiments does not play such a crucial role. This is a helpful detail to note, given that the mind–matter data is arguably not quite as robust as the other categories of psi. Although I've argued that the mind–matter interaction and group resonance evidence is substantial enough to help us weigh the different interpretations of quantum mechanics, one could put less weight on it and still reach the same conclusion.

Overall, the anomalous data we've discussed appears to best support a framework of active information, which incorporates the probabilities reflected in the waveform, similar to Bohm's implicate order and Stapp's

potentia. This underlying strata of pure information possesses a number of key features in both Bohm's and Stapp's frameworks. In addition to containing an intrinsic probabilistic nature, this strata also possesses mind-like or proto-conscious features that support the precursors of consciousness. Also, both Bohm and Stapp highlight nonlocal and holistic attributes. This framework supports an accounting of quantum mechanics that does not require sharp clashes with our sense of reality.

As discussed, this class of model does not currently rank very high on most quantum physicists' list of preferred explanations. This may be due to its radical departure from more conventional and materialistic approaches. However, some radical change from the status quo is likely necessary to explain the two greatest mysteries confronting science: quantum mechanics and the hard problem of consciousness. Using anomalous data involving consciousness that has been subjected to rigorous statistical analysis across diverse laboratories is arguably a fruitful approach.

We might also consider some common threads the three classes of explanations I've discussed in more depth share. First, Plato's argument that underlying our physical world is a realm of forms undeniably still has a strong influence on such classes of explanations. Recall that Penrose argues that something like a Platonic world is the source of mathematical order. Penrose and Hameroff speculate that a Platonic order informs how consciousness emerges through objective reduction. Stapp also has acknowledged that Heisenberg referenced Plato's world of forms in a comment on Stapp's work. And Bohm's implicate order, the source of active information and the potentia underlying quantum processes, may be considered to be a close relative of a Platonic realm.

Another common thread among these works is the process philosophy of Alfred North Whitehead. As I've discussed, Stapp sees direct parallels between Tomanaga–Shwinger relativistic quantum field theory and Whitehead's process philosophy. Hameroff has suggested that their objective reduction framework, which suggests all things undergo something of an alternation between quantum superposition and some degree of consciousness, fits very well into Whitehead's framework. Bohm's implicate order, describing a fundamental folding and unfolding of order, can also be understood as a contribution within process philosophy. As Pylkkänen (2007) notes, Bohm's proposal of a movement underlying dual aspects of mind and matter has close parallels with Aristotle and Spinoza, as well as more recently with Russell (p. 37).

The links with Plato's ideas and Whitehead's process philosophy help to highlight an arguably unpalatable feature: the inherently mysterious and hidden aspect of these theories. This manifests as the inherent holistic and

non-reductionist nature of Bohm's implicate order, which undoubtedly hinders its ability to generate experiments.

Bohm's interpretation invoking a hidden stratum of reality as a source of order stems largely from his efforts to interpret quantum mechanics using an ontology that in important ways is congruent with reality as we experience it. Thus, instead of positing our world in quantum superposition or splitting into parallel realities, Bohm sought an interpretation more consistent with our experience by essentially pushing the paradoxical features down into deeper levels of reality. Our physical world, as well as the equations of classical physics that attempt to explain it, exist in 4 dimensions (3 spatial and 1 temporal). However, Bohm recognized that the standard quantum waveform, as well as his proposed guidance equation, required a much larger number of dimensions due to its nonlocal and holistic features. For Bohm, this points to a deeper, higher dimensional reality as the foundation of our world. Thus he believed that conventional mathematical or mechanistic frameworks were probably inadequate for a complete understanding; hence the necessity for using metaphors in exploring the nature of the implicate order.

One example of a metaphor used by Bohm is the hologram, which contains information (through light interference patterns) structured in an inherently holistic way. Each part of the hologram, no matter how small, contains information regarding the whole. With the hologram metaphor, Bohm was attempting to illustrate how it was possible for particles in a quantum system to be connected with a much larger system.

We might consider further what this metaphor might imply for our conscious experiences and the psi data that we have briefly examined. Within a phenomenological framework, we can speculate that our thoughts or moments of experience are part of a whole rooted in a deeper ground of reality. Bohm's implicate order, as well as the available psi data, suggests a nonlocal feature to this ground that connects with each of our individual conscious experiences as well as our environment. Pursuing this rather speculative exercise, we might compare some of the feelings we experience to waves that propagate and connect with a much greater nonlocal field of proto-consciousness. Contrary to conventional theories in psychology, such feelings may be able to access a considerable range of information. While the psi data from controlled experiments suggests small or modest effect sizes, these results may understate the full significance of this nonlocal, proto-conscious field of information if we take into account its inherently holistic aspect. That is, while one's ability to ascertain information from particular subjects or locations may be limited, the holistic nature of Bohm's theory suggests we are likely accessing (albeit subconsciously) information from a wide variety of sources around us.

This possibility that some of our feelings are part of a larger, nonlocal reality suggests an interesting interpretation of other psi data, such as the emotional resonance mind–matter interaction experiments of the GCP. For these cases, the data suggest that groups of individuals sharing certain kinds of powerful emotions may be able to shift the outcomes of random number generator devices. Within the framework considered here, these emotions are perhaps linked with nonlocal fluctuations of information, which in turn may influence the proto-conscious potentia at the base of nearby physical processes, such as the test devices. Thus this interpretation suggests some spectrum of our feelings or emotions may affect the potential random outcomes of quantum processes at some distance away.

Bohm explored how a hidden order can be enfolded into reality through another metaphor where a few drops of colored dye are placed within a cylinder filled with clear viscous liquid. In a particular kind of setup that allows the fluid within the cylinder to be mixed, the mixing leads the colored droplets to expand and dissipate throughout the fluid until they ultimately disappear. However, once the droplets have vanished, turning the cylinder in the opposite direction allows the colored droplets to ultimately reappear in their original form.

Bohm employed this illustration of enfoldment to consider the experience of listening to music. That is, as we listen to the series of notes playing across time, we apprehend a set of co-present elements at different degrees of enfoldment. We listen to one set of notes that suggests or hints at a theme for a future stream of notes. As this first set of notes recedes from our conscious awareness, they are still present to some extent within our subconscious processes. They are thus hidden and enfolded in our awareness in some sense (like the vanished colored droplets), and they mesh to some degree with the next series of notes (or theme that they express) that play through our consciousness. Therefore, while a present stream of notes plays through our conscious awareness, there is a background or subconscious awareness that anticipates the next stream of notes, as well as its relationship to other themes or streams of notes, all in order to experience a greater sense of harmony.

Bohm extended this exploration of music experience to consider how our moments of consciousness may also be sets of co-present elements that are in different degrees of enfoldment. This suggests perhaps an atemporal ordering or harmonizing capacity that manages the flow of our streams of experience. That is, Bohm's implicate order, existing beyond time, manages in some sense conscious and subconscious flows of information, as well as their relationships. This speculation at the least appears congruent with precognition and presentiment data that indicate some degree of perception extending beyond our present moment of awareness.

Of course Bohm's proposal currently remains a radical step for most physicists. Nevertheless, we can note that the psi data we've reviewed also appear to take us in an unconventional direction, and something like a hidden order, containing information and potentia underlying both mind and matter, suits it well. Recall that the alternatives we have explored appear to struggle without this underlying level of information and potentia. The 'consciousness collapses the waveform' explanation appeared to founder in explaining clairvoyance and precognition without including something like the underling probabilities of events within the framework. Quantum entanglement (in the context of Penrose and Hameroff OR) does not seem sufficient for allowing coherent transmission of anomalous information. Something like Bohm's domain of active information underlying subatomic particles appears to be required.[18]

However, while there may well be difficulties obtaining testable mathematical predictions from such a framework, there appear to be significant compensations. The framework appears to be consistent with the quantum mechanical data, and all the psi data we've explored, and appears to hold significant promise toward a better understanding of consciousness. We achieve this without the sharp deviations from our sense of reality that the Copenhagen and Everett interpretations imply. Perhaps accepting the psi data (ironically) moves us in a direction more congruent with our common sense reality.

Conclusion

Nearly a century has passed since the standard or Copenhagen interpretation of quantum mechanics has been established; yet we are arguably no closer to a consensus solution that resolves the measurement problem. Despite its problematic nature, resolving its mysteries or moving toward an alternative explanation may be challenging, given the overall success of the standard interpretation and the lack of anomalies to exploit. And it appears that whatever explanation is ultimately correct, it will likely entail radical departures from a more classical worldview.

I've argued here that we have available anomalous data with respect to consciousness that is worthy of examination toward helping us resolve this conundrum. Of course, anomalous links with consciousness have been invoked from nearly the birth of quantum mechanics, and such avenues have rarely been pursued. A primary point here is that we know far too little about consciousness to dismiss its possible role in those areas of quantum mechanics where we still struggle to understand. With alternative explanations on the table that invoke bifurcating realities and ghost-like quantum superpositions, we are in a poor position to dismiss data that, while

controversial, is nevertheless rigorously obtained across diverse laboratories and researchers. Accepting such data may be a necessary step, not only toward progress in quantum mechanics, but for a deeper understanding of consciousness as well.

Notes

1 As I'll discuss later, this includes Bohm's (1980) implicate order framework and Stapp's (2007) theory of potentia.

2 Von Neumann's criticism of hidden variable theories eventually came to be viewed as unnecessarily restrictive (Bell 1966).

3 For example, Bohm (1980) and Bohm and Hiley (1993) describe drops of color embedded in a fluid contained in a cylinder. The drops are invisible until the cylinder is rotated sufficiently to reveal the drops. Another metaphor Bohm uses is the holographic plate that can be used to construct a three-dimensional object. The metaphors are interesting and illuminating but do not suggest an inherently probabilistic reality.

4 According to Stapp (1993), Heisenberg favored this interpretation but reluctantly conformed to the wishes of the Copenhagen school to refrain from talking about a deeper underlying theory behind quantum theory, presumably according to the wishes of Bohr (Stapp 1993:95–96).

5 See Radin (1997, 2006) for more depth and a broader presentation from an advocate of the evidence of psi within the laboratory. Also see Utts (1991), especially for a discussion on the evolution of criteria for evaluating psi. Krippner and Friedman (2010) provide arguments from both skeptics and advocates on the current state of psi.

6 Honorton (1975) reported that Rhine's results demonstrated an astronomically significant psi effect (p. 105).

7 Sherwood and Roe (2003) examined 21 dream-telepathy studies published between 1977 and 2002 and compared them with the Maimonides studies. They found significant results overall, however with smaller effect sizes which they attributed to slightly different methods and protocols.

8 A recent meta-analysis by Bem, Tressoldi, Rabeyron, and Duggan (2014) confirmed these effects with an overall p value of 1.2×10^{-10}.

9 Mossbridge, Tressoldi, and Utts (2012) report $p < 2.7 \times 10^{-12}$ using fixed effects estimation and $p < 5.7 \times 10^{-8}$ using random effects.

10 Another class of mind–matter experiment uses Young's double-slit apparatus, perhaps the best-known experiment showing quantum mechanical effects, as a framework for testing. Radin et al. (2012) used participants who had experience with meditation and found that the meditators performed better than nonmeditators, with odds against chance of 300,000 to one. Control sessions were found to have a non-significant effect. Re-

cently, Radin, Michel, and Delorme (2016) extended the experiment using a double-slit optical system for online users. The results showed that for human observers (1,479 people), the interference pattern deviated from null pattern by 5.72 sigma ($p = 1.05 \times 10^{-8}$).

[11] For examples, see Bierman (2003), Houtkooper (2002), and Radin et al. (2012).

[12] It's unclear whether Cartesian dualism generally allows for disparate minds to be connected, as we describe here in order to explore telepathy and other forms of psi. Nevertheless, we posit that as a feature here as we investigate the implications for waveform collapse explanations.

[13] This is the idea behind Observational theory, through which some parapsychologists explain mind–matter interaction via a "consciousness collapses the waveform" interpretation of quantum mechanics (Houtkooper 2002).

[14] Bierman (2010, 2015) bases his argument of time symmetry not on quantum mechanics, but on the time symmetric feature of most classical equations. Thus perhaps his argument is not undone by the inherently time asymmetric feature of the Copenhagen interpretation. My point here is that precognition and presentiment do not fit well within a "consciousness collapses the waveform" style of explanation.

[15] At the present time, see this lecture Hameroff presented to the Rhine Center, available at http://vimeo.com/7357010.

[16] To be clear, quantum entanglement, according to the experimental evidence at hand, need not suffer distance effects. However, if the number of entangled particles grows exponentially with distance, then presumably the noise to signal ratio will grow at a comparable rate.

[17] Bohm (1980) posited a hierarchy of nested implicate orders, while I will try to keep things simpler. Also, as I've discussed, while much of Bohm's work had a determinate flavor, I will emphasize probability as intrinsic. As I'll discuss, the framework I recommend here is neutral monism, which departs from Stapp's dualism.

[18] This reasoning suggests a possible direction for development of Hameroff and Penrose OR. Recall that Penrose invokes a Platonic Order, which guides the expression of objective reduction. Perhaps their interpretation of Platonic Order could be extended as a level of reality that supports nonlocal exchange of information.

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RESEARCH ARTICLE

Sasquatch & Other Wildmen: The Search for Relict Hominoids

Jeff Meldrum
Idaho State University

Editor's Note: This presentation was delivered on the occasion of the bestowing of the 2016 Tim Dinsdale Award at the Meeting of the Society for Scientific Exploration, Boulder, Colorado, on June 20, 2016. The Society has presented the Dinsdale Award every two years since 1992, for significant contributions to the expansion of human understanding through the study of unexplained phenomena. Winners have led their fields in uncovering noteworthy anomalies. The Awards Committee has recognized Dr. Meldrum's significant contribution to our understanding of the possible presence of an as-yet unrecognized primate in our midst. In the course of more than two decades, while recognizing the risk to his professional reputation, he has created a corpus of credible work by conscientiously applying his knowledge of primate evolutionary anatomy and behavior to this most difficult and controversial subject.

First off, I would like to express my appreciation to Patrick Huyghe and the members of the search committee for this honor and the privilege of addressing the members of the SSE. I accept this Dinsdale Award, not so much in recognition of my modest accomplishments, but as acknowledgement of the import of the fundamental question—*Are there biological species, i.e. relict hominoids, behind the legends of man-like monsters?*—as a legitimate and timely scientific question.

In response to persistent indications of mystery hominoids, we have witnessed a recent rash of skeptical books published on the subject of Bigfoot (e.g., Long 2004, Daegling 2004, Buhs 2009, McLeod 2009, Nickell 2011, Loxton & Prothero 2013). Some of these titles, penned by fellow academicians, have been inexplicably published by prestigious university presses, e.g., University of Chicago Press and Columbia University Press. Others are the work of journalists turned popular author, or self-proclaimed paranormal investigators. In spite of glowing endorsements by fellow skeptics, in-depth reviews of these undertakings by those with first-hand knowledge of the data and events have been much less complimentary. For example, an extensive and thorough review of Daegling's book, *Bigfoot Exposed*, was published by this journal (Meldrum 2005) enumerating extensive inaccuracies and misrepresentation of fact, inexcusable in a scholarly work by a practicing anthropologist. The review concludes with

the acknowledgement that ultimately, "it is a notable contribution precisely because it so plainly illuminates the dismissive tactics that are too common in anthropological and zoological academia regarding this subject."

Turning to Buhs' *Bigfoot: The Life and Times of a Legend*, we see from the outset that Buhs (a self-described "independent scholar") undertook his book with the assumption that *sasquatch* did *not* exist, and so any issues of supposed Bigfoot biology could be left along the wayside. Buhs was not encumbered with scientific evaluation of evidence, nor distracted by the serious discussions occurring at scientific meetings and in wildlife agency seminar rooms. Christie Henry, Executive Editor of Sciences at University of Chicago Press, shepherded Buhs' *Bigfoot*, even though she along with its author admit it has very little to do with "science." She pointed out the irony of Chicago publishing a book on Bigfoot and mused over the challenge of finding peer reviewers, finally resorting to *historians* of science and the paranormal (Meldrum 2009).

Disappointingly, similar criticisms could be and have been leveled at the remaining distracting examples, which have attempted to reduce the subject to mere myth and legend at best, or to the delusions of socially threatened, working, middle-class male schmucks, at worst.

I am reminded of the parable of the eight blind men examining an elephant. Each attempted to explain their encounter from their limited and constrained perspectives and subjective perception. Each perhaps cleverly and creatively, but nonetheless naively, misconstrues his experience. One interprets a writhing trunk to be a snake, another concludes the stalwart limb is a tree trunk, another perceives the expansive ear as a fan, and so on. The objective reality and novelty of their encounter is missed, due to their lack of familiarity with the phenomenon and their inability to comprehend their experience within its broader context. It is a certain lesson from history, a theme developed by Kuhn (1962) and others that without a context, i.e. an accommodating niche within an existing paradigm, a novel concept, regardless of the nature of the supporting evidence, will rarely command an open and objective hearing.

Context and perception are critical in this process. In this vein it is informative to consider the general perception of literature on Bigfoot. To illustrate, where are treatments of man-like monsters placed in the library according to the Dewey Decimal System? Many of my generation, who remember actually going into libraries to browse through physical books, will recall searching the shelves in the lower end of the numbering system for titles relating to Bigfoot. Why? The explanation and enumeration of the system's categorizations now occupy four volumes and is still not entirely precise. By some interpretations Bigfoot falls in the 100-range—

Philosophy and Psychology. This includes "things we don't understand," such as ghosts, UFOs, aliens, and Bigfoot. Elsewhere, the subject is to be found in the 000-range—Generalities—specifically 001.9—Controversial Knowledge, including various mysteries and oddities, phenomenon unexplained or unverified.

When my book, *Sasquatch: Legend Meets Science* was published, I was quite adamant that it be categorized as a work of natural science, with a place on the shelf alongside Jane Goodall's books about primates (all the more appropriate since the cover bears her endorsement). In the information for librarians found on the back of the title page, it was recommended to the Library of Congress designation QL89.2 within General Zoology, but also 001.944 in the Dewey Decimal System, within Controversial Knowledge. The publisher had arranged for my book to be carried by Barnes & Noble bookstores across the country, so whenever I had an opportunity to visit a store, I would check to see where indeed my book was shelved. With few exceptions, it was in the New Age/Occult section (i.e. controversial knowledge), somewhere between works on the Bermuda triangle and crop circles. Once I confronted a store manager on the matter and to my chagrin she assured me that the title would get ten times the traffic in the New Age section as opposed to the Natural History section. So much for context and perceptions.

What's in a name? How are labels and categories perceived? I have largely eschewed the popular moniker *Bigfoot* because of the tabloid stigma frequently attached to it. I prefer the term *sasquatch* in deference to the Native American and First Nations terms, widely translating to "wildmen of the woods." Even that term, through its popularization and commercialization, has been diminished somewhat as a label to be taken seriously. In addition, it is too narrow for what is clearly a global phenomenon—global, but not universal. The notion of contemporary wildmen is not to be dismissed as a universal manifestation of the human psyche. It is not merely a collective archetype of human ties to the wilderness. Within a global context distinct forms emerge, distinct in anatomies, behaviors, phylogeny, and distributions. There are ecological correlates within these distributions—these are wildmen of the woods after all. There is an evolutionary and anthropological context emerging as well. The term I wish to emphasize for this global phenomenon is "relict hominoids," a term first coined by Boris Porshnev (1963).

"Relict" is a term finding application and usage in the biological sciences. It denotes a species that has survived from an earlier period, or in a primitive form; a remnant of a formerly widespread species that persists in an isolated area. The term "hominoid" in a colloquial sense

means human-like, from the Latin *homin*—human, and the Latin *oid*—like, resembling; similar, but different. However, it also has a more precise taxonomic meaning and implication. In Linnaean classification, a hominoid is a member of the superfamily Hominoidea, which encompasses humans and great apes, i.e. chimps, gorillas, orangutans, as well as the lesser apes, the gibbons and siamangs.

For the purposes of this discussion of relict hominoids, I will limit myself to the direct human ancestors and their collateral branches since the divergence from the common ancestor shared with chimpanzees, some 5–7 mya (million years ago), although a similar discussion could be had for the apes. To understand the perception of this evolutionary history we must consider its context and the development of a paradigm that had a great influence on it. In 1934, Georgy Gause, a Russian microbiologist, published an influential concept called the Principle of Competitive Exclusion. The principle states that two species competing for the same resources cannot coexist. In other words, no two species can simultaneously occupy the same niche. One will do it more successfully and drive the other to extinction. In his famous experiments with *Paramecium*, he demonstrated that *P. aurelia* and *P. caudatum* thrived when grown separately in identical media. However, when colonies were combined in a single medium, *P. aurelia* eventually drove the *P. caudatum* to extinction. This became a fundamental principle in ecology.

In the 1960s, the hominin fossil record was sparse and the expanding field of paleoanthropology was becoming more interdisciplinary. The Principle of Completive Exclusion was applied to interpretations of hominin fossils. After all, the hominin niche was perceived as a rather singular one, defined in its simplest terms by traits such as bipedalism, braininess, and above all, culture. Some researchers advocated that it was an altogether exclusive club, which according to the Principle of Competitive Exclusion could be occupied by only one hominin species at a given time. Hence, the Single Species Hypothesis was spawned, as it was known in paleoanthropology. This served to reinforce a perception of human evolution as an inexorable linear march toward *Homo sapiens*, with a single evolving lineage, with one hominin species giving rise to and being replaced by a succeeding species (Brace 1967, Wolpoff 1971).

Thus, an investigator of relict hominoids in the 1950s and 1960s, such as Ivan Sanderson (1961), bringing evidence of unknown sub-human creatures, be they *yeti*, or *sasquatch*, or *almas*, would be confronted by a prevailing paradigm of hominin evolution, dominated by the Single Species Hypothesis. There would be no scientific context to accommodate the co-existence, let alone *existence*, of relict hominoid species alongside *Homo*

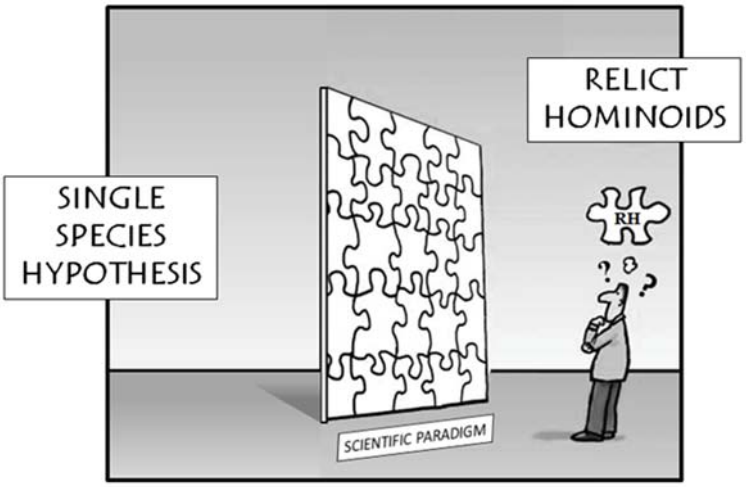

Figure 1. An investigator proposing an empirical concept of relict hominoids (RH) is confronted by an anthropological and broader scientific community operating under a paradigm largely influenced by the Single Species Hypothesis, which provides no context for accommodating it.

sapiens (see Figure 1). The persistent influence of this mindset was apparent to me even decades later, when a reviewer rejected my abstract submission one year to the American Association of Physical Anthropologists annual meeting, on the basis that "the topic [of *sasquatch*] was not of general interest to the anthropological community." This assessment betrayed an attitude that had no rational justification then or now.

This linear exclusive-club concept of hominin evolution was challenged in the '70s by the recognition of at least two kinds of fossil australopithecines, either gracile or robust in their masticatory adaptations. Some rationalized this apparent exception to the competitive exclusion principle by pointing out that australopithecines were little more than bipedal "chimps" displaying little brain enlargement and certainly no tools, which "maketh the man" (Oakley 1959, Lewin & Foley 2004). Taxonomic diversity among this grade of contemporary species could be accommodated in these earliest of the hominins, but once a *Homo* grade was achieved, in particular *Homo erectus* (a.k.a. *H. ergaster* in Africa), then competitive exclusion was presumed to be in full force, and from then on the hominin niche was understood to be an exclusive club again (Washburn & Ciochon 1976).

This fallback position was itself undercut when Leakey and Walker (1976) provided unequivocal fossil evidence for the contemporaneous

existence of multiple species of *Homo,* as well as persistent forms of robust australopithecines coexisting in East Africa. Traveling across that landscape, 2 mya, one might encounter examples of *Homo ergaster, H. habilis, H. rudolfensis,* or *Paranthropus boisei*—at the very least—and quite likely additional varieties of hominins, yet to be uncovered. These species display the expected ecological reaction, short of extinction, in response to a sympatric competitor, i.e. niche partitioning, involving diet, micro-habitat divergence, and possibly also temporal differentiation of resource use (Winterhalder 1981). In other words, there was more than one way to be a hominin. Stephen J. Gould (1976) made a prediction in his popular column in *Natural History*, stating: "We know about three coexisting branches of the human bush. I will be surprised if twice as many more are not discovered before the end of the century."

The past four decades have indeed been punctuated repeatedly by the discovery of additional hominin species, far exceeding Gould's prediction. Today more than 25 species of hominin are recognized. No longer a linear array, or ladder, of succeeding hominin species, rather a veritable bush of radiating branches marks our extended family tree. And even this is almost certainly an underestimate. Conservative assessments now point to easily double or triple that number of species. There is little doubt remaining that the known fossil record grossly underestimates past hominin taxonomic and adaptive diversity. Throughout the past, the rule rather than the exception was multiple hominin species coexisting across the landscape.

Running parallel to this recognition of the contemporaneity of multiple hominin species throughout the past, is the realization through ongoing discoveries that a number of these lineages, the terminal branches of the bushy tree, have persisted until much more recently than previously recognized. Latest discoveries of Neanderthal sites in the Altai Mountains of Russia suggest an age as young as 10 kya (thousand years ago). That is less than half the youngest age previously recognized for Neanderthal fossils. A specimen of *Homo heidlbergensis* in China has been dated to 12–20 kya. *Homo floresiensis*, the diminutive hominin from Indonesia was initially dated to 13 kya, although that date has been revised to ~50 kya through more precise sedimentology of the cave deposits in which it was discovered (Brown et al. 2004). These discoveries confirm that we shared the landscape with other hominin species until only a few thousand years ago—or perhaps even into the present.

What may be an archaeological record of an encounter between modern humans and pre-sapiens hominins may have been found. Woodhouse (1979) documented and described a curious petroglyph in South Africa, left by the San Bushmen (Figure 2). It depicts a band of gracile bushmen wielding

Figure 2. A petroglyph attributed to the San Bushmen of South Africa, described by H. C. Woodhouse (1979) as depicting gracile bushmen wielding weapons confronting robust, perhaps hair-covered "men of the early race."

weapons confronting a group of robust, possibly hair-covered, weaponless "men of the early race," in the words of the Bushmen's oral traditions.

Based on current understanding, a time-traveler to the Asian landscape of only 20 kya would potentially observe any of a half dozen hominin species coexisting. The implication of the recognized bushy hominin tree was a major theme developed in a *Nova* documentary series, *Becoming Human*. However, the final episode, which introduced modern humans, was titled "Last Human Standing: Many human species once shared the globe. Why do we alone remain?" Introductory remarks addressed the singular circumstance of *Homo sapiens*' solitary inheritance of the world. It seems the influence of the single species hypothesis persists, now transposed forward to our own species. Why would the present be the exception to the rule that has quite apparently prevailed throughout hominin history? Interestingly, the producers' explanation for this situation echoed the now defunct pronouncement of Washburn and Ciochon (1976) on the supremacy of *Homo erectus* (*H. ergaster*) over the primitive australopithecines, by suggesting that in this case, *Homo sapiens* were so successful that all other hominins were eliminated from the scene. This explanation may prove as unfounded as it was demonstrated to have been for *Homo erectus* a quarter century earlier. What was not discussed, or even considered, was the logical alternative—the potential of extant relict hominoids.

One indication of the beginnings of a shift in this paradigm came in the

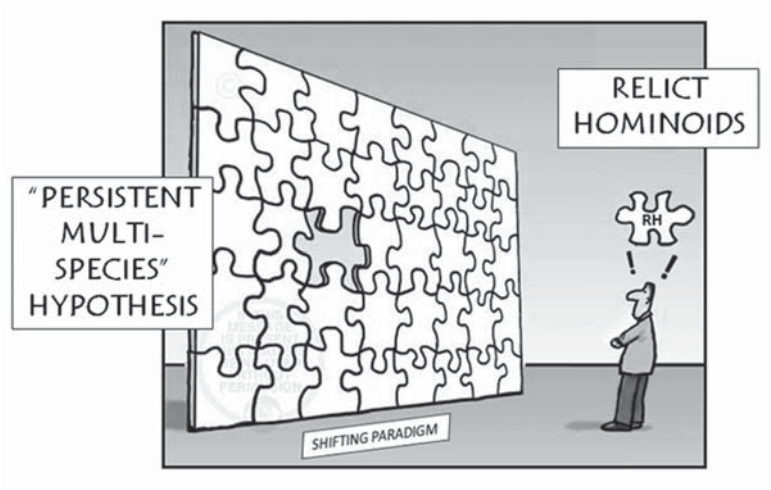

Figure 3. An investigator proposing a concept of relict hominoids (RH) confronts a shifting paradigm, revised by ongoing discoveries, which provide a theoretical framework to accommodate the possibility of persistent species of pre-modern hominoids.

form of a cover story in the March 2012 issue of *New Scientist* magazine. The cover read—*Human Evolution: The Ten Biggest Questions*. Many of these dealt with questions surrounding those adaptations that have long been thought to set the hominin niche apart—i.e. bipedalism, intelligence, language, technology, etc. However, question #9 was—*Are other hominins alive today?* That the question of relict hominoid survival into the present would be ranked among this selection of puzzling matters deemed central to current anthropological research is a significant acknowledgement (Meldrum 2012). It signals that the growing awareness of the complexity of hominin phylogeny has raised serious consideration of the possibility that pre-modern hominins, and perhaps some more distant hominoids, may still persist.

Now our investigator encounters a shifting expanded paradigm, which due to additional data reveals a context for this concept of relict hominoids. A theoretical framework we might refer to as the "Persistent Multi-species Hypothesis," accommodates the proposition that lingering populations of relict species could exist alongside *Homo sapiens* into the present (see Figure 3). Indeed, with the past as our pattern, we should be anticipating their discovery.

Recognizing the necessity of a change of venue, a shift in perceptions

of the context of this phenomenon, Sanderson (1961) anticipated a time when that would occur:

> Our term 'ABSM' [acronym for *abominable snowmen*, referring to all unknown relict hominoids] really means hominid, other than known kinds of modern man; no more and no less; and it is my firm belief that in due course, the whole business will be lifted clean out of the 'mystery class' and simply become a part of physical anthropology.

An event that should have driven this point home was the announcement of the discovery of *Homo floresiensis*, the so-called "Hobbit," and the acknowledgement by its discoverers that such hominins might have survived into historical times, if not even to the present. This was a major development for those investigating the possibility of relict hominoids (Meldrum 2004b). It was not wholly lost on others, such as Chris Stringer, paleoanthropologist at the British Museum of Natural History, who in a statement to *Nature* said, "One of the first things I thought of, on learning about the Flores skeleton, was a possible parallel with the *orang pendek*" (Gee 2004). The name *orang pendek* refers to diminutive relict hominoids alleged to survive on the island of Sumatra, known by other names throughout Southeast Asia (Forth 2008). He was not only fully aware of the matter of the *orang pendek*, but also immediately recognized the implications of the recent dates of fossils of a hominin quite similar to descriptions of this potential relict hominoid.

Henry Gee (2004) noted on the pages of *Nature* that

> The discovery that *Homo floresiensis* survived until so very recently, in geological terms, makes it more likely that stories of other mythical, human-like creatures such as *yetis* are founded on grains of truth.

He further acknowledged the possibility that the diversity of hominins was always high, has remained high until very recently, and might not be entirely extinguished. This was a notable acknowledgement in what many consider a flagship scientific journal, reflecting a changing attitude toward the possibility of relict hominoids, although one generally not so openly displayed.

On Flores, the indigenous population, the Nage, refer to a diminutive hairy hominoid similar to Sumatra's *orang pendek*, which they call the *ebu gogo*. Since hearing accounts of the *ebu gogo*, geochronologist Bert Roberts also thinks it possible that *Homo floresiensis* still stalks the mountain forests of Flores (Forth 2005a). Gregory Forth, who has studied the Nage folklore for more than 20 years, agrees. He noted that "the *ebu gogo* may be grounded in some empirical, even hominological reality" (Forth 2005b).

He continued:

> As amazing as it may seem, the speculation that something corresponding to *Homo floresiensis* could still be alive, or at least lived so recently to have made an imprint on local memory, is one that I believe can reasonably be taken as a point of departure for further anthropological, including enthnographic, investigation.

I said earlier that this astounding discovery *should have* driven the point home, but when discussing the impact and reception of Forth's publications and pronouncements, he acknowledged that there had been very little, if any, reaction. He was met largely with silence at the suggestion that the search for relict hominoids was a worthwhile endeavor. Even published reviews of his book focused exclusively on the ethnographic aspects, while omitting any commentary on the central premise of a potential "empirical species" of persisting wildman, as proposed by Forth (2008).

We have addressed the role of perception and context in evaluating a novel idea, but of course there must of necessity be more. There must be something substantial to place within the revised framework. There must be substantive evidence to lend weight to the hypotheses, and to counter the critics' various aspersions. I was once confronted by a colleague, who declared, "After all, these are *just* stories." My response: "Stories that apparently leave tracks, shed hair, void scat, vocalize, throw rocks, are observed and described by reliable experienced witnesses. Hardly *just* stories." Others mock the notion as "pseudoscience," but fail to persuasively explain their justification for that label, let alone account for the evidence at hand. Then there is the now popularized statement by Michael Shermer (2003), which eventually became the basis of a column in *Scientific American*—"The science starts once you have a body." On the contrary, most investigators would contend that the science starts once you have a question and observations. Each of these detractions begs the question of substance that motivates investigation, and instead either offhandedly dismisses all evidence, or demands conclusive proof up front, a priori. That is hardly the method or process of explorative science.

So what is the substance at hand that lends weight to the premise of the possible existence of relict hominoids? Given my research expertise into the evolution of hominin locomotion, especially the adaptations of the bipedal foot, my attentions have focused on the footprint evidence, for *sasquatch* in particular, but also other potential relict hominoids around the world. The footprints constitute the most prolific body of data that permits repeatable objective evaluation. They, the footprints, exist. I have amassed more than 300 specimens of footprint casts, as well as hundreds more photographs

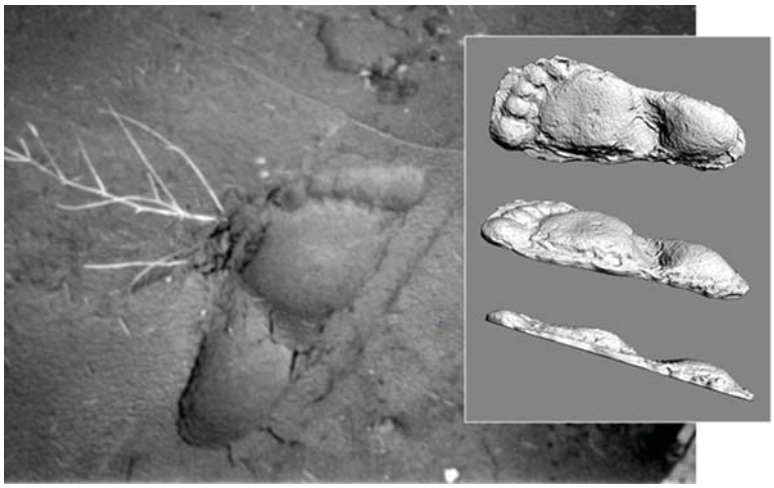

Figure 4. Photograph taken by Lyle Laverty at the Bluff Creek, California, site of the Patterson-Gimlin film of a 37-cm footprint displaying a pronounced midtarsal pressure ridge. Inset illustrates a series of stills of a 3D scan of a cast made by Bob Titmus of the accompanying footprint.

of footprints. The analyses of these have been the subject of a number of publications and public and professional presentations. I am in the process of archiving these data in digital form, as 3D scan files in the case of the casts. This will make these data available to any interested investigator.

It would seem a reasonably straightforward proposition to evaluate this trace evidence. But the discovery and excavation of the fossilized Laetoli hominid footprints in the late ’70s revealed a dearth of comparative data and acumen within anthropological circles for interpreting footprints. Although advances have been made, the implications of the *sasquatch* footprint evidence have remained largely unappreciated or, at least, underappreciated. Curiously, such is often not the case when I interact with clinical practitioners, e.g., podiatrists and orthopedists, as when I made an invited presentation at the Massachusetts General Hospital in 2012. Likewise, forensic investigators and wildlife trackers are generally more open-minded on the subject and appreciative of the impact of the footprint evidence, specifically, than is the anthropological community at large.

One of the best-documented and thoroughly examined trackway is that associated with the notorious Patterson-Gimlin film, taken at Bluff Creek, California, in 1967. The controversial 60-second film clip approaches its 50th anniversary and continues to evoke discussion and

debate as to its authenticity and ramifications, but has withstood concerted efforts to falsify it. The associated footprints were examined, filmed, photographed, and cast by multiple witnesses. The casts form the basis of the ichnotaxon *Anthropoidipes ameriborealis* (Meldrum 2007), namely the "North American ape foot." Ichnotaxonomy is a Linnaean system of classifying tracks and traces generally of as-yet-unknown extinct animals. In this instance, the living trackmaker is unknown, i.e. unrecognized or unacknowledged, but not extinct. The nomen applies to the tracks, not the trackmaker, and a description and diagnosis establishes the distinctions of these tracks from those of other species (Meldrum 2007).

One particular footprint in the trackway at the P-G film site, photographed by then U.S. Forest Service timber cruiser Lyle Laverty, and subsequently cast by investigator Bob Titmus, would prove to be pivotal in interpreting the distinctions in morphology of the *sasquatch* foot. This very distinct footprint captured the dynamic trace of a flat, flexible, bipedal foot resulting in this instance in a midfoot pressure ridge (Figure 4). More on that to follow.

In 1996, I had occasion to personally examine a line of very fresh, 38-cm hominoid tracks in the foothills of the Blue Mountains outside Walla Walla, Washington (Meldrum 1999, Murphy 2010:153–160). Several of these footprints exhibited evidence of midfoot flexibility, producing either distinct pressure ridges bearing remarkable resemblance to the Titmus cast from the P-G film site, or in one instance of very wet mud, an extrusion feature at the midfoot. The implications of this correlation, corroborated through numerous additional documented footprint examples, provided insight into the functional morphology of the *sasquatch* foot (Meldrum 2004a, 2010).

Sasquatch footprints indicate that its foot is not merely an enlarged facsimile of a human foot. The human foot is generally characterized by a relatively rigid longitudinal arch. This arch is a fairly recent evolutionary innovation associated with the gracilization of the human skeleton and adaptations for endurance walking and running (Hilton & Meldrum 2004). It derives from a primitive foot pattern marked by a larger range of flexion and rotation at the midtarsal joint. This midfoot mobility is integral to the ape's grasp-climbing adaptation, where the prehensile vs. propulsive functions of the foot are coordinated. When walking on the ground, this flexion of the ape's midfoot is called the "midtarsal break." This denotes a "break" in the sense of an axis of flexion, not as some form of damage or dysfunction. On the contrary, this flat, flexible foot morphology provides a biomechanically sound and effective adaptation for a massive terrestrial bipedal primate to negotiate steep, uneven terrain in mountainous forests.

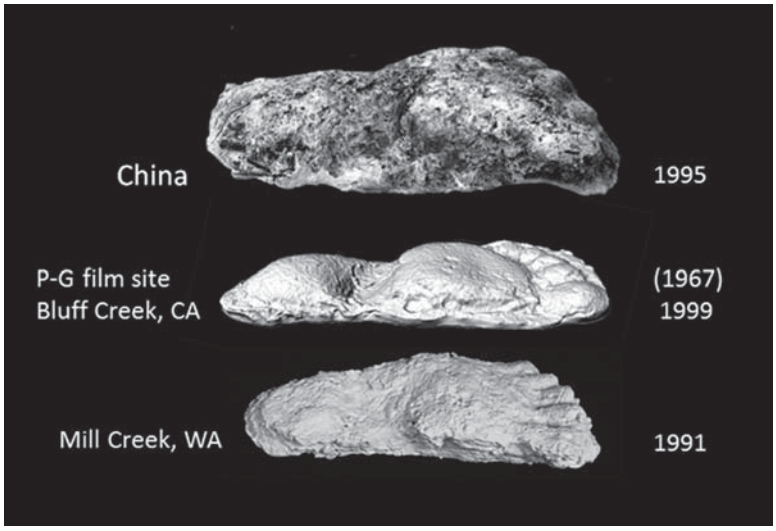

Figure 5. Independently collected footprint casts exhibiting similar midtarsal pressure ridges, marked by a double convexity just distal to the ridge (Note the dates; see text for discussion).

In contrast, the human foot has evolved along a very different path—one that took our recent ancestors into more open flat terrain, where distance running and walking were the activities selecting for a lighter skeleton and a more rigid foot platform. The arched foot and shortened heel of the modern human foot lend advantage to running behaviors (Meldrum & Hilton 2004).

This action of the *sasquatch* foot, as it correlates to these distinctive footprints, is evident and observable in the Patterson-Gimlin film subject. The elevation of the heel, while flexed at the midfoot, concentrates pressure beneath the forefoot. Under appropriate conditions of gait and substrate, this may occasionally produce the distinctive pressure ridge evident in the Titmus cast and other examples (Meldrum 2007). The observable subtleties of correlated form and function within a distinct biomechanical context make this film and associated footprints render the cliché adage "Oh, that's *just* a man in a fur suit" rather vacuous.

This interpretive model of the *sasquatch* foot function received dramatic corroboration during a visit to China's Shennongjia Nature Reserve, in Hubei province. It was there that in 1995, a park ranger, Mr. Yuan Yuhao, claimed to have witnessed an upright, hair-covered hominoid, a *yeren* (Chinese—*wildman*) while patrolling within the park (Meldrum & Zhou 2012). He was climbing a slope near the head of a valley at an elevation

of approximately 2100 m. The site, which I inspected, is a mosaic of fir forest and sedge meadows, not unlike the Rocky Mountain habitat I am so familiar with. Yuan observed the *yeren* through binoculars at a distance of approximately 500 m. It was covered in reddish brown hair, reclining, and sunning itself on the exposed facing slope. When Yuan called out to it, it returned his gaze. Instead of the expected snout and prick ears atop its head, he described a flat face. Furthermore, it arose and walked away bipedally into the nearby tree line. Yuan estimated its height at 2.3 m. He subsequently tracked the creature and cast a clear pair of its footprints on the banks of a spring.

The casts measure approximately 38 cm in length, 16.5 cm across the forefoot, and 10 cm across the heel. A distinct midtarsal pressure ridge indicates a significant degree of flexibility in the midfoot (Figure 5, top). Presumably the right and left footprints were left as the *yeren* squatted beside the spring to drink. This action apparently elevated the hindfoot, concentrating pressure beneath the forefoot distal to the transverse tarsal joint. The plasticity of the moist bare soil resulted in a pressure ridge proximal to the transverse tarsal joint. The deepest points on the cast lie just distal to the pressure ridge, apparently beneath the talonavicular joint medially, and to a lesser degree beneath the cuboid laterally. These two points of concentrated plantar pressure lend a distinctive appearance to the proximal edge of the forefoot ahead of the transverse pressure ridge. The margin is marked by a double convexity. In all distinguishing characteristics the casts resemble those of North American *sasquatch* footprints, especially those recovered at the Patterson-Gimlin film site. This resemblance not only substantiates the model of foot form and function, but indicates a circum-Pacific distribution to this form of relict hominoid, with its likely origin in Asia (Meldrum 2006).

Another example to further demonstrate this remarkable consistency of foot form and function comes again from the Blue Mountains of southeastern Washington State. This example was cast by Paul Freeman on January 14, 1991, along Mill Creek, outside Walla Walla, Washington. The tracks measured nearly 35 cm in length by 13 cm across the ball. The step length ranged from 1.0 to 1.2 m and the trackway was followed for more than two miles. Not only does the cast exhibit the distinctive pressure ridge in the appropriate position and orientation, but the double-convexity formed by the joints of the transverse tarsal joint is evident as well (Figure 5, bottom).

Now here is the remarkable aspect to all this. Although the Titmus cast was gotten in 1967, to my knowledge only a single screened black and white photo of it, depicted among a number of other casts in Titmus' growing

collection, was ever published, and that initially in 1973 (Green 1973:32). The first replica and analysis of that cast was published by me in 1999, after Titmus' death. A photo of the footprint itself, depicted in Figure 4, taken by Lyle Laverty, was published in 1978 (Green 1978:122), but no previous investigator had identified or drawn attention to the midfoot pressure ridge, let alone interpreted or discussed its significance for *sasquatch* foot function. Mr. Yuan had discovered and cast his footprint pair in 1995, with no knowledge of the North American *sasquatch* phenomenon, let alone details of alleged footprints. The Mill Creek cast was documented in 1991. To these could be added the tracks I cast near Walla Walla in February 1996 (Meldrum 2004a). How could these independent examples, separated by nearly three decades and half-a-world apart coincidently share these sound and significant subtleties of anatomy and functional morphology? Simply a convergent happenstance of unrelated hoaxed footprints? I think not.

Another remarkable example recently came to my attention. One of the first questions I asked myself when initially undertaking a systematic survey of the footprint evidence, was to determine if there were examples of repeated appearance of particular individuals. It stood to reason that if these creatures were as rare as I suspected, then should tracks be found in a given region over time, and the likelihood of them originating from a particular individual should be high. These could be recognized based on size, shape, and proportions of the foot, configuration of the toes, or other distinguishing features. So I was on the lookout for examples of footprint casts that could be attributed to a particular individual with some confidence. There were two very clear examples of footprint casts from the Walla Walla, Washington, region that at first glance seemed distinct from one another: One had what seemed to be a somewhat "arched" foot with toes disposed rather squarely across the distal end of the foot; the other was quite flat with toes lying along a rather inclined toe row. But the feet were very similar in size and proportion and the toes were otherwise similar, especially the distinctive big toes of both, which were similarly pronounced with a characteristic pad shape, among other details. Recalling that the very flexible foot of a chimp, for example, can be flat in one step, but display a raised medial margin of the foot (not equivalent to a fixed longitudinal arch), I wondered about this pair. What if I assumed that these casts did come from the same foot and considered them with the toes aligned, rather than the footprints aligned along generalized long-axis of the footprint (Figure 6, left). With the toes aligned, the margins of the forefeet segments likewise came into alignment and the only divergence was in the respective angles of the heel segments (Figure 6, right).

Movements about the transverse tarsal joint are not just a simple

Figure 6. Two independently collected footprint casts (38-cm long) from the Walla Walla, Washington, region, which appear to be from the same individual. The cast on the left exhibits a position of foot pronation, while that on the right exhibits foot supination. Alignment of the toe row and forefoot contrasts the respective angle of the hindfoot, illustrating the mobility of the transverse tarsal joint.

hinge action, but also describe a twisting action between the forefoot and hindfoot, and may also involve adjacent joints, such as the subtalar joint, and tarsometarsal joints. This coordinated twisting/flexing action can raise the medial border of the foot and increase the angle between the forefoot and hindfoot—i.e. supination. Alternately, it can flatten the foot and lessen the angle between the forefoot and hindfoot—i.e. pronation. These actions are present in the human foot, but to a lesser degree due to the limited range of motion in the joints involved in the relatively fixed longitudinal arch. The intersection of the axes of the forefoot and hindfoot segments in the representative *sasquatch* track falls at the inferred position of the transverse tarsal joint, in agreement with examples of midtarsal pressure ridges previously discussed. The two casts in question here were documented independently, by two different investigators, at different locations within the region, separated by nearly two years. What are the odds that such subtleties of footprint anatomy, correlated with intricacies of foot function, could have been so accurately incorporated into these separate and distinct tracks by two independent investigators with no pertinent knowledge or training, let alone the skill to fabricate such a contrasting, yet correlated pair of footprints?

The off-handed dismissal or overt omission of the footprint evidence is all too prevalent in the aforementioned skeptical works. For example,

the latest by Loxton and Prothero (2013) essentially takes the skeptical approach that since these creatures couldn't exist, then all footprint evidence is either hoaxed or misidentified, and proceeds to selectively focus on those examples they feel best make that assumed point. Their prejudicial approach is betrayed by the total lack of consideration of my extensive publication record and presentations on the *sasquatch* footprint evidence. Instead they cite anthropologist and fellow skeptic David Daegling (whom they inaccurately identify as an expert in primate locomotion), asserting that the underlying skeletal anatomy of the foot cannot be inferred with any degree of confidence from a footprint, and that investigation has shown that footprints are not good indicators of underlying anatomy (Daegling 2004). The assertion is baseless and curiously ignorant of the data and clinical practice. Similarly, McLeod (2009) in *Anatomy of the Beast* betrays a lack of discernment of the significance of the footprint evidence. When confronted with footprint casts, he quips: "To me they looked like clown feet, squared off at the toes, with no arch" (p. 12). An honest assessment, made by one oblivious to the very anatomical distinctions that lend credibility to the casts as the trace of a distinctly adapted hominoid. He characterizes the late Dr. Grover Krantz's lucid and thorough treatment of the footprint evidence as a "bewildering jumble" while disparaging the late professor as "one gone absolutely mad over hominid footprints" (p. 74), while again omitting any reference of my published discussions of footprints evidence.

To the contrary, Krantz, as I, recognized the significance of the footprint evidence for the question of *sasquatch* existence (Krantz 1992, Meldrum 2006). Even in the absence of a type specimen, the morphology and function of the *sasquatch* foot as inferred from the footprint record, both here and abroad, attest to the existence of this relict hominoid. The distinctions present are precisely those an informed researcher of hominoid locomotion would expect to find. They exhibit an elegant and appropriate adaptation of the foot of a large-bodied bipedal hominoid for negotiating steep, broken, mountainous, forested terrain. On the whole the footprint record is remarkably consistent, while also displaying the sort of individual variability one would anticipate in a biological population of long-lived hominoids. Of course there are hoaxes, as any reasonable person would expect under the circumstances. But in my experience these instances are rare. Far more common are misidentifications often by well-meaning but overly enthusiastic amateur investigators.

The compelling core of footprints exhibit subtleties of anatomy, as well as dynamic signatures of an animated step that have remained largely lost on many, excepting the most informed experts in functional morphology and experienced human and wildlife trackers. The implication of this evidence

is monumental, and on that basis difficult if not impossible for some to even acknowledge, let alone engage. However, it has been shown that the existence of species of relict hominoids living alongside *Homo sapiens* in present times would be consistent with the prevailing circumstances of taxonomic and adaptive diversity throughout prehistory. There have always been multiple species of hominoids coexisting across the landscape. Why, in spite of a shifting paradigm and in the face of so much suggestive evidence, should the very *possibility* of relict hominoids be summarily rejected?

It has been said—"No history is without legend; No legend is without *history*." The fundamental question remains: Are there biological species of relict hominoids yet to be discovered behind the legends of *sasquatch* and other wildmen?

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ESSAY

On Anomalistics Research: The Paradigm of Reflexive Anomalistics

Gerhard Mayer
Institut für Grenzgebiete der Psychologie und Psychohygiene, Freiburg, Germany
mayer@igpp.de

Michael Schetsche
Institut für Grenzgebiete der Psychologie und Psychohygiene, Freiburg, Germany
schetsche@igpp.de

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Abstract—Scientific anomalistics sees itself as a content-determined and delimited area of science committed to the application of appropriate scientific methodology, as well as to generally accepted, and necessary, scientific control mechanisms. The specification of research subjects is not the result of assignment to groups of phenomena of specific scientific (sub-) disciplines, but of the ascription of an anomalistic character, which (at first) makes these phenomena, or experiences, a subject of anomalistics research. Accordingly, anomalistics is not characterized by its own specific methodology but is oriented by the requirements of the respectively concerned discipline(s) (physics, chemistry, biology, psychology, sociology, science of history, etc.). For a long time, (natural) science approaches have been considered paradigmatic for anomalistics research and for parapsychological research in particular. However, during the last few decades, social-scientific approaches and qualitative research methods have become increasingly important as supplementary and alternative methods. As a result, single case studies and the investigation of ostensible spontaneous psi phenomena have lost their often premature reputation of being unscientific. Qualitative research methodology, which is used predominantly in social and cultural sciences as well as in anthropology, now represents a useful supplement to quantitative approaches. In some cases, and for several research questions, it proves to be ultimately superior, because one can avoid the considerable reduction of complexity that is obligatory in quantitative methods. Therefore, the research, as well as the researchers, can come much closer to living-world manifestations of anomalistic phenomena and experiences than is the case with the relatively artificial situation in laboratory experiments. As we are trying to demonstrate in our paper, anomalistics research should be

conducted in a reflective manner under the described paradigm of reflexive anomalistics. The term signifies a social-scientific informed approach to anomalistic phenomena that is aware of (a) the epistemic particularities of the phenomena under research, (b) the precarious cultural (media, science policy) framework conditions of this research, and (c) the areas of tension between subjective evidence, scientific proof, and social discourse. These factors have to be systematically taken into consideration when developing scientific research questions as well as methodological approaches.

Introduction: Qualitative and Quantitative Psi Research

One of the most salient developments in parapsychological and anomalistics research in the last few decades has been the growing awareness of qualitative research methods as instruments for gaining scientific knowledge within the fields of parapsychology, and anomalistics in general, as well as the increased selection of social science approaches in addition to traditional scientific and psychological ones. These approaches are certainly not new but have been present throughout the whole history of parapsychological research (cf. Zingrone, Alvarado, & Hövelmann 2015). However, quantitative experimental laboratory research has long been regarded as an ideal approach in psi research.

Efforts toward Normalization

This experimental approach could be considered to result from parapsychologists' endeavors to establish parapsychology as a "normal" academic discipline, and to deal scientifically with paranormal phenomena and psi as if they were conventional objects of investigation that do not differ essentially from those in mainstream science. This development was initiated by the American biologist and parapsychologist J. B. Rhine in the 1930s. His experimental laboratory psi research using "normal" research participants (students, etc.), as is the case with many other branches of academic psychology, marked the end of an era of qualitative psi research with gifted mediums as participants, as well as in-depth single case studies of psi phenomena (cf. Alvarado 1996b, Zingrone & Alvarado 2015). The aim of approximating hard science as closely as possible by adopting its research methodology in order to be taken seriously as a serious, academically based research program has been successful—at least to a certain degree (Dean 2015, see also Irwin & Watt 2007:247–262, and Zingrone 2002). However, it has resulted in a substantial narrowing and specialization of the field of research. The psi phenomena under investigation in laboratories differ significantly from those experienced in everyday life. The obligatory strict control of the experimental conditions and of the parameters considered

relevant can only be achieved with a significant reduction in the complexity of the investigated phenomena (e.g., Alvarado 1996b, Kelly & Tucker 2015:65, Mayer & Schetsche 2012).

This emphasis on experimental laboratory research has led to a large body of evidence that has to be assessed as undeniable anomalies, or, as Stefan Schmidt put it: "In parapsychological experiment data, irregularities can be found which cannot be explained by chance; little is known about the nature of these irregularities" (Schmidt 2014:103, translation from the German by G.M.). In this respect, the concentration on laboratory experiments and the narrowed focus have been useful strategies.

Discourses of Demarcation

However, this strategy widened the gap between laboratory research and the investigation of psi outside the laboratory, and, furthermore, between parapsychology and other branches of the field of anomalistics in general. For many researchers in parapsychology, only anomalies that could be conceived by a limited number of operationalizable variables had been of scientific interest, insofar as they could easily be made the subject of such research approaches. The investigation of spontaneously occurring phenomena—many anomalistic phenomena belong to this category—as well as single case studies outside the laboratory, had only been seen as being of illustrative or anecdotal use (Alvarado 1996a:3–5, Kelly & Tucker 2015:65, Rhine 1977:77). In addition to the above-mentioned distinction of "clean" experimentally accessible psi phenomena and rather "dirty" ones in the living environment, further discourses of demarcation occurred: between "good" parapsychology and other rather "feeble" fields of anomalistics such as ufology, astrology, cryptozoology, and diverse Fortean phenomena.[1] However, from the perspective of (scientific) anomalistics, paranormal phenomena as investigated by parapsychology, and by laboratory experimental parapsychology in particular, represent only a partial area of the whole field of interest. Several phenomena in anomalistics are basically not, or only partially, accessible to experimental investigation.

New Perspectives

Since experimental parapsychological research has generated a comprehensive base of evidence (Broderick & Goertzel 2014, Cardeña, Palmer, & Marcusson-Clavertz 2015, Irwin & Watt 2007, Krippner & Friedman 2010, Radin 2006, Schmidt 2014) that allows informed and unprejudiced experts to be convinced of the reality of psi, or at least of the existence of anomalies that cannot be explained by the known laws of nature (cf.

Irwin 2014), research carried out during recent decades has increasingly moved from a proof-oriented (evidential approach) to a process-oriented direction, which has drawn attention to contextual conditions.[2] Therefore, qualitative single case studies have again taken on greater significance (e.g., Alvarado 2002, Mayer & Schetsche 2011, Stokes 1997). A decisive innovation of parapsychological research is the integration of new research methods that have been developed in social sciences and anthropology (cf. Kruth 2015, McClenon 2001, Zingrone, Alvarado, & Hövelmann 2015). Their application has led to a significantly more reflective treatment of qualitative data in particular, as well as methodological and knowledge–sociological issues in general, and has considerably expanded the range of potential advancement of scientific knowledge from such data.[3] This applies to the (qualitative) data of all scientific disciplines in general when human individuals build a relevant part of the data collection (i.e. when human participants, interviewees, etc., are part of the study design), but especially to anomalistics because this research field features some essential particularities.

These particularities are determined by the nature of the research topics, which, on the one hand, have led to well-known methodological and conceptual problems such as insufficient replicability, but have, on the other hand, become relevant on completely different levels. Practically all active researchers in the field of anomalistics have been confronted with these difficulties. Attacks by skeptical scientific colleagues that are directed toward the research work *itself* in this area are as old as the history of "scientific occultism" (e.g., McClenon 1984). However, from the perspectives of the science of history and the sociology of science, the skeptic movement is primarily an indicator of the peculiarity of the research topics, which is expressed on different levels and considerably influences the process of research. Nevertheless, many researchers—especially those who are familiar with social and cultural sciences and have included these research areas in their range of interest—are aware of this, and, accordingly, take the specific conditions in the field of anomalistics into consideration (e.g., Machado 2009).

Anomalistics as a Research Field: The Paradigm of Reflexive Anomalistics

Anomalies are phenomena and/or experiences that seem to conflict with "certain very general principles" (Broad 1962:3) which are accepted by science as well as in everyday life during that respective period in time. The English philosopher of science C. D. Broad called them "*basic limiting principles*," which build unhesitatingly, and in a self-evident manner,

the framework of our everyday practice as well as of generally accepted scientific theories (Broad 1949, 1962:3–6). These limiting principles imply, for example, that rivers do not run uphill, that future events cannot be predicted with complete certainty, and that inanimate objects do not move by themselves. Some of these principles, says Broad, seem to be self-evident, and others are "overwhelmingly supported by all the empirical facts" (1949:291). It would be regarded as absurd to consider them critically, at least with regard to practical everyday activities as well as conventional scientific research. Anomalies, however, can bring these principles into question, and assessing or refining them can be a natural focus of anomalistics research.[4]

In our opinion, anomalistics is not a separate academic *discipline* but builds a content-determined *field of research* because anomalies can basically occur in all areas of science. There is no clear-cut and undisputed definition of what exactly defines the subject area of anomalistics (cf. Bauer 2015:74), because anomalies, in a broad understanding, propel many scientific efforts aimed at integrating hitherto non-understood phenomena (anomalies) into the canon of scientific knowledge. Accordingly, some authors distinguish different kinds of anomalies. Sturrock (2010), for example, differentiates between "OK anomalies," "not-OK anomalies," and "sleeping anomalies." The first group seem to be solvable within the framework of conventional science, the second seem to be unsolvable with conventional scientific models, and the third group contains anomalies for which it so far remains uncertain whether they are accessible to scientific investigation at all. Atmanspacher (2009:280) emphasizes the potential connectivity with accepted knowledge and distinguishes, quite similarly, "anomalies at the frontier of accepted knowledge," "anomalies surrounded by accepted knowledge (interior anomalies)," and "anomalies in no man's land" (cf. Hövelmann 2015).

With this paper, we present an analysis of the specific conditions of anomalistics research that we systematize under the paradigm of *reflexive anomalistics*.[5] In our understanding, reflexive anomalistics means a *social-scientific informed* approach to anomalistic phenomena that provides specific basic rules for the investigation of extraordinary experiences and phenomena. The specifying adjective *reflexive* signifies a main objective of research, which is awareness of (a) the epistemic particularities of the phenomena under research, (b) the precarious cultural (media, science, policy) framework conditions of this research, and (c) the areas of tension between subjective evidence, scientific proof, and social discourse, and which takes these factors into account, systematically and from the beginning, with regard to the scientific research question as well as the methodological

approach. Each of these factors leads to specific methodological problems that have to be considered in anomalistic research. Not only should epistemic issues and the sociology of knowledge be part of scientific anomalistics, but media thematization, as well as its psychosocial, or knowledge-concerning consequences for potential and actual interviewees, should also be taken into consideration. Finally, the phenomenological particularities of this research field, which are reflected in data gathering as well as evaluation, have to be kept in mind. We will explain this in more detail below.

Epistemological Particularities and Their Impact on Methodology

Anomalistic Phenomena in Experimental Laboratory Research

"Classic" psi phenomena such as clairvoyance, telepathy, precognition, and psychokinesis belong to the class of anomalies that can be investigated in laboratory experiments. Despite sound evidence of the occurrence of anomalies in the data that have appeared in the meantime (cf. Schmidt 2014 for an overview), the phenomena resist treatment as a "normal" research topic because they cannot be reliably replicated under controlled conditions (Edge & Morris 1986:318–319, Schmidt 2014:101–102). The *elusive nature of the phenomena* is certainly one of the reasons why there are indeed several theories but none that would find undivided support within the scientific community (cf. Schmidt 2015). Both theory construction and experimental methodology are required to take this peculiarity into account. At the theoretical level, this is done, for example, with attempts at modeling such "unreliable" behavior of the phenomena by referring to the laws of quantum physics (cf. Millar 2015), as in the case of the *Model of Pragmatic Information* (Lucadou 1987, 1995a, 1995b:139–155) and *Weak Quantum Theory* (Atmanspacher, Römer, & Walach 2002, Walach, Lucadou, & Römer 2014). In statistical evaluation, the *replication problem* is addressed insofar as one can achieve a "second order replicability" with the use of meta-analyses, and by the accumulation of findings that relativize the problem of "classic" replicability (first order) (cf. Utts 2015, Tressoldi & Utts 2015). Even in the field of experimental methodology, the elusive nature of the phenomena can be operationalized using a theory-driven approach, as was recently achieved by Lucadou with his Correlation-Matrix Method (CMM), which has since been successfully tested (cf. Walach 2014, Walach, Horan, & Hinterberger 2016).

In addition to the replication problem, *experimenter effects* represent a further problem that has been discussed in experimental psi research for a long time. The observer invariance required in experimental research is undermined by the finding that some experimenters obtain significantly

stronger psi effects with their experiments than others using an identical experimental design and environment (cf. Watt, Wiseman, & Schlitz 2002) and by the experimenter effect in general (Palmer & Millar 2015).[6]

Even if one is able to experimentally register anomalies like the above-mentioned "classical" psi phenomena by means of sophisticated methodological designs and statistical evaluation, it must be stated that the effect size of psi obtained with such methods is very small (see Schmidt 2014:99 for an overview)—so small that they should not play a significant role in everyday life. At the same time, there are reports from everyday life that describe the experience of such phenomena of an enormous, and sometimes existentially shocking, severity, compellingly raising the questions of construct validity and ecological validity of experimental laboratory psi research (cf. Alvarado 1996b, Braude 1997:4–14, Mayer & Schetsche 2012). Braude (1997:10) notes that laboratory conditions are so different from conditions in everyday life that experiments on human cognition and behavior can generally only be conducted in a meaningful way with great reservations.[7] This applies particularly to parapsychological experiments because, according to a common assumption (e.g., Irwin & Watt 2007:129ff, McClenon 2005, Stanford 1990), the psi ability of human beings is extremely dependent on situation and context; it occurs mainly in emergency situations ("need-determined") which can hardly be simulated in a laboratory.[8] Nevertheless, an increasing orientation toward the investigation of anomalies as they occur in the "natural" living environment is promises a considerable increase in knowledge that can stimulate theory construction and also be of value for process-oriented experimental research.

Anomalistic Phenomena in Field Research and in Interview Studies

The epistemic particularities of anomalistic phenomena in the living environment can be found on various levels to be partly related to each other. Anomalistic phenomena (a) occur spontaneously in most cases[9] and are therefore not available for scientific investigation at will; they are not inducible and cannot be scheduled (Alvarado 2002, Mayer & Schetsche 2011:12–13, Rush 1986).[10] As a consequence, they are (b) mostly not directly observable but only available as recollections; that is, they are available to the researcher as *subjective experiences* and have taken the form of experiential reports (recollected perceptions and experiences), for example reports of ghostly apparitions, synchronistic events, and out-of-body experiences. With prolonged events such as, for example, a typical poltergeist case, but also with intersubjectively shared observations like a collective UFO sighting, the investigators have to deal with (c) an *experiential context of high complexity* that includes more than one witness,

and maybe a substantial amount of physical traces. Finally, there are (d) singular cases that have to be seen as *structurally, or historically, unique*. Examples are: the "red rain of Kerala," a reddish precipitation that fell sporadically in the Indian federal state of Kerala during the period between July and September 2001 (Gangappa & Hogg 2013, Louis & Kumar 2006), as well as the "Tunguska event," an explosion in Siberia in 1908, the cause of which has still not been determined beyond doubt (cf. Rubtsov 2009). These four characteristics prevent an approach exclusively oriented to natural scientific, or quantitative–psychological, methodology, even though laboratory tests (e.g., of material samples) can play a significant role in field-based, single case studies.

Multi-Methodological Approach. Three preferred methodological settings result from the above-mentioned particularities: field-research–based, single case studies (with regard to anomalistics, cf., e.g., Kelly & Tucker 2015, Mayer, Gründer, & Schetsche 2015, Mayer & Schetsche 2011),[11] interview studies (e.g., Schmied-Knittel & Schetsche 2015), and surveys (for an overview, cf. Kelly & Tucker 2015:67–68; see also West 1993).[12] The diversity of anomalistic phenomena under investigation makes it almost impossible to make generally valid statements on the research methods to be used. This is because the aim of the research, as well as the methods to be chosen, may vary considerably depending on the research object. Investigations of the above-mentioned examples of unique cases may be highly proof-oriented and object-centered, and apply the research methodology of (physical) science (is it actually a scientific anomaly not yet understood, or can it be sufficiently understood within conventional models of explanation?), but once we have to deal with witness statements as a data source, social-scientific, person-related, and process-related aspects come into effect. According to the structure of a case, a multi-methodological approach will be indicated which generates various kinds of data. In a poltergeist investigation, for example, one usually has to deal with interview data that are supplemented with data from observations, measurements, and documentation that can be collected during location surveys (photographs, quantitative physical measurement data, etc.), as well as diary accounts and data from historical enquiries. In some circumstances, laboratory tests of physical objects can be necessary or useful in order to gain additional evidence for the assessment of the events (to confirm a conventional explanation or the presence of an anomaly).

With such a multi-methodological approach, case studies in anomalistics do not differ from those in other fields such as criminology. In both cases, techniques of conducting and evaluating interviews, psychological aspects of witness testimonies, and questions of fraud and self-deception play

important roles. Here, too, a particularity arises only through the specific nature of the phenomena that conflict with *basic limiting principles*. Because such anomalies belong, admittedly, to a culturally handed down (through fairy stories, myths, and fictional works) body of knowledge but are in conflict with the publicly dominating physicalist–materialistic worldview in Western modern societies, communication about such phenomena and extraordinary experiences (ExEs) is subject to particular rules that have to be taken into account methodologically (this will be discussed below).

Distorted Image of Science. Anomalistic research is often faced with another particularity: confusion caused by a false, or distorted, image of science held by people involved in a case (e.g., of poltergeist phenomena), and who often have erroneous expectations with regard to appropriate methods of investigation. In most scientific areas, this point is not controversial—sociologists do interviews and deal with survey data, biologists and chemists operate with test tubes, microscopes, and analyzers, etc.—but such clear referential ideas (e.g., applied in school education) are lacking in anomalistics. Thus, the idea of scientific investigations of anomalies is normally mediated by media, but also by scientific laypersons, and oriented on a scientific methodology of objective measurement with technical instruments. This is clearly displayed, for example, in the approach of high-tech, ghost-hunting groups (Mayer 2013a).[13] Indeed, efforts also have been made by professional anomalistic researchers in spontaneous cases to obtain a complete recording of all possible environmental data, as well as data directly concerned with phenomena (optically, acoustically) by using the largest possible collection of measuring instruments. However, the extensive deployment of technology has not proved particularly worthwhile to date, and most experienced ghost investigators with an academic background have become skeptical of using technology in this way (cf. Cornell 2002:377–381). An indirect, person-oriented, and process-related approach seems to be less spectacular, but currently appears more promising against the background of long-term, phenomenon-oriented research than—returning once again to the example of haunting investigations—roving through allegedly haunted ruins armed with various measuring instruments and recording tools, as is practiced by ghost-hunting groups. Their idea of a potential physical–technological detection of ghostly apparitions results from a scientifically highly dubious interaction model, but it is adapted to lead the concerned lay investigators to a belief in a delusional "objectivity" of the instrumentally based findings (Mayer & Schetsche 2011:97). Accordingly, other methodologies, that is to say valid and epistemically well-considered methods of (social) environment research, are of particular importance for many anomalistic case studies.

Models and Methods. In anomalistics, it is particularly apparent how strongly theoretical presuppositions and models shape the methodology, and the degree to which the chosen method depends on the respective ideas of the researcher about the (ontological) nature of the phenomena under investigation. This point is trivial as such, and seldom leads to considerable differences with research issues in conventional scientific areas, especially in the natural sciences, so that controversies occur over methodological questions of detail at most. Therefore, this point is rarely considered. In anomalistics, there is basically no lack of (serious) theories[14] but rather of a basal consensus in the modeling and understanding of extraordinary events and experiences (e.g., Edge & Morris 1986:312–314). Depending on ideological attitude, different research focuses are emphasized, which mostly affect the research methodology (e.g., selection of measuring instruments, interpretation of collected data). The research methodology is often influenced by implicit or explicit theoretical or perhaps empirically driven presuppositions—if, for example, an assessment of the "genuineness" of the phenomena is made on the basis of a structural correlation, or accordance, with accustomed or cherished models. The detection of an "affective field" (Bender 1964)[15] or a dysfunctional family structure is then considered to be a strong indicator of the possibility of genuine anomalies, whereas their lack gives rise to deep distrust. The same applies to the elusiveness of the phenomena: If during an investigation of a poltergeist case psi phenomena continue to occur after the arrival of the investigators, this is interpreted as an indication of fraud.[16] With regard to the narrative structure of reports of ExEs: If, for example, an account of a near-death experience does not display the typical and well-known features (tunnel, bright light, etc.) of such reports, it is likely to be interpreted as confabulation, or a conscious attempt to cheat.[17] Although such models provide cognitive landmarks on the "swampy ontological ground" of anomalistic phenomena that seem to be, as structures of rationality, reasonable criteria for the selection of research methodology (aims, measuring instruments, etc.), it must not be overlooked that these are inevitably reductionist approaches,[18] and one thereby runs the risk of narrowing the perspective too far and overlooking essential aspects—a risk that might be bigger in the field of anomalistics than in other research fields.

In many cases, it will therefore be useful to choose an explorative, data-guided research strategy in the sense of a qualitative and interpretative social research (cf. Flick, Kardoff, & Steinke 2000, Strübing & Schnettler 2004). With such an approach, methods are provided that observe a principle of openness and postpone consideration of the theoretical structure of the research object. Thus, the emergence of its inherent structure is facilitated

(cf. Hoffmann-Riem 1980:343). This general relinquishment of theoretical presuppositions about the research object and, therefore, the nature of the interviewees is crucial when the research topic relates to heterodox worldviews.

American-style, ghost-hunting groups represent a good example of how fundamental (theoretical or ideological) preconceptions influence the methodological approach. Spiritual, religious, or spiritualist basic assumptions that are rarely questioned form the basis of their work, accompanied by the idea that ghosts or paranormal phenomena manifest themselves on a physical level; that is, that they have an effect on measuring instruments of any kind so that anomalies can be detected in measurement data. The more physical parameters measured, the more likely it is that some "anomalies" will be detected, which can then be interpreted as an effect of the transcendent on the physical world. For this reason, these groups are technically extensively equipped: video and audio recordings are made, and various physical parameters (geomagnetic field strength, temperature, air pressure, atmospheric humidity, noise, light) are measured at a supposedly haunted place. The collected data are then jointly analyzed and examined for conspicuous structures. This approach can be characterized as being positivistic and almost physicalistic: Ghosts manifest themselves physically, and they are detectable physically with the respective measuring instruments. Accordingly, technical devices are indispensable tools for creating evidence:

> The technology itself is celebrated, promoted, and sold on sites professing to lead the practice of 'high-tech ghostbusting.' This latest version of techno-mysticism fuses a feeble-minded mysticism (as cited above) with a fetishizing of the technology itself. (Potts 2004:221)

However, if the basic assumptions of the physical manifestation of ghostly entities are rejected,[19] the measured "evidence" of the paranormal quickly becomes evidence of the investigators' faith in technology. In most cases, there are numerous alternative explanations of the identified anomalies in measurement data available. Instead of making use of ghosts, it is then sufficient to move around in a "normal"—in a double sense—research area with fluctuating environmental factors.

Precarious Cultural Framework Conditions

A core problem of anomalistic research is that anomalistic phenomena have been, and still are, the subject of highly controversial public debates, as well as systematic attempts at deconstruction (cf. Schetsche 2015). For example,

the dealing of the mass media with this topic area is characterized by different strategies of de-legitimization: If the mass media cover such issues at all, the respective experiences and phenomena are often ridiculed, or mitigated through *selection of facts* and *re-interpretation* (cf. Mayer 2003), or neutralized through *fictionalization* by locating them in the fantasy genre.

Nihilation Strategies

By means of nihilation strategies, (empirical) knowledge that contradicts the accepted order of reality is argumentatively rejected—often with the aim of eliminating it from the culturally recognized "inventory of knowledge about reality" (cf. Berger & Luckmann 1991:132–134). Such nihilation strategies (cf. Schetsche 2015:65–67) are:

- ***ridiculization and disqualification*** of individuals and interpretations. Individuals who report ExEs, or who deal with anomalistic phenomena, are ridiculed by means of various language strategies, or critical features in their environment are sought out in order to disqualify them as serious witnesses/scientists/interviewees (see also Edge & Morris 1986:322, Mayer 2003:22–25).
- ***delegitimization by reproductions***. Artificial events (as pseudo-phenomena) are created that simulate anomalistic phenomena (e.g., photos or videos of UFO sightings, appearances of ghosts, crop circles) in order to prove that such phenomena can be human-made and hence are human-made; therefore, further clarification of such phenomena is not required.
- ***epistemic extinction*** by concealment. This strategy can mainly be found in science. By way of mechanisms of scientific self-control (research funding, peer review processes), findings or theoretical interpretations that deviate from scientific orthodoxy are prevented from reaching an expert audience or cannot be produced at all due to the withholding of financing.[20]
- ***pathologization*** of experiences. Attempts are made to neutralize anomalistic phenomena by interpreting them as an expression of a mental disorder. For example, in the context of the diagnosis "schizotypal personality disorder," extraordinary experiences are declared to be the core indicator of a psychological disorder (cf. Schetsche 2013b).

If, therefore, someone experiences something that is difficult to explain, and perhaps even contradicts the fundamental rules of the scientific order of reality, then he or she is put at risk of social stigmatization or, at worst, pathologization (cf. Schetsche 2013a). Diagnoses of the above-mentioned kind signal to individuals as well as to society that it is precarious to communicate about ExEs and paranormal interpretations. The same also applies to the sciences: Someone who deals with ExEs and anomalistic phenomena in an open-minded manner jeopardizes his/her reputation

and career (cf. Hess 1992, Cardeña 2015, Schetsche 2015). From a methodological viewpoint, knowledge in the lifeworld and in science about the heterodox status of ExEs creates a double hiatus: just as it prevents scientists from dealing scientifically with respective phenomena, it causes concerned individuals to hesitate before speaking openly and honestly about their experiences and personal interpretations. The latter is reflected in the specific strategies of communication used when dealing with such experiences.

Communication about Anomalistic Phenomena and Extraordinary Experiences

Reporting ExEs, as well as talking about this issue in general, always makes a self-positioning toward the "extraordinary" necessary (Schäfer 2012:234). Three factors play a crucial role in communication about ExEs: communication in a specific "secure mode," social desirability, and social distinction.

Shielded Communication. Schmied-Knittel and Schetsche (2005, 2015:436–438) have demonstrated that individuals report ExEs in a particular way that they characterized as a mode of "shielded communication." The background of this frequently occurring specific secure mode of speech about personal experiences is the knowledge, or the premonition at least, that they have dared enter into an area of "special knowledge" that is in contradiction to the dominant scientific worldview, and that therefore their experiences could be regarded as deviant in our society. They know that proponents of paranormal interpretations are regularly exposed to ridicule by public media, and, in some circumstances, can be classified as in need of therapy and, at worst, psychiatrized (cf. Schetsche 2013b, Wooffitt 1994). This style of "shielded communication" is characterized by different strategies, such as the repeated assurance that one is neither crazy nor naïve, assuring that one's powers of recollection are excellent, argumentatively eliminating other logical possibilities of conventional explanation, citing witnesses, and referring to (scientific) "experts" of the paranormal. Such strategies do not necessarily have to be explicit. They can be assimilated into the very construction of the narration (Bender 2007, Childs & Murray 2010, Lamont 2007, Wooffitt 1991, 1992).[21] Bender (2007:214) demonstrated, with regard to interview studies of ExEs in general, "how account and experience are tied together in a complex relation to each other, and to the embodied cultural and social worlds in which they are experienced and expressed." The same applies to a comparative field study by Cassaniti and Luhrmann (2011, 2014) on the cultural interdependence of accounts and experience, as well as of the likelihood of having such ExEs.

Social Desirability and Distinction. With her impressive field study of

magic practices in northwestern France, Favret-Saada (1977) demonstrated that the interviewed person initially scrutinizes the interviewer's attitude toward the contents to be reported, as well as his/her ideological positioning. They then tend to shape their narration according to the anticipated expectations or attitudes. If there is no observable openness by the interviewer toward the possibility of the existence of paranormal phenomena in principle, this will have an unfavorable influence on the conversational situation in general, and on the quality of the obtained data in particular. ExEs are potentially relativized, reported in a biased way, or possibly completely concealed to avoid the danger of social stigmatization, or even just an implicitly pejorative attitude of the scientific investigator.

However, biased accounts may also be elicited under the condition of an observed openness of the conversational situation. When dealing with ExEs, we must make reference to the dimension of normalization versus "especialization" (to become someone special). The particular quality of ExEs allows them to be used for the biographical construction of identity, as Schäfer (2012) has shown in a study of the biographical integration of ExEs. Both strategies can bias the narration for the purpose of self-styling: normalization as a means to avoid the impression of arrogance, and especialization as an expression of one's own special role and meaning as a person being distinct from "normal people."

Anyone who ignores these culturally precarious framework conditions of the research field runs the danger of producing various kinds of artefacts in the data as well as in their interpretation.

Complex Entanglement of Subjective, Intersubjective, and Objective Evidence, and Social Discourse

In the living environment, accounts of ExEs are the main data source of scientific knowledge: retrospective narrations of what the concerned persons experienced a short or longer while ago, or more correctly, what they *reconstructively remember* to have experienced at the moment the statement is made.[22] In addition, the experience has to be culturally encoded (verbally, epistemologically, and often normatively) in order to be communicated at all. Accounts of such experiences are, therefore, pre-shaped, not only by individual processes of interpretation and memory, but also by social interpretive patterns, norms, and not least, epistemic basic rules. A closer look at the term "experience" and its different meanings should be helpful for the understanding of these processes.

The German language differentiates between *Erlebnis* and *Erfahrung*. The first term indicates experience in the sense of a purely individual impression—immediate or lived experience; while the second refers to

a social form of experience based on shared knowledge—interpreted or coherent experience (Bauman 2008, Junge et al. 2008:17). *Erlebnis* and *Erfahrung* have to be distinguished from an *event* that indicates an incident, a fact, an occurrence whose existence is *thought of* as independent of human perceptual experience (even though a direct or indirect human observer is needed to record it as scientific data). Accordingly, *Erlebnisse* produce subjective evidence, *Erfahrungen* intersubjective evidence, and *events* objective evidence (cf. Mayer & Schetsche 2012, see also Cardeña, Lynn, & Krippner 2000, with regard to a differentiation between "experience" and "event").[23]

Accounts of ExEs mainly consist of verbally expressed *Erfahrungen*. Thereby, culturally pre-shaped narrative structures become essential for the communication of personal (non-communicable) *Erlebnisse.* While forms of *Erfahrung* can be studied easily by researching the development of narratives or the reconstruction of cognitive concepts, the biographical moments of evidence (as *Erlebnis*) often are embedded in commonly shared narratives. To illustrate this by way of an example: In neopagan religion, and especially in Wicca, the so-called "coming home experience" is a widely spread type of conversion narrative. It refers to the spiritual experience of a feeling of coming home (to the Goddess, to where humanity started, to your true self, to where you always have been but did not know it, etc.) and has virtually gained the status of a theological principle. This narrative, with its serial character, has taken on a life of its own as an "identity module" narrative. It is expected that personal ExEs are understood as important parts of such spiritual developments, and thus embedded into accordingly pre-shaped narratives. Thus, the particular individual "experiences of evidence" have often become obscured. This problem concerns interview studies and field investigations of ExEs in general. If the researcher is not only interested in the question of the knowledge of particular narratives that are applied to particular contexts, but also in the underlying personal (lived) experiences, and possibly even in the actual events that caused the ExEs, then he has to deal with this obscuring effect (Mayer & Gründer 2010, 2011).[24]

Which ExEs *can* be reported at all, in which terms, and on what basis of interpretative framework, is therefore always dependent on cultural discourses that deal with issues of the admissibility of particular thematizations within the accepted order of reality (the so-called epistemic regime of a culture). Thus, it depends on the respective cultural conditions *if and how* extraordinary *Erlebnisse* will be transformed into intersubjectively communicable *Erfahrungen*. During the scientific analysis of such experiential reports, the experience of subjective evidence that is culturally

preformed has to be filtered, edited, and reformulated in order to become scientific knowledge. Between the evidential experience of the individual and scientific evidence, there are, therefore, at least two inevitable thresholds of knowledge that must be surmounted in a methodological and deliberated way. In addition, there are various social (political, economic, religious, etc.) influences on research, and, furthermore, researchers are not free from their own interests, ideological limitations, and ways of thinking related to the zeitgeist. Particularly with the investigation of culturally controversial phenomena and experiences, which belong to the heterodox segment of the accepted order of reality, relevant influences on single scientific findings, as well as on the scientific world view in general, have to be taken into account analytically.

Being aware of the specific conditions in anomalistic research—to repeat the three main areas once again: (a) the epistemic particularities of the phenomena under research, (b) the precarious cultural (media, science policy) framework conditions of this research, and (c) the areas of tension between subjective evidence, scientific proof, and social discourse—and taking them routinely, and as a matter of principal, into consideration, characterizes an approach that can be aptly referred to as reflexive anomalistics.

Notes

[1] It would be an interesting research issue itself to examine the degree of acceptance of various kinds of anomalous experiences, such as near-death experiences, mystical phenomena, or cases of possession, by parapsychologists and other anomalists, i.e. to scrutinize which characteristics make a field of anomalistic phenomena regarded as a "feeble" one.

[2] However, process-oriented research is not a relatively new development but has been done since the early times of the *Society for Psychical Research* (Alvarado 1996a).

[3] See Kruth (2015) for a short overview of several common qualitative research approaches, their differences from quantitative approaches, and the contexts of application.

[4] It should be added that definitions of anomalies, especially anomalous experiences, are highly culturally dependent, of course.

[5] The paradigm of reflexive anomalistics has been introduced by one of the authors (M.S.) of this paper, and was first presented in the context of a partial area of anomalistics, UFO research (Schetsche & Anton 2013). A "Manifest für eine reflexive UFO-Forschung" [Manifesto for a Reflexive U.F.O. Research] resulted from this (Anton, Hövelmann, & Schetsche 2013). An extension of the paradigm to the whole field of anomalistics

was made in Mayer, Schetsche, Schmied-Knittel, & Vaitl 2015 and in Schetsche, Schmied-Knittel, & Anton 2016).

[6] It should be mentioned here that this problem with replicability as well as the experimenter effect are now known to not only apply to anomalistics. While the former has reached public debate (Open Science Collaboration 2015), the latter would, if taken seriously, severely unsettle the foundations of scientific work because the possibility of an experimenter effect would also compromise the conclusions of all conventional experiments.

[7] With their analysis of verbal statements during "ganzfeld" ESP experiments, for example, Wooffitt, Holt, and Alliston (2010) showed impressively that the significance of the laboratory environment as a contextual factor remains underestimated. This produces an overestimation of the validity of verbal statements as "objective," and therefore seemingly reality reproducing, data. Thus, it can easily lead to an overgeneralization of the scope of the results:

> The analyses presented here suggest that mentation narratives are not merely neutral verbal expressions of inner mental phenomena that, more or less, capture conscious experience in flight. They are a series of discursive acts through which participants pragmatically address institutional, interpersonal, and inferential contingencies of the setting. What counts as inside the head is a product of the discursive management of the social outside. (Wooffitt, Holt, & Alliston 2010:15)

See also Alvarado (1996b) for problems with, and limits of experimental laboratory research in parapsychology.

[8] As Alvarado (1996b:15) aptly puts it:

> In short, I would like to state the obvious: To understand the spontaneous we need to study the spontaneous. There can be no substitute. Unfortunately, most of the research conducted in recent years has neglected the obvious.

However, there are theories that contradict the idea of the need-determined character of psi, such as, for example, Carpenter's *First Sight Theory* (Carpenter 2012).

[9] We would like to thank anonymous reviewer "C" for the following important note, with which we absolutely agree:

> It should be noted that the term 'spontaneous' here may merely reflect our ignorance about the true aetiology of the phenomena in question, and is not to suggest that it happens without triggers as in the spontanous decay events of radioactive substances; hence, there is a prospect in principle that in the future these phenomena could be studied in a more 'controlled' manner.

[10] However, this only applies to anomalies that are perceived and interpreted as extraordinary experiences. Some theories such as the above-mentioned

First Sight Theory (Carpenter 2012) assume permanently ongoing "anomalistic" processes that, however, remain below the threshold of conscious perception and are similar to subliminal perception. The occurrence of an anomaly as content of consciousness, that is as an object of conscious cognition, is therefore the exception. The presentiment experiments by Daryl Bem (2011) also are an example of psi effects that remain below our perceptual threshold.

[11] On a second level, the comparative analysis of single cases in case collections is an important method of gaining knowledge about anomalistic phenomena, of course (e.g., Alvarado 2002:118–121, Kelly & Tucker 2015:68–69, Rhine 1981:245–257, Rush 1986). Thereby, both quantitative and qualitative methods of analysis can be used.

[12] Rhea White (1992) provides a more detailed depiction of various approaches to the study of spontaneous psi experiences. She mentions twelve different methods of investigation which, however, cannot be sharply distinguished in every aspect.

[13] Here we can find an almost positivistic or physicalistic approach in measuring and collecting ostensibly objective data with a great number of high-tech measuring instruments accompanied by rarely questioned spiritual, religious, or spiritualist basic assumptions in a peculiar way.

[14] Schmidt (2015) provides an overview of theoretical explanation models of psi effects.

[15] The term "affective field" means, according to Bender, "the total sum of dynamic affective factors operating in a contact situation and the reciprocity of their effects" (Bender 1964:23, see also Roll 2000). With regard to poltergeist cases, see Mischo (1983). William Roll (2004:158–168) suggested a "field theory" of psi which, however, has a slightly different focus, and is more oriented to physical field theories, distinct from the psychological and social–psychological theory of Bender.

[16] With regard to the latter, this seemingly paradoxical statement is based on the experience that in genuine poltergeist cases the RSPK phenomena cease to appear after the arrival of investigators because of the elusive nature of such phenomena, or maybe their 'trickster' quality. With the Model of Pragmatic Information, Walter von Lucadou (1995a) provides a plausible explanation for the specific dynamics of RSPK phenomena (with regard to dynamics of poltergeist cases, cf. Lucadou & Zahradnik 2004).

[17] In a talk about near-death experiences, for instance, a speaker stated with regard to the authenticity of such accounts: "If tens of thousands report letter by letter the same story, and then there comes somebody and reports a different story of what he had experienced," then it is immediately clear

that it must be invented (Christoph Konrad Kalka, September, 13, 2003, DEGUFO-Jubiläumskongress, Bad Kreuznach).

[18] It is inevitable because of the empirical underdetermination of theory in the sense of Quine (1951).

[19] However, one cannot completely dismiss the possibility of physical correlates of these phenomena.

[20] Anthropologist Åke Hultkrantz (1981:74–75) impressively describes the systematic withholding of the findings of methodically sound field research for fear of loss of reputation and the related swift end to a research career. The potential size of the commotion, and strength of the reaction resulting from successful publication on an anomalistic issue in a prestigious mainstream journal—and this may well prove to be possible because of the excellent reputation that the scientist has earned in the scientific community due to his groundbreaking research on conventional research topics—has been demonstrated by the article "Feeling the future: Experimental evidence for anomalous retroactive influences on cognition and affect" in the *Journal of Personality and Social Psychology* (Bem 2011). This immediately gave rise to a heated debate, and created doubt about experimental and statistical methods that had until then been unquestioned (cf. Radin 2013:168–169).

[21] See also Mayer (2013b) and Mayer and Gründer (2011).

[22] The social sciences have been concerned with the issue of the epistemological value of such subsequential experiential reports for a long time (cf. e.g., Nassehi 1994).

[23] The term "objective" is used here in an instrumental–methodological sense, and not in a strict ontological sense.

[24] Cassaniti & Luhrmann (2011, 2014) and Luhrmann (2012) also provide impressive examples of such processes with their investigations of ExEs of members of American evangelical churches and of Thai Buddhists in a village in Northern Thailand.

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OBITUARY

George Spencer Brown, 1923–2016

Farewell to G. Spencer-Brown, a creative mathematical logician extraordinaire, one of a handful of twentieth-century polymaths who saw the need to integrate spatial and numerical mathematics into a system of reasoning that is logically prior to conventional mathematics, symbolic logic, and mathematical science. While I never had the privilege of meeting him in person, I became aware of his work in 1984 when I purchased a copy of his exceptionally well-written book, *Laws of Form*. This book is one of my most prized possessions. I re-read it from time to time, and gain new insights every time.

Similar to many brilliant thinkers who forge ahead of their time in history, he was misunderstood and misinterpreted by some who, although competent in their individual fields of specialization, failed to see the larger picture he was able to perceive. In my opinion he deserves a place of high honor in the Meta-Mathematics Hall of Fame, if there were such an institution, for revealing the connection of 'imaginary' numbers (an unfortunate misnomer) with symbolic logic and geometrical representation.

G. Spencer-Brown was born in Lincolnshire, England. He studied medicine and passed the First M.B. at London Hospital Medical College in 1940 at the age of seventeen; but, after serving in the Royal Navy from 1943 until 1947, he struck out in a different academic direction at Trinity College, Cambridge, earning Honors in Philosophy (1950) and Psychology (1951). From 1952 to 1958, he taught philosophy at Christ Church, Oxford, and earned M.A. degrees in 1954 from both Oxford and Cambridge. His doctorate thesis *Probability and Scientific Inference* was published in 1957. Brown's thesis expressed a healthy skepticism concerning the concept of randomness in the statistical methods commonly used in the evaluation of ESP and other psi phenomena.

During the 1960s, he studied under the Scottish psychiatrist R. D. Laing. He also did postgraduate work with Bertrand Russell and Ludwig Wittgenstein, and upon recommendation by Bertrand Russell he became a lecturer in formal mathematics at the University of London. From 1969 onward, he was affiliated with the Department of Pure Mathematics and Mathematical Statistics at the University of Cambridge. In the 1970s and 1980s, he was a visiting professor at the University of Western Australia,

and at Stanford University and the University of Maryland in the United States. In addition to his academic pursuits, he played chess, held two world records as a glider pilot, and was a sports correspondent to the *Daily Express*. He also wrote novels and poems under the pen name *James Keys*.

George Spencer-Brown died in Wiltshire, England, on August 25, 2016, at the age of 93.

I personally owe G. Spencer-Brown a deep debt of gratitude, because without some of the calculus of indications theorems and innovative applications to logic published in his groundbreaking book, *Laws of Form*, my life's work, documented in my books and other writings, especially *Infinite Continuity* and *Transcendental Physics*, and in *Reality Begins with Consciousness*, and a number of articles, papers, and books written in collaboration with Dr. Vernon Neppe, would have been much more difficult, if not impossible.

In keeping with his statement in *Laws of Form*: "*Although all forms, and thus all universes, are possible, and any particular form is mutable, it becomes evident that the laws relating such forms are the same in any universe,*" I believe this understanding should serve him well in any universe in which he now might find himself.

Edward R. Close

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ESSAY REVIEW

Some Reflections on Parapsychology, Stimulated by the Publication of a New Handbook of Parapsychology

Parapsychology: A Handbook for the 21st Century edited by Etzel Cardeña, John Palmer, and David Marcusson-Clavertz. McFarland, 2015. 424 pp. $65 (paperback). ISBN 978-0786479160.

Handbook of Parapsychology edited Benjamin B. Wolman. Van Nostrand Reinhold Company, 1977. 967 pp. $25 (paperback). ISBN 978-0442295769.

As fields of science go, parapsychology is miniscule. Yet with more than a century of research behind it, it long ago needed a handbook to orient new researchers, and recently a new *Handbook* was published.

When I was asked to review the new *Handbook*, I regretfully said no, I didn't (and still don't) have the needed time to give a very important book like this the kind of thorough, chapter-by-chapter review it deserves. Asked again, I thought about it and said okay if I could, as someone who has devoted a major part of my career to parapsychology for half a century, instead give an overall impression of the field and its *Handbook*, and this was okay with the editor. To start, I envisioned holding the old *Handbook* (to which I had the honor of contributing a chapter on drug-induced, altered states of consciousness) in one hand, the new one (no chapter by me) in the other, and sharing some general reflections on what's happened in the past three and a half decades. That's the position I will take in this brief essay.

They weigh about the same to my hands, but inside . . .

I imagine a lot of people will see some confusion in the title of a book that calls itself a handbook of parapsychology. At one extreme, parapsychology has long been a popular term (too) widely used to mean *anything* weird and apparently impossible by conventional scientific standards, with weirdness being foremost and questions of scientific quality of evidence given little weight. For those really interested in science, or in promoting the field of parapsychology as a science, this popular, indiscriminate mixture drives us crazy!

We've worked so hard to develop parapsychology as a branch of *science*. And that's the other extreme: A very small number of us who use

levels of scientific methodology and standards typically higher than in most conventional areas of science, are convinced we've discovered several human faculties or processes, *psi phenomena*, as definitely existing, such as "telepathy" or "precognition," and yet find that far too many people who work as scientists in other fields a priori deny the very existence of this evidence, much less its quality, for what can only be assumed to be *ir*rational, rather than scientific reasons. A possible psychological dynamic behind these irrational attacks is that parapsychological phenomena, especially if we use the older and wider scope of investigation termed *psychical research,* rather than "parapsychology," are about things that can be extremely important to human beings, raising questions as to whether there is a reality to a spiritual side of life or not. Many people now take a totally materialistic view of the universe, as if this philosophy were Revealed Truth, and vehemently attack studies that claim there is scientific evidence that the universe is bigger than we know, bigger than the current materialistic view, and may have vital spiritual aspects to it. I call this an implicit philosophical stance, rather than a scientific one, as its proponents apparently know a priori there **cannot** be any psi phenomena, so they don't bother to even read the evidence for psi. **Real science always, *always* puts evidence ahead of convictions.**

I've been involved in scientific parapsychology for more than half a century, starting with my first experiment (1957) while still an undergraduate engineering student at MIT, trying to induce out of the body experiences (OBEs) with hypnosis (Tart 1998). With the wisdom of hindsight, my design didn't have an adequate, a priori chosen evaluation method, but it was pretty good for a college sophomore. But a lot of high-quality research has occurred since my youth, so, looking at the new *Handbook*, and drawing on my experience, where have we gotten to?

Trying to write this review for a scientific journal, my feeling is that it should be tight, logical writing, drawing almost exclusively on the scientific data. But my cat, leaping up into my lap and sitting down on my two handbooks of parapsychology, waiting to be rubbed (the cat, not the handbooks), reminds me quite strongly that we're not dealing merely with abstract scientific "anomalies," but with material that can be emotionally extremely *important*. And that's why I primarily define my scientific specialty nowadays as *transpersonal psychology*, with parapsychology as a technical specialization within that. Yes, I want to know what's likely to be real psi effects versus delusions, correlations, and mechanisms, etc., with precise lab work as a foundation, but I also want to know about what psi means *to* people and what it means *about* people.

So, two handbooks of parapsychology. The first is the one edited by Benjamin B. Wolman, published in 1977, and has 967 densely packed

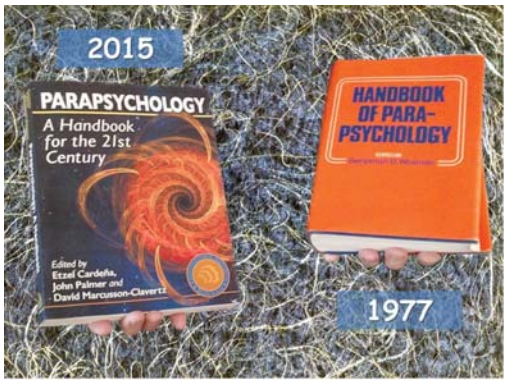
pages. Although I've only occasionally dipped into it for reference and for leads to a literature that I otherwise knew well, it has held an honored place on my bookshelf these many years. The new *Handbook*, published in 2015, comes along 38 years later and makes me wonder, have we made much progress?

There's 414 pages in the new *Handbook*, but it's an attractive, larger format book, and certainly contains a huge amount of both standard information any serious investigator should know, as well as much new material. And I can tell just from the list of the editors, Etzel Cardeña, John Palmer, and David Marcusson-Clavertz, that this will be high-quality material. I may be a little bit prejudiced here, for Etzel Cardeña was a graduate student of mine many years ago, and I sometimes think that what I did to support him was one of my greatest gifts to parapsychology, hypnosis research, and the field of consciousness research in general. Not that he needed much support from me, he was moving along quite nicely by the time he arrived in our psychology graduate program at UC Davis! Cardeña now holds the endowed Thorsen Chair of Psychology at the University of Lund in Sweden. John Palmer is an old friend and colleague who worked with me at UC Davis for a couple of years on studies to try to increase ESP ability by providing immediate feedback training, and is now the director of research at the Rhine Research Center and editor of the *Journal of Parapsychology*. David Marcusson-Clavertz was a graduate student of Cardeña's working on the preparation of the book, which tells me immediately he must be very bright!

So have we made significant progress in the almost 40 years between these two handbooks?

"Progress," is, of course, a very general term. To answer my question would require a detailed evaluation of each chapter in the new *Handbook* and a comparison with what we knew as it was summarized in the old *Handbook*. But in general, as someone who has both been very much inside the field of parapsychology for a major part of my career, but also coming from a wider perspective of studying the nature of consciousness, particularly altered states of consciousness and transpersonal psychology, my general impression is that, except in certain areas, we haven't really made much progress, and I'll look at some of these negative aspects first.

As it was decades ago, parapsychology is still a minuscule field of research with hardly any resources, and too much of the effort is still caught up in the question of proving whether there is any kind of reality to psi phenomena. You might think that parapsychologists would've learned decades ago from the kind of irrational attacks continually launched by those I call *pseudo-skeptics* that while you can think about the existence of any kind



of psi as a rational, scientific question, in point of fact most of the pseudo-skeptics' reactions to parapsychology seem to come from an emotional level, and allow them to frequently disregard ordinary rules of evidence. For example, in 1955, I found this all too readily expressed in a feature article in *Science* (Price 1955), one of the most prominent scientific journals on the planet. The author, G. R. Price, a chemist if I remember correctly , who, as far as I knew, had never actually done a single experiment dealing with parapsychology, wrote, in essence, that no intelligent man could read the evidence for ESP and doubt that it existed, but, *since we knew ESP was impossible*, we had to conclude that all of this evidence was due to error and fraud. A powerful statement of faith! Published in *Science*? A good reminder that we scientists *try* for objectivity, it's essential to the scientific process, but we don't always achieve it . . .

The forces behind this kind of attitude of the pseudo-skeptics are still very active, and some of my parapsychologist colleagues are still focused on producing higher and higher quality evidence supporting the existence of psi, evidence whose general quality long ago surpassed that required for more conventional phenomena. I have no objection to routinely using the highest-quality scientific procedures, double-blind methods, e.g., in parapsychological studies. As well as methodologically necessary, I think that such rigor also plays an important psychological function of conveying to would-be psi percipients that ordinary sensory and logical information gathering is of no use here: Psi, ESP, is required. Part of this focus on rigorous evidence and controls though, has been, I suspect, to avoid the emotional implications of psychic phenomena, which may trigger irrational resistance in the pseudo-skeptics. "Look how pure our methodology is!" But let's face it: Most of the "miracles" cited in various religious scriptures, and frequently used to "prove" the reality of those religious views, are apparent examples of kinds of psi, ESP, and psychokinesis, so parapsychology seems to be being seen, on some mental level, as bringing religion back into a materialistic world, and this is treated as if it were heresy!

I'm proud of the fact that we have such exceptionally high standards of scientific procedure in parapsychology, but insofar as we refuse to

acknowledge the covert emotional issues within the controversy about psi, and continue to waste our efforts in providing better and better evidence for the existence of psi that will be irrationally ignored and rejected, we're not getting very far. *We need to get on with studying the nature of psi, applications of psi, and what that nature means for our understanding of the universe*. Not that we should relax our scientific standards, of course. I'm proud that in scientific parapsychology we have such exceptionally high standards (see, e.g., Sheldrake 1999), and I cannot repeat often enough that such standards should be a standard part of any kind of parapsychology study, but *we need to get on with facing the emotional, spiritual, religious implications associated with parapsychological phenomena and deal directly with them, not ignore them* and assume that somehow these pseudo-critics who are bothered by these things won't notice any religious implications of psi. I've suggested some useful approaches on this to parapsychologists (Tart 2002) and to transpersonal psychologists (Tart 2004).

In the new *Handbook*, for example, there is much use of the phrase "anomalies" instead of older terms like ESP and psi. Anomalies is a scientific-sounding word and perhaps stimulates less immediate resistance than "psychic" or "psi" or "ESP," but the people whose materialism seems to act like a dogmatic religion, and who are fighting against the heresy of parapsychology aren't fooled by words like anomalies. Not to mention that the word "anomalies" typically carries the implication of small-scale, probably trivial phenomena, or errors that need to be corrected, even if intellectually interesting. As I argued in my own final summing up of my view on parapsychology, spirituality, and consciousness (Tart 2009), the data of parapsychology can support an openness to (a) some aspects of spirituality as being about real things, and (b) it's rational for a person to be *both* spiritual *and* scientific in their approach to life, but remembering this is an attitude that must also take into account that (c) nonsense exists in all areas of life and in our own mental processes, nonsense and error that we must be careful of.

As I said earlier, ". . . my cat, leaping up into my lap and sitting down on my two handbooks of parapsychology and waiting to be rubbed, reminded me quite strongly that were not dealing merely with abstract scientific anomalies, but with material that's emotionally extremely *important*." I love objectivity—or at least striving for as much of it as we can get—as a tool for acquiring and refining knowledge, but true objectivity is not helped by pretending something does not have emotional, meaningful aspects. Yes, religion has been used as a major force in manipulating people (as has politics, etc.), but we humans have (without attempting to define "spiritual" here, which would take us too far afield) important spiritual needs, and

I've often made the point that (scientific) parapsychology is to spirituality as physics is to engineering. Physics provides us with basic knowledge about materials and their properties, and engineering, using this knowledge, creates useful structures and processes. Parapsychology, at this stage of our (still primitive) knowledge, tells us there is more to the human mind than is explicable in current physical terms, so a wholesale denial of any reality to spirituality because it doesn't make physical sense is not a scientifically valid conclusion: Religions and spiritual paths may be pointing to and constructing useful processes and ways of living.

I wrote about progress above: ". . . my general impression is that, except in certain areas, we haven't really made much progress . . . ," and I would like to balance that with a few outstanding examples of progress, but I'll limit myself to one in the space available here. A handbook must, of course, cover a whole field, not just the parts I find most promising and interesting, but . . . The outstanding progress, in my personal opinion, has been the development and application of the remote viewing procedure.

There are many things that are obvious in retrospect . . . but it took us a long time to think of them. Trying to use psi to identify abstract symbols with no direct meaning—cards, numbers—which has been the procedure in various forms for most of the field's history is, if you think about it, pretty boring. Indeed I find it rather amazing that percipients can attach enough temporary meaning to success in guessing cards or numbers to score significantly above chance. But, of course, it's a very convenient way to study psi in the laboratory and precisely quantifiable. Too, parapsychology, like psychology, is, as I often half-tease colleagues, the study of the college sophomore by former college sophomores for the benefit of future college sophomores, and you don't make it through college without being able to, at least temporarily, believe in the importance of abstract symbols and numbers. . . . But, insofar as we are products of our evolution and history, abstract symbols are very late comers in human history, and what's always been really important to know is *what might be around the next bend in the trail?* Something you can hunt and eat? Something that's liable to hunt and eat you?

Remote viewing, trying to describe with words or sketches, some hidden place or process that's going on or will be going on (precognitive remote viewing) around that metaphorical next bend in the trail, is much more like what's important to us. Fortunately, blind matching tests now let us give relatively objective probability estimates of how successful a given study is, and we now have many laboratory demonstrations of how often remote viewing can work and work well. That work, initially focused at the Stanford Research Institute (now SRI International) by physicists

Harold Puthoff and Russell Targ, and continued by physicist Ed May and colleagues, has given us many rigorous demonstrations of this form of psi (see Targ & Puthoff 1977, Tart, Puthoff, & Targ 1980, Tart, Puthoff, & Targ 1979 as examples). Also very impressive to me has been the practical application of remote viewing technology, independently developed around the same time by Stephan Schwartz for archaeological work (Schwartz 1978, 1983). Asking several remote viewers to find the location of certain types of artifacts in Egypt while they are in the Western Hemisphere, e.g., separating signal from noise by averaging, doing this on an increasingly smaller scale and looking for areas of agreement, and then going to Egypt or other distant sites and successfully digging up such artifacts is—a scientific term is not sufficient here—mind-blowing!

Similar remarkable successes occurred in the Army's applied remote viewing program, inspired by the earlier research. Quite aside from all the statistical evaluations, one example I often think of is two Army remote viewers (Joseph McMoneagle and Hartleigh Trent) who were simply given a set of geographical coordinates. This was before everybody had Google Earth or other mapping systems on their cell phones. The coordinates were somewhere in Siberia, a very, very big place with hardly anything in it, to put it mildly. The viewers correctly described some factory buildings. The intelligence agency that tasked this viewing said that was correct, they could see that from satellite photos, but they wanted to know what was in the buildings. The viewers remote viewed again and described a gigantic submarine being built, three times as big as any existing submarine.

The tasking agency considered this nonsense. Building such a gigantic submarine was not feasible, and besides these factory buildings were well back from the ocean. McMoneagle (personal communication 2016) tells me the remote viewing unit got a note back from Robert Gates, Secretary of Defense, saying "Total fantasy." Angered, McMoneagle said "They will launch the total fantasy 112 days from today." He added to me, "They launched it 114 days out." It was indeed the world's biggest submarine, literally three times as big as others, and satellite imagery showed it was launched through a canal that had been dug from the factory to the Arctic Ocean.

That politics was allowed to cancel U.S. government support for remote viewing research strikes me as a major tragedy, for it was indeed a very useful source of intelligence, and intelligence tends to deter aggressive military actions. If you know they're waiting for you around that bend in the trail, you'll probably take a different path. If they know that you may know they are planning a surprise attack, they will probably not do it, having lost the advantage of surprise.

To my disappointment, remote viewing is only one topic of many in the new *Handbook* and it tends to be treated in a relatively abstract way rather than presenting mind-blowing examples like this. . . . But, as I said, a *Handbook* is obligated to cover a whole field, there is only so much space, and within these limits it is an indispensable guide and first class work! Despite little research funding and irrational barriers to scientific acceptance, a lot has happened in the almost 40 years between the publication of the two handbooks.

New Directions?

I do not believe that the *only* way to make any progress in understanding reality is through the strict application of logic and with an overwhelming physicalistic bias in science. I've argued, for example, that the development of state specific sciences (Tart 1972), giving us other ways of perceiving and thinking about the world, may lead to important discoveries and understandings. I also think the hidden psychodynamics that people have with respect to psychic phenomena produces strange effects in the field that inhibit real progress in parapsychology.

As a specific example, in the 1970s I was continuing classical parapsychological research on multiple-choice guessing, as was so well-embodied by card-guessing tests, but adding an element of immediate feedback so there would be an opportunity for *learning* to use psi abilities. My analysis of standard card guessing, done without immediate feedback in many studies over the years (Tart 1966), was that it was exactly the same as standard psychological *extinction paradigms* for any ability, so it was not surprising that the *decline effect,* lower and lower scoring down to chance with repeated testing, was common in parapsychogical experiments. My initial results (Tart 1976, 1983) were quite encouraging, but within a couple of years, after hearing about the SRI remote viewing research, I basically gave up that line of research. The more successful examples of remote viewing from SRI that I had heard about, although not capable of being well-quantified, suggested a much higher level of routine psychic functioning than you get in multiple-choice tests. I then spent a year consulting on the SRI project, and never really went back to multiple-choice guessing, even though I think it has some value.

While I was speaking with Russell Targ, one of the originators of the SRI remote viewing paradigm, he once mentioned his previous work as an engineer/physicist in developing lasers. Particularly that while most researchers could only get extremely low power outputs from lasers, his team developed a laser that would drill a hole through a firebrick! This was a jump way above everything else in laser research, and other laser researchers

quickly began to copy and further develop his techniques. So surely, since the remote viewing procedure was routinely producing so much more psi than almost all other forms of ESP research, most parapsychologists would become involved in using the remote viewing procedure?

To my surprise, only a few other investigators took it up, and that included very few who came from what we might call the orthodox style of parapsychological research. Since I had argued for years that the low reliability and very poor signal-to-noise ratio in ESP prevented real progress in understanding its nature and applying it, I couldn't believe that most people wouldn't have an intense interest in something that markedly raised the level and reliability of psi functioning.

That's still the case today. There is little remote viewing research, even though I think it's proved its viability (given the right experimenters) and its practical application.

If I were a skilled psychoanalyst and had done extensive psychoanalysis with all the active researchers in parapsychology (not very many, sadly), I suppose I might have some pretty specific clues as to the dynamics of this avoidance of success. I've hinted at some of these factors (Tart 1984, 1994), but they are just guesses at this point in time, parapsychologists have not been tested with in-depth psychological assessment techniques.

I'm not an psychoanalyst, of course, and, as I mentioned above, while the resistance is beginning to lesson a little, by and large most parapsychologists seem to believe in the objective experimenter who has no particular part to play in experiments with psi. Resistance to the idea of the experimenter as a potential independent variable, a possible source of bias, is very strong in mainstream psychology, too. This simply does not compute for me. You can't do a psi experiment without postulating as a working hypothesis that there is an unknown information transfer channel between people that we know little about, have no idea of how to block, and which can certainly transfer information back and forth between the person designated as the "experimenter" and the person designated as the "percipient" or "subject." So if you don't "calibrate" the experimenters and take those factors into account, how can you hope to begin to understand what affects the functioning of psi?

So as I said at the beginning of this essay, there's certainly been significant progress in parapsychology, but it's still a long way from a satisfactory understanding of psychic functioning. The new *Handbook* covers most of the tools needed to research psi, but it does not deal much with the question of the experimenter. I'm hoping things will change by the time the next handbook is published.

Charles T. Tart

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ESSAY REVIEW

The State of the Art of a Tough Place in Science and Psychology, Parapsychology

Parapsychology: A Handbook for the 21st Century edited by Etzel Cardeña, John Palmer, and David Marcusson-Clavertz. McFarland, 2015. 424 pp. $65 (paperback). ISBN 978-0786479160.

Handbook of Parapsychology edited by Benjamin B. Wolman. Van Nostrand Reinhold Company, 1977. 967 pp. $25 (paperback). ISBN 978-0442295769.

Is it fortunate, fortuitous, or foreboding that this book emerges from the shadows of the publishing world even as the embers of the Daryl Bem "feeling the future" controversy are still aglow? Whatever the case may be, and whatever your view of the data at the center of it, many thanks are due Daryl Bem for opening up the tough and much-needed conversation about the nature of science, methodology, statistics, replication, meta-analysis, and, yes, prejudice, via his now well-known *Journal of Personality and Social Psychology* article (Bem 2011). Moreover, I am reminded of P. T. Barnum's wily wisdom, "I don't care what you say about me, just spell my name right!" During the writing of this review I had a chance encounter with a young man in his third year of Ph.D. studies in psychology at a large state university. When I mentioned my own special interest in parapsychology, he asked, "What's that?" But as soon as I started to tell him " . . . telepathy, clairvoyance, . . . ," he blurted out, "Oh, the Bem stuff!" Thank you, Daryl Bem! And I for one am looking forward to the rounds still to come (Bem, Tressoldi, Rabeyron, & Duggan 2015).

Thanks also to editors Cardeña, Palmer, and Marcusson-Clavertz for their service in putting together this arguably controversial volume, *Parapsychology: A Handbook for the 21st Century.* For those who are brave and confident enough to go to the tough places in science and psychology, with an open mind, this book is just your ticket. All of the issues raised by the Bem-o-versy are here, and much, much, more.

This book needs no introduction to scholars whose interests wander along the frontiers of science where controversy and opportunity dance.

It's a sequel of sorts, a re-examination of the current state of the art in the realm of parapsychology. The original, Benjamin Wolman's *Handbook of Parapsychology* published in 1977 (Wolman 1977), with associate editors Laura Dale, Gertrude Schmeidler, and Montague Ullman, will hereafter be referred to as "HB77." The 34 essays in HB77 detailed the findings and ruminations of 30 very smart, respected scholars who represented their respective disciplinary perspectives, heavily weighted toward psychology. Wolman's book was a watershed moment in the history of parapsychology (hereafter called "ppsych"), and became a classic read as a comprehensive introduction to the field. This update, hereafter referred to as "HB21st," is edited skillfully by Etzel Cardeña, John Palmer, and David Marcusson-Clavertz, and is an instant classic in this enigmatic and diverse area of study, a "must-buy" addition to one's personal, university, and institutional libraries, and a great gift for a few selected colleagues. They won't be disappointed.

So, what is the current "state of the art" in this enigmatic area of study? How have things changed since HB77? What's gone "viral," and what's succumbed to the virus of time? To get the reader started, the editors provide an exceptionally comprehensive and readable overview of this book and its content, appropriately titled "Preface: Reintroducing Parapsychology." Kudos for opening with the famous Mark Twain quote, "*The report of my death was an exaggeration.*" The editors point out its poignant relevance to the health of parapsychology impishly, but proudly, with tongue in cheek, but there's more to it. Samuel Longhorne Clemens (Mark Twain) was 37 years old when the British Society for Psychical Research (SPR) was founded in 1882 for scientific study of the big questions surrounding life and death. He—like all of us—was no stranger to the need for such study. For example, a few years later (1896) the first of Clemens' three daughters died prematurely, in her early twenties, reportedly plunging him into depression, and drawing the Clemens family into séances, of which Twain wrote equivocally. He would eventually became a member of the SPR (Dunne 2014). This excellent opening reminds me of the big, life/death questions upon which parapsychology was founded, and the noble goal of addressing them via science rather than by religious doctrine, a fact easily buried by the din of debates on p-values, effect sizes, and the possible functions of human psi.

The Preface begins with some basics—"what is parapsychology?"—using an information processing framework. Then the editors jump head-first into the tricky topic of terminology, seemingly endorsing the suggestion of Ed May and colleagues to use AC (anomalous cognition) for ESP, AP (anomalous perturbation) for micro-PK, and then adding their

own proposed term of AF (anomalous force) for macro-PK. But the reader soon discovers that individual contributors to this volume tend to use their own idiosyncratic terminology anyway. This is the first indicator (in this book) of a major feature of parapsychology that will show itself over and over in this volume: its *diversity*! The editors correctly state that although parapsychology is often portrayed as an independent, separate discipline, ". . . it is more precise to think of it as a transdisciplinary topic . . . relevant to a number of disciplines." Its research business extends beyond the so-called "psi hypothesis."

The Preface points out differences between HB21st and HB77. The chapters do match up somewhat, but it's definitely not a one-to-one correspondence. This can best be seen in a specific topic such as psi-mediated experimenter effects, or experimenter psi (aka "Epsi"). In HB77, Rhea White introduced a new topic in a chapter entitled The Influence of Experimenter Motivation, Attitudes, and Methods of Handling Subjects in Psi Test Tesults (HB77:273). In it, she planted a flag, stating ". . . there could hardly be a more significant area of investigation than the role of the experimenter." White focused upon experimenter's attitude, motivation, and methods, but specifically excluded "psi-mediated experimenter effects" (p. 273), due to lack of space. HB21st editors point out in the Preface that parapsychologists in 1977 were uncomfortable with this topic, for what it implied about laboratory psi results. Stanford's psi-mediated instrumental response model had yet to take hold, and the *implicit* versus *explicit* psi distinction (a feature of HB21st) was not commonly employed. To pick up on White's HB77 chapter, HB21st has a split chapter (Chapter 22, Experimenter Effects in Parapsychological Research), in which two authors (John Palmer, Brian Millar) contribute back-to-back essays that first extend and update White's HB77 piece and then proceed into the more fully bloomed topic of experimenter psi, or Epsi, to pave the way for Millar to wax eloquent on theories, logical issues, and prospective ways to assess or at least "fingerprint" the Epsi, and conclude that Epsi is the "*crucial* determinant" of results in ppsych research (p. 299).

Interestingly, Chapter 1 (An Overview of Modern Developments in Parapsychology), by Zingrone, Alvarado, and Hovelmann, makes no mention of post-HB77 research relevant to psi-mediated experimenter effects, and cites only one study of experimenter effects. They make no reference to the remarkable Schlitz/Wiseman series (which directly compared two experimenters with opposite outcome histories). However, Stefan Schmidt's Chapter 18 (Experimental Research on Distant Intention Phenomena, p. 248) includes a detailed summary of it, and Sheldrake's Chapter 27 (Psi in everyday Life: Nonhuman and Human, pp. 359–360)

provides another, this time in the context of responding to skeptical claims regarding the "sense of being stared at." Thus, HB21st shows that Epsi is a relatively new topic which has taken root, spawned a number of published research studies, and been discussed and debated; and has now been added to the "lore" of ppsych, the growing, throbbing body of facts in search of more elaborate explanation. Clearly, parapsychologists no longer avoid Epsi, but have embraced it. And just as clearly we can see the diversity of the field even in this sound bite.

One tangent off this issue is worth a quick mention here. Cardeña and Marcusson-Clavertz briefly cite the Schlitz/Wiseman series in their Chapter 9, States, Traits, Cognitive Variables, and Psi, in a short section containing a strong suggestion that strikes my personal narrative and schemata as just right. They write, ". . . one of the most neglected areas in the study of consciousness is the interactive, interpersonal process involved in the co-creation of conscious experience" (p. 111). They bemoan the fact that we are very far from having developed a systems approach to psychology or parapsychology, and complete this thought with an insightful suggestion, ". . . the concordance between researcher and participant conscious experience requires investigation . . . rather than assuming that psi phenomena reside only in either the participant or the experimenter" (p. 111).

Some Disappointments

I'd like to register a few of my disappointments with this book right away. HB21st comes in a large-format paperback so commonly seen on college bookstore shelves these days. It's attractive and appears solid enough, but over the months I've spent reviewing it, it lays side-by-side with the hardbound HB77 (1986 McFarland edition). After a few months, the brand new ($65 list price) HB21st is nicked and scratched and dog-eared—though still very readable—while HB77 still looks as if it came off the press yesterday. On the other hand, HB21st has an alternate format, an e-book version, which Amazon sells for less than $25. Call me ol' fashioned, but I'm still partial to the stanchions of my library being hardbound.

There are more typos than I'd expect in a book of this sort. The Index is rather poor. A few paragraphs above, I outlined a thread on Epsi (experimenter psi) that runs through HB21st, which would have been so much easier for me to trace using a more complete index. For example, "psi meditated" only appears for "psi mediated instrumental response (PMIR)," and "experimenter effects" only branches to three subtopics (behavior, checker effects, expectancy). Unlike HB77, this book has no glossary, arguably a vestigial organ in the smart-phone era.

Although the topics squirreled into the 31 chapters of this volume are comprehensive and clearly and thoughtfully justified in the Preface, I had trouble with Chapter 26 on Electronic Voice Phenomena by Mark Leary and Tom Butler. I admit to a personal bias on the issue of EVP. It is in part due to a visiting researcher at the Psychical Research Foundation (PRF) at Duke University, where I worked with Bill Roll during the 1970s. This researcher (from University of Adelaide, Australia) was a professor of electrical engineering with a keen interest in EVP, and after 6 months of intensive study he was forced to conclude that its inherent unpredictability makes it unsuitable for scientific study. Forty-odd years later, I can agree wholeheartedly. There's a mis-attributional flaw common to EVP, haunted house investigations, astrology, synchronicities, and other circumstances which I've come to call *post-diction*. It results from combining a priori theories with post-hoc observations. It works like this: Some big event occurs, e.g., a boy gets into a fight at a local bar and gets arrested and put in the slammer. An astrology enthusiast who knows the boy then checks his chart and says, "Oh, of course! Mars went retrograde right at that time!" So what's the probability of *that* happening? I say, "100 percent." Another example: A particular house is reported to be haunted, so a ghostbusting team makes an investigation and records unexplained voice-like sounds and unusual streaks in the photos they take. What's the probability of that happening? Again, 100 percent, because it *did* happen, making it a post-hoc observation. Similarly, a person listens to a recording of type 1 (transform) or type 2 (live-voice) EVP (p. 341) and hears a voice-like sound, with post-hoc probability of 100 percent, so where is the science? Leary and Butler have done a nice job explicating the state-of-the-art of EVP, I believe, including a nice discussion of pareidolia (perception of random or vague stimuli as meaningful), and trying to link it to parapsychology (PK maybe?). It's not at all clear that there's any phenomena at all to investigate, as the authors themselves recognize, "The question is whether all purported EVP are due to pareidolia, and the answer is that we simply do not know" (p. 344). The same is true of astrology, which has no chapter here, and for ghostbusting forays into haunting phenomena.

This does, of course, bring up the issue of what is the difference between the popular ghostbuster type of activity that is commonly seen on TV, and the scientific investigation of haunted houses as done in psychical research, such as Michaeleen Maher describes in Chapter 25, Ghosts and Poltergeists? First, RSPK (aka poltergeists) clearly have psi phenomena associated with them—documentable physical, acoustic, energetic events that defy normal explanation. Haunting phenomena are complicit with RSPK, sometimes including both subjective (EVP-like) and objective events, and both RSPK

and hauntings have been found to display such patterns as "phenomenal shyness," repetitive sounds, electrical malfunctions, and person and place focusing. Thus, haunting investigations which include RSPK-like patterns, or include objectively observable events, or are investigated using quantitative methodology (see p. 331) go beyond the usual ghostbuster's post-hoc observations. (See also some of my further thoughts on this topic in Solfvin 2016.)

Diversity

What Bem calls "feeling the future" or "anomalous retroactive influence," Radin/Pierce call "presentiment," and Julia Moss calls "anomalous anticipatory phenomena" (Moss 2013). Stephen Braude finds the use of "anomalous mental phenomena" to be an "absurd" synonym for what has traditionally been called "psi" (p. 259). Several others authors mention or discuss terminology issues in ppsych. Diversity, diversity, diversity!

I applaud the editors of this tome for their attention to diversity in ppsych since 1977, and in the opening Chapter 1, An overview of Modern Developments in Parapsychology, I applaud authors Zingrone, Alvarado, and Hovelmann for endeavoring to ". . . venture beyond the Anglo–American focus of the original *Handbook*." After a tour-de-force summary of ppsych research and institutional trends since 1977, spanning topics, approaches, disciplines, and social trends, they conclude that ppsych is ". . . more varied, more interdisciplinary, and more international," than earlier (p. 23). However, it's not enough for my money. If ppsych is to survive and grow as many of us would like it to, it would be wise to embrace diversity far more than is evident here. Let's consider the lack of Asian perspectives, especially Indian. I searched the main Index for "yoga" or "Sutras," or "Patanjali," or even "K. R. Rao," all of which appear in this tome, but none made it into the Index (although "*Siddhis*" is there). This is despite the fact that some parapsychologists have been deeply influenced in profound ways by yogic material, especially Patanjali's Yoga-Sutras, as Serena Roney-Dougal points out in Chapter 10, Ariadne's Thread: Meditation and Psi. In Chapter 5, Emily Kelly and Jim Tucker point out that ". . . the association of psi, or siddhis, and mystical experiences, particularly as expounded in the yoga-sutras of Patanjali, led psi researchers to adopt conditions conducive to the latter in ganzfeld research." (Obviously, they are referring to Chuck Honorton.) William Braud, to whom this book is dedicated, wrote articulately about the usefulness of viewing parapsychology through the eyes of Patanjali Yoga-Sutras. Braud (2010) pointed out that ". . . the possible effects of asana [postures] and pranayama [breathwork] have not been directly assessed in formal psi research," suggesting that this

may be fruitful. But Braud also points out that parapsychologists who are simply looking for techniques that will help yield more psi in their labs are missing an important point. There are several ethical questions that need to be addressed first. A serious student begins exploring yoga not to acquire "powers" (siddhis) but to understand oneself and reality, with yoga-sutras as a guide. The powers that a parapsychologist is interested in are said—by yoga-sutras—to be detrimental to the serious individual's primary aim. What is the ethical obligation of the parapsychologist who encourages the devotee in this direction?

Further, Braud suggests that some psi research ". . . might be likened to stealing jewels from temples" (Braud 2010:255), which raises more ethical issues. In the 1970s, David Rogers reported that a patient was admitted to the state mental health center (where Rogers was employed) in a paranoid panic due to fears that others could read his thoughts. The patient had just visited the Institute for Parapsychology (in Durham, NC), where he was told he got a positive score on a telepathy test suggestive of telepathy. Leaving the building, he panicked to think that strangers could read his mind, and hours later was brought to the state mental health center where Rogers was on staff. This opens an ethical question which parapsychologists have yet to fully pursue.

On the same page as above, Braud points out another dimension of this issue related to the increased interest in experimenter effects—psychological and/or psi-mediated—that this volume documents. According to the yoga-sutras, ". . . by engaging in yogic practices themselves, investigators might more thoroughly acquire the preparation and adequacy that might allow them to plan and conduct their psi research projects more creatively and interpret their findings more accurately and effectively." Braud himself is an outstanding example of a researcher who clearly demonstrated his ". . . preparation and adequacy . . . " in his laboratory.

Thus, the yoga-sutras reflect an entirely different way of conceptualizing the problem of producing psi, on demand, in a laboratory setting. The psi researcher who goes to the yoga-sutras seeking a quick fix to increase psi scoring in his/her lab, is like a man who brings his puppy to a dog school expecting to pick him up later, fully trained. It may be hard, at first, for the man to accept that *he and the puppy* need training, and that this process may require some fundamental changes in both.

My concerns about diversity are driven by the fear that ppsych may succumb to those natural monistic tendencies that, if unguarded, move corporate endeavors toward one single, correct way of doing/thinking/seeing things. So even as we rail against the monistic monolith of *materialist science*, for which ppsych is the rebel group, we must also be wary of monism

within ppsych. A good read to remind one of the importance of diversity in science is provided by Hasok Chang (Chang 2012), Hans Rausing Professor of History and Philosophy of Science at the University of Cambridge, UK, who has become an articulate advocate for scientific pluralism. He points out, for example, through the words of American philosopher Hilary Putnam, "Classical thinkers saw diversity of opinions as a sign of decay and heresy; only since the Enlightenment have we been able to see it as a positive" (quoted in Chang 2012). Chang proposes "complimentary science," employing history and philosophy to ask questions that specialist science cannot, such as why science accepts certain untested assumptions that bring a bit of dogmatism and narrowness of focus that may be injurious to scientific progress. In his books, Chang documents specific instances in which scientific progress was hindered by this monistic tendency. Diversity, Chang assures us, is healthy for scientific discovery, while the side effects of monism can sometimes work to stifle its growth.

Basic Concepts

Even though Chapter 1 missed the mark on Epsi, this "overview of developments in parapsychology" since HB77 provides an excellent kickstart to readers of HB21st. Zingrone, Alvarado, and Hovelmann rush through a ton of material, rarely stopping to take breath, but it's all there. They touch upon ppsych's topics and approaches, connections with other disciplines, conceptual frameworks, methods, criticism, and even give a brief tour of institutions, funding, journals, and educational issues. I was happy they took a breath long enough to say a few words about Lucadou's intriguing model of pragmatic information (MPI), a bold attempt at uniting "meaning" with quantum entanglement to help explain spontaneous psychokinesis, and one of several "pointers to the future" that will be found in this book.

I'm also delighted to see Chapter 2, Ed Kelly's Parapsychology in Context: The Big Picture, for which HB77 has no precedent, used here as part of the introductory, ground-laying section of HB21st. It is a brief summation of his monumental *opus magnus*, *Irreducible Mind* (Kelly, Kelly, Crabtree, Gauld, Grosso, & Greyson 2007). Kelly gently but convincingly tills the field within the reader's mind for the healthy planting of the subsequent chapters. He explains ten types of "rogue" phenomena, which a purely *materialist* science (or ontological physicalism) is unable to explain. Many of these have been dug up by earlier parapsychologists, Dr. Rhine's ESP or psi phenomena among them. Kelly points out that some mainstream scientists misperceive these phenomena as threats to scientific rationality and progress. Ppsych holds exactly the opposite—these *phenomena* are not

threats to science but the failure to include them is. This may explain why ppsych is caste off prejudicially to the gutters by some scientists even while being cheered and supported by others.

The "basic concepts section" of HB21st completes with Douglas Stokes Chapter 3, The Case Against Psi, and I'm so glad that it's not one of those blatantly "missionary" attempts to convert rather than inform the reader. (Such blabbering occurs, sometimes, on both sides of the podium in the so-called "skeptic–parapsychologist" debates.) Rather, Stokes recounts his personal journey, including four decades of involvement with parapsychology, which moved him from agnosticism (regarding existence of psi) to full-fledged atheism, or "to the psi equivalent of radical Unitarianism." I am stumped and a bit confused by his choice of words, but as I read his chapter it all becomes clear. This really is an every-parapsychologist story, citing the very real frustrations, such as the methodological flaws, possibility and temptations of fraud, data selection issues, and the gnarly repeatability problem. This is a familiar scenario, and Stokes writes, after years of clear and patient rational consideration, "The pattern of experimental results is exactly what would be expected if there is no psi." And he concludes that "the only rational conclusion is that psi does not exist."

I can relate to this because I went through it, too, like everyone else in ppsych I suppose. I have several personal friends who left active involvement with ppsych for similar reasons. At some point I realized that there's no need to make a final decision on this global yes–no question which for Stokes and others became inflated like the milk in a bottle left on the doorstep on an icy night. Something's got to give, they say. But like William Braud, I've tasted enough Eastern philosophy to accept the power of "not-knowing," of nondualist thinking, of *embracing mystery*. At some level, Stokes, too, remains equivocal. He tacks on another sentence after his "rational" conclusion, "However, at times I wonder if I am really rational." And his final paragraph is overwhelmingly positive, and reveals the "keys" (e.g., spontaneous cases) that could in the future nudge him in another direction. This is *skepticism* at its BEST! This is the *pluralism* that is so much needed in science!

Research Methods

Methodology is covered much more completely and readably in HB21st than it was in HB77. Chapter 7, Statistical Guidelines for Empirical Studies, by Tressoldi and Utts is particularly impressive, a go-to resource that meets the researcher more than halfway. Perhaps we should call this retroactive, anticipatory, presentiment of researchers' future needs, written in plain language, covering all of the future issues/questions researchers will have.

It covers the latest standards that came out of the APA uproar at the turn of the century (APA Board of Scientific Affairs 1999), explaining the limits and alternatives to null hypothesis significance tests (NHST), plus sections to explicate and advocate knowledgable use of Baysesian methods, effect size, power analysis, handling "outliers," as well as methodological and statistical recommendations. There is a strong recommendation for pre-registration of hypotheses, a recommendation which stipples this tome like dandelions across a meadow. Tressholdi and Utts touch all the important bases in this chapter, and it is a great improvement over its technically accurate but narrowly focused Kelly and Burdick predecessor chapter in HB77. Utts' successful textbook authorship career shows to advantage here, with comprehensive, readable, practical, soup-to-nuts coverage from basic to relatively advanced topics. I can't say enough about this excellent chapter!

John Palmer's Chapter 4, Experimental Methods in Anomalous Cognition and Anomalous Perturbation Research, provides a good argument for the use of this book, in whole or in part, as an introductory textbook for a college course in parapsychology. This chapter, if read carefully, provides the student with sufficient background to actually select, plan, and carry out a first experiment. That said, readers who've already mastered basic research skills in parapsychology may want to skip or just scan this chapter. Readers with research experience in other disciplines may also want to scan the early sections, but will be wise to attend closely to the latter half to fully grok the unique issues that ppsych presents to the researcher.

In Chapter 6, Graham Watkins provides a relatively short essay on Macro-Psychokinesis: Methodological Concerns, and suggests interesting results in the past and some pitfalls to avoid in the future. Although it provides good hammock-reading, with Watkins' homey style, it's the weakest in the methodology group. There are no great insights here but some practical suggestions and generally positive encouragement for the prospective researcher. While Watkins does point out some difficulties with studying special subjects such as Swami Rama, or controlling observation of movements of a so-called "psi wheel" (p. 80), this chapter presents a relatively uncritical view of some things, such as William Bengston's healing studies.

The big surprise here is Chapter 5, Research Methods with Spontaneous Cases, by Emily Kelly and Jim Tucker. This is a delightful and stimulating read. Kelly and Tucker begin by taking Louisa Rhine to task (author of the HB77 chapter on spontaneous cases) for devaluing her own spontaneous cases work as "peripheral" to the more important experimental research of her husband (J. B. Rhine) and others, and placing too much emphasis

on the value of "proof." They throw down a manifesto of sorts, and argue convincingly for elevating the scientific status and use of spontaneous case collections. Spontaneous cases provide an ethology of psi phenomena, re-invigorate our interest in volition and brain–mind relations and consciousness, and help prevent us from wallowing in the ditch of the study of "anomalies" when the real target—they assert—is the incompleteness and inadequacy of the physicalist model that dominates science. They point out forcefully that a considerable portion of "great" science emerged from uncontrolled naturalistic observation, such as Darwinian evolution and Mendelian genetics. I guarantee that the reader will leave this chapter with a far different view of spontaneous case research than what they had when they entered it. They may also leave, as I did, with a distinct feeling that more great things are yet to come out of spontaneous case research in ppsych.

Transdisciplinary Psi

Proceeding now into the specific content areas of this book, the diversity of ppsych becomes ever more obvious, in content, terminology, and tone. Rex Stanford is one of three contributors who is represented in both HB77 and HB21st. The other two are Ed Kelly and John Palmer. Stanford contributed the two longest chapters in HB77, on experimental psychokinesis and, his most memorable, Conceptual Frameworks of Contemporary Psi Research, in which he articulated his recently developed psi-mediated instrumental response (PMIR) model of psi functioning. In HB21st, Stanford's Chapter 8, Psychological Concepts of Psi Function, is in two pieces. The first six pages are devoted to PMIR, specifically an explanation of seven assumptions of the revised PMIR model which further delineate its implications. The remainder of the chapter, about 9 pages, is devoted to a rather detailed explanation—not a critique but an explique—of Jim Carpenter's First Sight Model and Theory (FSMT). This chapter will be of particular interest to the psychologically minded reader. Both PMIR and FSMT are attempts to bridge or even integrate these two estranged sister sciences. Stanford ends the chapter on that conciliatory note, leaving the reader with a vision of ". . . psi and psychological research as potentially being mutually enhancing" (p. 108).

Chapter 9, States, Traits, Cognitive Variables, and Psi, by editors Cardeña and Marcusson-Clavertz, has no direct reflection in HB77 but pieces together some thoughts on psychological factors and their possible relation with psi performance in a laboratory. This chapter is brief but informative, clarifying definitions, mapping the territory, and pointing out pitfalls in studying such things as psi-related personality traits and states,

altered states of consciousness (ASC) (e.g., hypnosis, trance, dissociation), cognitive style, and belief. Drug and Psi Phenomena are dealt with in David Luke's Chapter 12. It's difficult to catch a central thread of this potpourri chapter, but it is stippled throughout with interesting insights.

The psychology and psi section completes with Serena Roney-Dougal's Chapter 10, Ariadne's Thread: Meditation and Psi. The rapid rise in meditation awareness in the USA and elsewhere, and the concomitant increase in meditation research, make this an especially attractive topic. Roney-Dougal has some excellent suggestions to encourage researchers to add to the admittedly ". . . very patchy . . . " state of the art in this area. She's done part of the work already in supplying useful listings of previous studies.

Other Areas/Disciplines

Two other disciplinary areas in addition to psychology are specifically represented, Part 4—Biology and Psi; and Part 5—Physics and Psi. In Part 4, psychologists Richard Broughton and David Luke pick up where Bob Morris and Charles Tart, respectively, left off in HB77. Broughton's conclusion says it all for his chapter (11, Psi and Biology), and you can almost hear him sigh as you read ". . . a further three and a half decades of admittedly sporadic research in neurobiology and psi have not advanced the field any further than the cautious position of the earlier chapter by Morris." Broughton bemoans the meager yield of the newer neuroscience approach, the neurobiology of psi, which the older physiology of psi has matured into. He's guardedly optimistic about focusing upon the evolutionary context of psi and the adaptive needs it serves, and provides a rather nice overview of the evolutionary framework (pp. 144–145). Luke, on the other hand, concludes his chapter (12, Drugs and Psi Phenomena) much more optimistically, and has a number of tangible suggestions for researchers. I learned two new words in Luke's essay: *parapsychopharmacology*, whose meaning should be obvious, and *apophenia*, which is a perceptual error, "increased tendency to find patterns in apparently random data" (p. 153), and which is not easily distinguishable from *pareidolia*, which Leary and Butler mention regarding EVP (Chapter 26), as attaching meaning to "a random or vague stimulus." And I struggled mightily to *pronounce* many other words as Luke dives bravely and competently into the complexities of neurochemistry. This slightly shortened version of his earlier review (Luke 2012), is excellent, exciting, and humbling all at once, in a good way.

Part 5, Physics and Psi, is a bit of a misnomer since the second of the two chapters (14, Physical Correlates of Psi by Adrian Ryan) is devoted

to the new topic of geomagnetic correlations with psi receptivity spawned by James Spottiswoode's observations. Interestingly, Ryan argues that the relationship between local sidereal time (LST) and effect size in receptive psi scoring is due to seasonal variation, but finds extensive evidence that psi and geomagnetic activity are related. Ryan is therefore ". . . extremely optimistic . . ." about the future of parapsychology, specifically that favorable conditions will be found that yield ". . . medium to large effect sizes . . . "

In the other chapter in this section (13, Quantum Theory and Parapsychology), author Brian Millar agrees with Ryan, at least in that the task of ppsych is ". . . the pragmatic one of learning how psi can be produced with sufficient strength and reliability." In his conclusion he states it again, ". . . the biggest experimental difficulty in parapsychology is to find a stable source of psi," as if there were simply no other way of looking at it—and for him, I assume, there's not. And for Millar, the essence of the problem is Epsi, ". . . who does it—participant or experimenter?" In this we confront diversity (again), in that Cardeña and Marcusson-Clavertz in Chapter 9, as well as (Emily) Kelly and Tucker in Chapter 5, suggest that the ". . . who's doing it?" question may not be the right one to ask at this point. Millar appears to view ppsych in a kind of endless death cycle, and he's quick to lay blame directly on ". . . using the unaided assumptions and methods of psychology. Rather, this approach seems to have mired parapsychology in an endless cycle." Millar offers a solution, ". . . NLTs (OT in particular) offer conceptual and experimental tools to solve this problem." In so doing, Millar provides a fascinating tour of quantum mechanics, non-local theories (NLT), and observational theories (OT) as they might be applied to ppsych research, as well as some interesting suggestions for manipulating feedback, a central feature of NLT. Millar's suggestion of a positive definition for psi is laudable, but its implementation is not at all clear. More interesting and potentially testable, is his suggestion that "reduced within-group variance is a fingerprint for experimenter psi."

Part 6 gathers together the "meat and potatoes" of ppsych, an organizational improvement over HB77. This section consists of eight chapters (15 through 22) and covers ". . . the evidence for psi phenomena across various research paradigms." It includes chapters on explicit AC, implicit AC, AP (micro-PK), AF (macro-PK), and Experimenter Effects in Parapsychology Research (mentioned above, by Palmer and Millar), rounded out by specific chapters on presentiment (Psi and Psychophysiology by Dean Radin and Alan Pierce), and direct mental interaction in living systems (DMILS, Experimental Research on Distant Intention Phenomena by Stefan Schmidt), and on the Global Consciousness Project (Implicit Physical Psi by Roger Nelson). In this section, the diversity of ppsych bleeds

through like shadows on an X-ray, not only in topic but also in approach, method, and interpretation of results.

Of the 13 authors for these 8 chapters, 5 are relatively "new blood." Chapter 15 is an especially impressive introduction of relatively new contributors to ppsych. Physics students Batista and Derakshani teamed up with psychometrician Tressoldi to raise hope for the future of this field. They take a close look at the still-raging ganzfeld meta analysis controversy and take a solid whack at contributing their own analysis to it.

I'll remember this chapter (15) as the one with the longest title, Explicit Anomalous Cognition: A Review of the Best Evidence in Ganzfeld, Forced Choice, Remote Viewing and Dream Studies. It's quite data-intensive, and I suspect may lose some readers as a result. On the other hand, it is written so clearly that it may also have the opposite effect and succeed in gently drawing the data-detail–avoiders into the conversation. In either case it makes me wonder whether this is a foretelling of the future of parapsychology. Will there be room in the future for a J. B. Rhine, who struggled a bit with the psychometric aspects of the research? Or will our great ppsych leaders of the future be drawn from a population whose scientific ruminations tend to run more along sophisticated mathematical/statistical tracks than philosophical ones? And how will this, in turn, affect the direction of parapsychology?

If we take the B-D-T chapter as a taste of the future, it is comforting. They strongly support the preregistration of studies in a trial registry, such as Open Science Network, and KPU registry. They see results in ppsych to date which "merit further process-oriented and proof-oriented research" (p. 211). They also see the need to tighten down methods, and they point to specific suggestions mined from ganzfeld, forced choice, remote viewing, and dream studies that are aimed at boosting replication rates and effect sizes. The eye(s) through which they see ppsych are not jaded but grounded in a near Buddhist-like clarity. They see it as it is, its promise and difficulties, and suggest that further research by open-minded scientists, no matter the outcome, ". . . would constitute significant progress from the current situation" (p. 211).

In Chapter 16, Implicit Anomalous Cognition, John Palmer attempts to clarify the simple-sounding definition of implicit AC provided in the Preface. This page may leave some readers gasping, especially novices to ppsych, but it does point out how definitionally challenged this field is. Palmer notes that the implicit AC concept falls out of Stanford's PMIR model (mentioned above), that psi kicks in to subserve needs without conscious effort, cognition, awareness, or prior knowledge of the need or of psi. Palmer publically ruminates for more than a page concerning selection criteria for implicit AC studies, reminding me of my mother's

colorful expression in times of crisis, "the more you stir shit, the more it smells." Palmer settles on the criterion that participants are *not* instructed to respond as if to a psi task. Bem's study and replications fit this, and Palmer provides an overview of these, including a meta analysis (Tressoldi, Rabeyron, Duggan, & Bem 2014) of 82 studies showing strong overall positive results, apparently a subset of the 90 study analysis by the same authors (Bem, Tressoldi, Rabeyron, & Duggan 2015) with similar results. Palmer is, however, more optimistic about the PMIR studies, which also fit his criterion.

Chapter 17, "Psi and Psychophysiology" by Dean Radin and Alan Pierce is a natural extension of implicit AC, including "presentiment" studies, physiological response to a random future stimulus, a near-twin complement to Bem's precognitive emotional responses. They also cover brain correlation studies (between subject) and brain state studies (within subject). They conclude that the positive overall results of psi and psychophysiology research are promising but few solid conclusions can be drawn at this stage due to heterogeneity. The data do provide general support for the importance of alpha rhythms and right hemispheric involvement, and viewing psi as an innate, unconscious process.

Jumping next to AP (micro-PK) and AF (macro-PK), the authors express positive visions for future research. In Chapter 20, Micro-Psychokinesis, Mario Varvoglis and Peter Bancel give a very readable and complete, historical survey of this specialized area, beginning with thoughtful ruminations on the arbitrariness of the distinctions between macro-, micro-, and bio-PK, pointing out that this chapter, micro-PK, is based upon superficial taxonomy, questionable methods to observe it (probabilistic anomalies), and that it may also logically be interpreted as precognition (AC) instead of PK (AP). In any case, Varvoglis and Bancel examine studies that involve a probabilistic target system for which a participant explicitly intends or favors some predetermined outcome, under the watchful eye of an experimenter who orchestrates and records it all. They discuss Helmut Schmidt's machines and innovations, the PEAR research, especially the failure of the consortium replication, and describe two meta analyses that ground this area of research. They suggest some directions for future research, but admit that we are "very far from being able to claim to understand micro-PK."

In Chapter 19, Macro-Psychokinesis, philosopher Stephen Braude agrees with Varvoglis and Bancel that the micro/macro PK distinction is "shaky." He's also in substantial agreement with Emily Kelly and JimTucker regarding the largely unrecognized, potential positive impact of spontaneous cases for the future of ppsych. His summary of the body of

evidence for "dramatic, observable PK—no matter how we choose to label it," is philosophical, on the nature of eyewitness evidence when examining some older cases of physical mediumship, and then he cites some stunning new cases, of which he's written at length elsewhere (e.g., Braude 2007). I wish that he, like Richard Broughton, would've provided a detailed account of at least one such case.

Of the remaining four chapters in Part 6, I especially enjoyed Stefan Schmidt's Chapter 18 (Experimental Research on Distant Intention Phenomena). Although HB77 had no such chapter, the so-called EDA–DMILS paradigm began—coincidentally—with a paper William Braud presented at the 1977 PA conference. Schmidt covers this topic extremely well, I believe, from its history, detailed description, discussion of meta analyses, summary, and outlook. The reader will also find here, as previously mentioned, a sober account of the Schlitz/Wiseman series. Schmidt is another young researcher who, like Tressoldi, Batista, and Derakshana, seems committed to a ppsych that is built upon a solid objective scientific foundation.

The Rhine school–dominated portrayal of state-of-the-art ppsych in HB77 wants to distance itself from its psychical research roots; HB21st may be seen as re-embracing those roots. The survival research section of HB77 had only 2 contributions, the magnificent but rather narrowly focused essay (on "super-psi" issue) by Alan Gauld on Discarnate Survival, and Ian Stevenson's summary of his (and others') reincarnation studies. What might have been a third chapter in the survival section, Poltergeists, by William Roll, was transplanted to the section on Parapsychology and Physical Systems, which seems especially sensible since Roll's perspective was decidedly on the human causation side of things, as evidenced by his use of RSPK (recurrent spontaneous psychokinesis) to refer to these phenomena. Roll once wrote, "If poltergeist phenomena say anything, I suspect that this is not about spirits, demons, or ghosts but about human personality" (Roll 1972:12).

HB21st has four chapters in its survival research section, and arguably Stephen Braude's macro-psychokinesis chapter (19) might be considered a tacit fifth. Moreover, Ed Kelly's Chapter 2, Emily Kelly and Jim Tucker's Chapter 5, and even Belz and Fach's Chapter 28, reach back in time to revivify and update valuable threads left for us by the early psychical researchers.

Beischel and Zingrone open this surprisingly compelling section with a stunning and inspiring chapter (23) on mental mediumship, which radiates with utter positivity about this line of research, even while fully acknowledging its limitations and past disappointments. Amid the clamor

of "is it or isn't it" background noise, like a rattle in the drivetrain that won't go away, they drive on not really in spite of it, but perhaps because of it. They focus on issues such as the clinical socio–psychological value of mediumship (e.g., bereavement), the golden opportunity for sound and creative methodology advances, and potential usefulness of mediumistic research in other areas of science, such as neuropsychology, medicine, forensics, and consciousness studies. They tread a narrow line here, between cultural norms and materialistic science, to find an utterly attractive positive path toward sober progress in this serious field of science. Any reader with a crusty, black-and-white image of mediumistic research, is likely to find the cure here.

Michaeleen Maher's Chapter 25, Ghosts and Poltergeists: An Eternal Enigma, does an excellent job of updating Bill Roll's HB77 Poltergeists chapter. She goes well beyond it, broadens it with thought-provoking discussion of possible similarities and differences between hauntings and poltergeist studies as well as an impressively comprehensive overview of various theoretical perspectives, however speculative. In this, Maher is a model citizen in Hasok Chang's pluralistic science society via her respectful and nonjudgmental coverage of various theoretical speculations regarding these "spooky" phenomena.

Chapter 24, might best be titled "spontaneous cases of the reincarnation type—or CORT," because other angles, such as clinical, social, or psychological are not discussed here. Or, it might be called "Paean to the monumental life work of Ian Stevenson" since it adds little to Stevenson's HB77 chapter. It's still good reading, like a song you've heard a hundred times that still grabs your attention. It's a must-read for any reader who's unfamiliar with Stevenson's work. The survival research section concludes with the previously mentioned EVP chapter (26) by Leary and Butler. But in light of Hasok Chang's call to pluralistic science, I'm inclined to change my earlier opinion and applaud editors Cardeña/Marcusson-Clavertz/Palmer for including this chapter!

Interestingly, HB77 had no section on "practical applications," but did have a section on "parapsychology and healing" with three chapters by psychiatrists Jan Ehrenwald (2) and Montague Ullman (1), which might be considered harbingers of the later development of so-called "clinical parapsychology," the much needed applied, clinical side of ppsych which is a natural extension of ppsych. HB21st authors Martina Belz and Wolfgang Fach are at the forefront of this movement and contribute a chapter (28), Exceptional Experiences (ExE) in Clinical Psychology, which, together with the 2012 publication of *Perspectives of Clinical Parapsychology*, and supplemented by the recent APA book *Varieties of Anomalous Experience*

(Cardeña, Lynn, & Krippner 2010, 2014) could serve as a foundation for this nascent field. Belz/Fach adapt Rhea White's "exceptional human experiences" (EHE) notion to define exceptional experience (ExE) as: *incompatible with one's explanation of reality*, or *worldview*, in terms of *quality, process, origin*. They provide examples, brief history, and an impressively comprehensive vision of the coming together of clinical psychology and parapsychological research in the service of mental health. The *Institute for Frontier Areas of Psychology and Mental Health* (IGPP, Freiburg, Germany) has long fostered research and counseling services specific to ExE, and Belz/Fach draw upon an IGPP counseling database dating back to 1996 in this chapter. The authors discuss the role of ExE in the classification of mental disorders, help-seeking issues, types of complaints, and ways in which ordinary psychological functioning are affected by them. They also discuss intervention and treatment issues specific to ExE. This is an outstanding chapter, perhaps at times a bit rough reading for nonclinicians but well worth the effort. Clinical parapsychology is a no-brainer supplement and complement to ppsych which has been too long delayed. This chapter may go a long way to changing that.

Rupert Sheldrake's Chapter 27, Psi in Everyday Life, includes spontaneous case collections, reports of premonitions in humans and nonhuman premonitions, studies of "feeling of being stared at," related phenomena, and much about skeptical criticisms and rebuttals. It's a good read, a short summary of Sheldrake's main interests, especially for those unfamiliar with his extensive publications. The applied psi section completes with Smith and Moddel's Chapter 29, Applied Psi, which focuses upon "explicit applications to desired outcomes," such as forensics, police and military "snooping," archeology, dowsing and divination, and investing.

Gerd Hovelmann's Chapter 30 could have been part of the applied psi section, On the Usefulness of Parapsychology for Science at Large. Hovelmann lists a number of important contributions ppsych has made to psychology and science generally. I would have preferred an expansion of his mere mention of Daryl Bem's *feeling the future* publication, into a full paragraph or two of praise for Bem. As I understand it, University of Virginia psychologist Brian Nosek's Open Science Collaboration and his orchestration of attempted replications of a hundred experiments previously published in three psychology journals—of which nearly two-thirds failed!—came about thanks to Bem (Open Science Collaboration 2015). I'm not sure Nosek ever delivered the thank you. Thank you, Daryl Bem!

The final chapter of this book, by senior editor Etzel Cardeña, On Negative Capability and Parapsychology: Personal Reflections, is brilliant. Best for me not to say more, for fear of inadvertently removing a bit of its

polish. Read it! And discover what some already know, that in Professor Cardeña, ppsych has found a youthful, energetic, productive, and articulate emergent leader behind whom to rally.

My Summary

When British psychologist Hans J. Eysenck published a book review of HB77, (Eysenck 1982) he pointed out that ppsych is one of those topics ". . . on which everyone seems to have made up his mind, usually before looking at the evidence." Eysenck wrote that HB77 is "an excellent attempt to review the present state of the art and is to be recommended to anyone interested in this topic, even though it is unlikely to change people's preexisting views." He candidly shared his own view

> . . . that there is stronger evidence for the existence of ESP than for many well-attested psychological phenomena treated in the textbooks, and reading the various chapters in this book has strengthened this belief.

Much the same can be said about HB21st. Moreover, 30-something years later, ppsych is alive and well! It is more diverse now than in 1977. There are new names making impressive contributions, while at the same time an increased respectfulness for past contributions. The subtle maturing of Stanford's PMIR model into the "lore" of ppsych, plays out in a general awareness of psi as an innate, unconscious, and perhaps adaptive process. It also supports an increasingly realistic hope of re-connection with psychology.

In his final chapter, senior editor Cardeña refers to Gertrude Stein's famous quip about Oakland, California, "there is no there there," rejecting its applicability to psi, which I would strongly second. However, Stein's words may be quite applicable to the HB21st picture of parapsychology as a field of research, in a structural way, a *Feng Shui* way. That is, the ppsych of HB77 had a distinct solar-system–like structure with a great sun at the center surrounded by various-sized satellites, at various distances. But the ppsych of HB21st has no such structure, "there is no there there." There's no single dominant theory, method, research group—no style of music to which all must march.

Instead, HB21st reveals a ppsych whose strength is its diversity. The hierarchical predictability of the sun-centered solar system gives way to an army of smaller points of light. And this, according to philosopher of science Hasok Chang, advocate for scientific pluralism, is a good sign for the future of this field of science (Chang 2012). HB21st tells the story of new tools, such as meta-analysis, a re-visioning of spontaneous cases, the

global consciousness project, data augmentation theory (DAT), DMILS, presentiment, and expanded measures of environmental influences (e.g., geomagnetic, electromagnetic, *alla* Spottiswoode, and Persinger), and innovative ways to examine mediumship and Epsi. There are further forays into quantum, NLT (non-local theories), and entanglement models, and renewed focus on the limitations of physicalist science and scientific monism, and on how psi contributes to science at large, and how psi may infiltrate known psychological, biological, and social processes, such as Bem's "feeling the future" adventures or Stephan Schmidt's "helping" in psychological tasks. Amid this garden of new delicacies, one finds, perhaps surprisingly, a trend toward re-attention to ppsych's illustrious past with some of its seminal nuggets of wisdom. One of many connecting threads between HB77 and HB21st, Stanford's PMIR, stands out, now augmented by Carpenter's First Sight model, in reifying the study of psi as innate, unconscious, and adaptive in nature. In all of its diversity, HB21st offers readers a grand vision of ppsych that is contagiously positive.

Not everyone, perhaps, will see it.

> Everything has beauty, but not everyone sees it. (Confucius)

And what about the "stuff" of ppsych? As senior editor Cardeña asserts, there's little question that there's *something* there, but what? Keeping an open mind means, paradoxically, abiding knowingly in uncertainty and embracing *mystery*. Nobel Prize winner Andre Gide wrote, profoundly, "Believe those who are seeking the truth. Doubt those who find it." But can a field of science continue on without definitive, proven-beyond-the-shadow-of-a-doubt "stuff" which it studies, and which hasn't a satisfying, positive definition? I don't know. But there are interesting, suggestive precedents for this in neighboring sciences, which Cardeña points out in Chapter 31. My favorite is *placebo* and its associated *placebo effects*, a transdisciplinary topic around which many scientists have gathered (Finniss, Kaptchuk, Miller, & Benedetti 2010). A few years ago, Harvard Medical School launched the first multidisciplinary institute dedicated entirely to placebo study (Program in Placebo Studies and the Therapeutic Encounter, PiPS) (Feinberg 2013). The parallels are impressive: Psi and placebo have both resisted attempts at universal, positive definition (both tethered to "no normal explanation") (Howick 2016); and there's no widely accepted measure of individual differences for either (Frischholtz 2015).

Be clear—psi is not placebo, or vice versa! However, it's a relatively wealthy neighbor whose better funded adventures are important for ppsych to keep track of. For example, significant progress is being made by paying

attention to the social and psychological context from which placebo effects are born, such as *meaning* and the *therapeutic relationship* (Frisaldi, Piedimone, & Benedetti 2015, Moerman & Jonas 2002).

> What has emerged from the recent insights into . . . placebo . . . is that the psychosocial context around the patient and the therapy, which represents the ritual of the therapeutic act . . . may change the biochemistry and the neuronal circuitry of the patient's brain. (Frisaldi, Piedimone, & Benedetti 2015)

A close reading of HB21st shows trends in less-well-funded ppsych that align with this, such as a call for systems thinking, and one of reducing emphasis on gold-standard proof or "who's doing it?" in favor of closer examination of the experimenter–participant relationship. Placebo research is throwing money at a deeper understanding of the relationship between clinician and patient, to find ways to enhance the placebo—not as a separate treatment, but to catalyze the active part of any treatment. The exciting part of this tiny snippet, to me, is that it offers an additional (not a replacement) vision of psi to complement the information processing model with which we are familiar, specifically a vision of psi as a *process*. Perhaps there's some traction for ppsych in studying psi as either a "force" with a unitary (finite) source, the origins of which ("who's doing it?") were the primary focus of the ppsych of HB77, or alternatively (complementarily) as a complex synergetic *process* whose hidden source resides in a network of unknown dimension.

Reading between the lines, HB21st seethes with the subtle energy of subdued action. The overall picture I got from HB21st is a strange mixture of fascination, eagerness, knowing and not-knowing, with a palpable trace of frustration at its core. The ppsych of HB21st, unlike its rather staid, controlled, predictable predecessor, is more like a furnace of not-yet-focused energies, preparing to heat up the world. All the fuel is there, waiting to be channeled. In the final analysis, the ultimate question is how much are YOU, the reader, willing to contribute to this field?

Jerry Solfvin

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ESSAY REVIEW

Discoveries and Discoverers

A Monstrous Commotion: The Mysteries of Loch Ness by Gareth Williams. London: Orion, 2016. 365 pp. ~$20 on Amazon shipped from UK (hardcover). ISBN 978-1-4091-5873-8.

Readers should be aware that this reviewer is mentioned at several places in this book, not always in a complimentary fashion.

What do the personalities of those who assert something tell us about the possible validity of what they assert?

On scientific issues, nothing, really. As I. J. Good was fond of saying, geniuses are cranks who happen to be right, and cranks are geniuses who happen to be wrong. Both exemplify stubborn persistence and a refusal to be swayed by critiques coming from lesser minds. Sheer luck plays a huge part in scientific progress (see, e.g., Stephan & Levin 1992). Nasty people can make significant scientific advances (see, e.g., such insightful novels as Balchin 1949 or Hilton 1947). Albert Einstein was less than nice to his first wife and their daughter. And so on.

In that light, this book is wrongheaded, in effect if not in intention. Gareth Williams focuses primarily on the people who have been drawn into the quest to solve the mystery of what the Loch Ness Monster is. He disclaims making a case for or against Nessies being real animals, and at the end suggests rather vaguely that the question remains open: "a place where almost anything could be hiding" (p. 295). But throughout the text, the book makes a case implicitly against the reality of Nessies by denigrating those of us whom he calls believers and by mis-describing the evidence through the lenses of the debunkers, whom he mis-describes as skeptics.

That is a great shame, because Williams gained access to and shares with readers much interesting and useful new material, notably from the archives of Sir Peter Scott. What he cites would allow an historian or a sociologist to construct a nuanced narrative of people's actions and what that reveals about their cultural context, for example Britain's rigid social caste system that was only beginning to dissipate around the time of World War II.

That would leave aside, of course, the issue of whether Loch Ness harbors a population of large unidentified creatures. Such a discussion

would be in the spirit of the so-called "strong program in the sociology of science," which held that scientific activity should be described as a truth-neutral process: How science gets done should be analyzed and understood without taking into account whether a claim or a research program turns out to be true. That this makes no sense is at last beginning to be admitted (e.g., Collins 2009), just as the associated postmodernist fad of deconstruction has been largely abandoned, in part because it was seen to be a personal attempt by Paul de Man to distract from his pro-Nazi activities (Alter 2014).

In any case, a truth-neutral story about Loch Ness might not have much popular appeal. Most people simply want to know whether Nessies are real, and they are likely to seek clues about that in this book—and thereby they would be greatly misled. *A Monstrous Commotion* is chiefly a collection of asymmetric gossip: disbelievers, debunkers, and fence-sitters are portrayed sympathetically, while committed believers are treated in a manner that verges on sneering. Moreover, substantive evidence is described quite misleadingly by accepting uncritically even highly dubious assertions by disbelievers.

About People

For one example, Roy Mackal is described as a failed academic whose failure could be ascribed to seduction into Nessie-hunting: "From that moment, Mackal's promising career was history. . . . Some believe that Mackal was 'booted out of the biology department'; an alternative view is that 'lateral promotion' landed him the post of Energy and Safety Coordinator" (pp. 261–262).

But the American Society for Biochemistry and Molecular Biology thought Mackal worthy of a respectful obituary, which described not only his early work on bacteriophage but also his restless curiosity and his love of tinkering with gadgets, suggesting that he "discovered his true calling" in cryptozoology.[1]

Not unlike Mackal, after a decade or two of a quite successful career in chemistry I wanted to do something different, in my case not cryptozoology but academic Science & Technology Studies, and as a stop along the way I took an administrative position. Mackal had tenure and could not have been "booted out" without demonstrating incompetence or malfeasance. Becoming more interested in other fields is not in itself a sufficient reason for losing tenure; academe is replete with faculty who are no longer fascinated with research but who continue to pull their weight in other ways, typically by teaching or administrative service. In the absence of documentation, it is perfectly plausible that Mackal took the initiative in moving from biology research to administrative service congenial to his bent for gadgetry and

mechanical things, leaving time and intellectual effort for adventuring in search of creatures awaiting discovery. There are no grounds for denigrating Mackal for having changed interests and having the courage to follow them; to regard his career as a failure is just academic snobbery.

There are many other places in the book where individuals are portrayed less than favorably and without relevance to the possible existence of Nessies:

- Alexander Keiller enjoyed sexual orgies, for example (p. 25).
- Rupert Gould (p. 253) is said to have had a "fondness for orgies with prostitutes . . . and Keiller." Thus he "lived the lie," having had an ugly divorce, once suffered a mental breakdown, and had been an "unpromotable lieutenant."

So what? "His many obituaries celebrated . . . his flair for exciting the man in the street with oddities and enigmas, and the place he earned in history by resuscitating John Harrison's priceless chronometers." In my view, Gould's books (1923, 1928, 1929, 1930, 1934) remain even now informative, rewarding reading, and his work on chronometers is of permanent value.

- Robert Rines had once been described as "an unscrupulous opportunist" (p. 265) who faked the flipper photos (p. 264). "His achievements as lawyer, inventor and philanthropist . . . were breathtaking," but "Some of it . . . was too good to be true" (p. 264); "his patents looked nothing like the eventual technologies, were never tested, and, if the laws of physics can be trusted, could never have worked" (p. 265, citing Wikipedia [!]). But the Academy of Applied Science[2] that Rines founded carries on worthwhile projects in science and technology education. He organized research at Loch Ness that enlisted such eminent people as Harold Edgerton, Charles Wyckoff, Martin Klein, and which produced important, unprecedented results, including the first proof that Loch Ness had been part of the ocean after the last Ice Age had ended (Rines & Dougherty 2003).
- Surgeon Wilson is alleged to have hoped "that war would break out again" (p. 36), rather incongruously since his office had been close to Harley Street which specialized in "the extraction of money from the wallets of the wealthy" (p. 36).
- This reviewer is referred to as "cryptozoologist, who believed the Monster existed and that the human immunodeficiency virus (HIV) did not cause AIDS" (p. 198). I suspect that this was not intended as support for my credibility since my book-length analysis of HIV/AIDS theory (Bauer 2007) is not cited nor is the website[3] where I list more than 900 peer-reviewed mainstream articles that demonstrate flaws in HIV/AIDS theory.

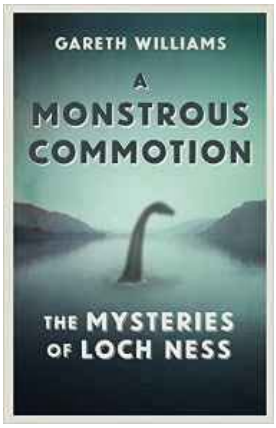
None of these derogatory allegations, nor any number more, could substitute for a substantive analysis of the actual evidence, and the claim that the flipper photos were faked is without basis, see About Evidence section below.

Tim Dinsdale is portrayed as an initially naïve obsessive given to wishful thinking and over-interpretation, even as it is acknowledged that it "is generally agreed that he was . . . a man of . . . transparent honesty . . . [and] 'an intelligent man of great integrity'" (p. 263). The book giggles at his approaching the British royalty over his filmed evidence for Nessies. But a sociologist or historian might have taken the opportunity to enlighten the reader about the role of the monarchy as traditionally iconic of the best non-political aspects of British society, a role entrenched by the morale-building personal courage displayed by members of the Royal family during World War II. To a man of Dinsdale's age (born 1924) and background (born outside Britain to parents who sought to bring British ways and faith to foreign shores), it would not have seemed inappropriate to forewarn the Palace that a zoological discovery of worldwide interest had been made within the homeland. Dinsdale had just not caught up with our modern times where credentials and connections trump substance.

On the flip side of portraying Nessie fans unfavorably, this book relies on undocumented comments from disbelievers or debunkers such as Adrian Shine, whose attempt[4] to characterize as a boat the Nessie hump filmed by Dinsdale is nothing short of absurd. No one who has seen the film could give Shine's view credence. As to personalities, if one wanted to portray Shine less favorably one might cite his determined spreading of the unfounded rumor that Dinsdale had lost faith in his own film,[5] or perhaps his unscrupulous takeover of the Loch Ness Monster exhibition that Tony Harmsworth had founded in 1979 at the Drumnadrochit Hotel.

About Evidence

The publication of this book was accompanied by considerable media ballyhoo[6] emphasizing its new information, including that a public-relations consultant, D. G. Gerahty, had thought up Nessie to bring tourist trade to local hotels. Far from new, however: I had discovered and published this story 30 years earlier (Bauer 1986). *A Monstrous Commotion* gives my book full credit for that, but it misleads on a crucial point in saying that "Gerahty's assertion was . . . that he created the Monster *de novo*, where none had existed before" (p. 278). In fact Gerahty had written to me that one of his partners "told us that for centuries a legendary creature was supposed to dwell in Loch Ness" (Bauer 1986:3); and *A Monstrous Commotion* even cites that on the same page as the statement that the Monster was created *de*



novo. So the publicity firm did not invent Nessie, they capitalized on old folklore that could well have a basis in fact (Bauer 1986:155–156).

The objective evidence—leaving aside eyewitnesses, that is—about Loch Ness Monsters comprises the Dinsdale film and several short clips not publicly available; a few photos, notably the underwater ones by Rines et al.; and sonar echoes. For a detailed description and analysis, including refutation of allegations of faking, re-touching, etc., see Bauer (2002a). Many of the documentaries dealing with Loch Ness are somewhat misleading, and they sometimes include serious errors (Bauer 2002b). So too with *A Monstrous Commotion*.

First, as to films: The book accepts that the Nessie hump in the Dinsdale film is really a boat, apparently taking Adrian Shine as authority (p. 263). But the hump is quite obviously not a boat, since at one point it submerges with corresponding narrowing of the wake. The film is available on the Internet,[7] as is Shine's discussion[4] which is based not on an authentic copy of the film but on a TV show; see my response[5] to Shine for more detail.

The book states that "nothing diagnostic could be made out" (p. 36) in the 1934 film taken by Captain Fraser; yet the *Proceedings of the Linnaean Society* record (Pt. 1, 8 November 1934. 7–12) that the experts judged it to be an animal, albeit they could not agree that it was an otter, seal, or whale, as one or another suggested; in other words, the film was of an unidentified, even unidentifiable and sizeable animal. Nor does the book mention the several short bits of film (upturned boat, large object on or near shore) obtained by the Loch Ness Investigation, or the 1977 Smith film that shows a tubular object rising vertically out of the water.

Second, as to the Rines photos: The book accepts that the flipper photos are fakes (p. 264). That is unadulterated nonsense. As stated on my website[8]:

> Charles Wyckoff, the photographic expert on the Rines team points out that the only manipulation was to superpose several transparencies filtered through different colors. Alan Gillespie, who did this "computer enhancing" at Jet Propulsion Lab, pointed out that the flipper shape can be seen in the original un-enhanced transparency, which was published in a WILDLIFE, March 1976, article by Nigel Sitwell, "The Loch Ness Monster evidence", pp. 101–109. The "retouching" allegation was first made in an article in DISCOVER magazine, which refused then to print Wyckoff's letter of protest, a copy of which is now available here.[9]

Rines is criticized for failing to publish the claimed photos, for example one purported to show parts of two Nessies; but the latter is the bottom illustration in this book's Plate 46, albeit mis-described there as a computer-enhanced version of the flipper in the upper part of Plate 46.

The book also accepts that the most famous Nessie photo, the Surgeon's, was faked; for a debunking of that allegation, see Shuker (1995: 87).

Third, as to sonar evidence: The book discounts this rather vaguely by pointing to possible artefacts, echoes off side walls, and periodic water seiche (pp. 243–236). But there are far too many documented reports of large, moving, underwater things to all be dismissed as artefacts, for instance the 1969 tracking of an object that moved steadily through a circular course underneath the tracking boat (p. 148). Shine recorded more than 40 contacts with moving objects underneath his floating platform in the early 1980s, described then as confirming the observations by the Birmingham team some years earlier. In 1987, Operation Deepscan recorded 3 contacts with objects that could not later be located again, one of them described by the sonar manufacturer Lowrance as not a shoal of fish and larger than a shark but smaller than a whale. A midget submarine "logged a large sonar contact, 50 feet above the bottom, which moved away as the submarine closed in"; but this is described as "Positive results: nil"! (p. 147).

There are a few other errors in the book as well, as pointed out above regarding Plate 46. Thus Plate 1, the Hugh Gray photo, shows a bulky, light-colored object apparently at rest with a long protuberance (neck?) at the left and the suggestion of a short one (tail?) at the right, with little blips where front and hind limbs would be; yet the text (p. 24) calls it a sinuous dark object with spray suggesting high speed. The book also cites the suggestion that Plate 1 shows a dog with a stick in its mouth, on the authority of Tony Harmsworth recounting that schoolchildren pointed this out to him (p. 230). I've tried unsuccessfully for years to see that, not succeeding despite Harmsworth's hints of how to look. *A Monstrous Commotion* cites (p. 230 & p. 340 note 23) Harmsworth's book (2010:88), but the relevant pages in Harmsworth are 83–84, and he mentions a visitor to his exhibition, not schoolchildren, as "seeing" the dog.

Others' Opinions

A number of individuals have made favorable mention of this book on various websites. I certainly agree that it makes interesting reading, replete as it is with human-interest material. I confess that, like many others, I cannot help getting interested when people of whom I know something are subjected to derogatory gossip, as here about Dinsdale, Gould, Keiller, Mackal, Rines, et al. But I hope that other readers will be as clear as I am that flawed human

beings—as we all are—have nevertheless accomplished major things—which far from all of us have. And I certainly hope that readers of the book will not be taken in by the biased and erroneous presentation of the evidence (see above).

Notes

[1] Angela Hopp (2014). Roy P. Mackal (1925–2013)—Biochemist-turned-cryptozoologist hunted Loch Ness monster and other mysterious beasts. http://www.asbmb.org/asbmbtoday/201409/Retrospective/Mackal

[2] http://aas-world.org

[3] The Case against HIV (2013). http://thecaseagainsthiv.net

[4] Adrian Shine (2003). The Dinsdale Loch Ness film. An image analysis. https://dl.dropboxusercontent.com/u/56983081/FilmAnalysis---dinsdale%20paper%202003%20V2.pdf

[5] Henry H. Bauer, "To whom it may concern" (response to Shine's request for a copy of the Dinsdale film). https://dl.dropboxusercontent.com/u/56983081/HHB%20response%20CZ-list.pdf

[6] I saw stories in a number of newspapers:
http://www.mirror.co.uk/news/weird-news/legend-loch-ness-monster-invented-6743971
http://www.dailymail.co.uk/news/article-3297971/Was-Nessie-just-invention-boozy-London-pub-lunch-hoteliers-keen-drum-custom-Scottish-hotels.html
http://www.thesun.co.uk/sol/homepage/features/6719078/Loch-Ness-monster-was-invtented-at-a-boozy-pub-lunch.html
http://www.dailyrecord.co.uk/news/scottish-news/cant-true-london-pr-come-6745044
http://www.thenational.scot/news/was-the-loch-ness-monster-just-a-pr-stunt-to-boost-hotel-occupancy-in-the-1930s.9566
http://www.thenational.scot/news/new-twist-in-nessies-tale-debunks-claims-of-pr-stunt.9608
http://www.dailyrecord.co.uk/news/scottish-news/legend-loch-nessie-believers-inspire-6779943
http://www.bristol.ac.uk/news/2015/november/loch-ness-mystery.html
http://www.mirror.co.uk/news/uk-news/loch-ness-monster-just-fantasy-6840324
http://www.dailymail.co.uk/home/event/article-3325725/Loch-Ness-monster-CRAIG-BROWN-Lost-Ness-monster-hasn-t-spotted-1954-1933-cares.html
as well as on various websites, for example:
https://uk.news.yahoo.com/loch-ness-monster-pr-stunt-142502542.html#9TbV2Vm

http://www.thedrum.com/news/2015/11/02/historian-claims-nessie-nothing-more-monster-pr-wheeze

[7] http://www.themanwhofilmednessie.com/tims-nessie-film.html

[8] Genuine facts about "Nessie," the Loch Ness "Monster"; http://henryhbauer.homestead.com/LochNessFacts.html

[9] Charles Wyckoff to Henry Grunwald, 27 August 1984. https://dl.dropboxusercontent.com/u/56983081/WyckoffToDiscover.pdf

Henry H. Bauer
Professor Emeritus of Chemistry & Science Studies
Dean Emeritus of Arts & Sciences
Virginia Polytechnic Institute & State University
hhbauer@vt.edu; www.henryhbauer.homestead.com

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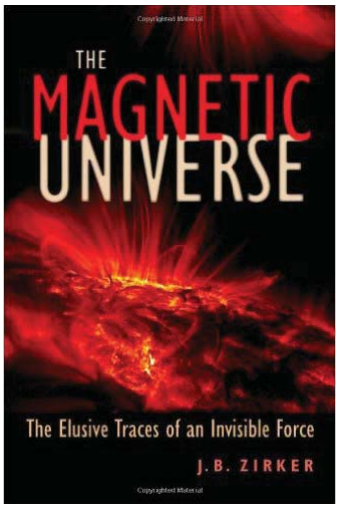
BOOK REVIEW

The Magnetic Universe: The Illusive Traces of an Invisible Force by J. B. Zirker. Johns Hopkins University Press, 2009. 312 pp. $37 (paperback). ISBN 978-0801893025.

Magnetism is a complex concept to explain to the general public. The human eye cannot "see" a magnetic field; the human body cannot "feel" it even though all of us are constantly crossing Earth's magnetic field lines on a daily basis—going to work, to school, to the grocery store, to the park. Our home planet is surrounded by a magnetic "cocoon" called the magnetosphere, which plays an important role in shielding the Earth's atmosphere from the devastating effects of solar flares. Without it, solar flares could cause havoc in electrical power grids, damage communication satellites, and threaten astronauts in orbit. This explosive solar activity is fueled by the energy of solar magnetic fields.

How could something so weak and "invisible" be so devastating? What role does the magnetic field play in other astronomical objects? Where does the field come from and where does it go? There are many questions to consider about this topic, and as explorers throughout human history have shown us one of the best ways to answer these questions is to go on a discovery journey. Jack Zirker's book on *The Magnetic Universe: The Illusive Traces of an Invisible Force* takes the reader on such a journey through the magnetic Universe with stops at the Sun, the Earth, and the other planets in our solar system, the stars, the galaxies, the black holes, and other more exotic astronomical objects. As a true master of metaphor, Jack starts this journey by offering his readers a pair of imaginary glasses that enable them to see magnetic fields. Could you imagine what one would see if such glasses were really to exist?

Of course, a discovery journey must also account for time: the past, the present, the future. So, in his book, Zirker reviews the history behind the study of magnetic fields and connects it to currently known concepts. As he explains, researchers collected some of the first information about magnetic fields surrounding the Earth from the orientation of a magnetic compass needle and the patterns of the aurora displays. Then, during the Nineteenth Century, systematic measurements of the magnetic field were collected at magnetic stations, which were built in several locations around the globe.



Those measurements revealed that the orientation of the geomagnetic field slowly changes with time. As Zirker describes, Earth's magnetic field has its origin in the motions of material that occur in the core of our planet. Collectively, the action of these motions is called a dynamo. Zirker initially reviews the basic principles of a dynamo in his chapter on Earth magnetisms, and then utilizes those principles in later chapters to explain dynamo processes that take place in other planets and even stars.

Interestingly, the collected measurements of geomagnetic fields also revealed variations on shorter time scales (hours and days) that were later associated with space weather or the influence of solar activity on Earth's atmosphere and magnetosphere. In this book, Zirker introduces the concept of space weather, which originates in solar flares and coronal mass ejections—all powered by solar magnetism. He also briefly reviews sunspots, flares, coronal mass ejections, and other features of solar activity associated with solar magnetism, and describes how solar activity changes with the 10–11 year solar cycle. Next, he teaches about solar wind, a constant flow of material and magnetic field escaping the Sun. Subsequently, he guides the reader to "follow" solar wind into interplanetary space—to visit all major planets on its way to the outskirts of the solar system. The reader learns that space weather and aurorae are not limited to Earth, but are also present on some of the other planets.

Similarly, the magnetic field is also not limited to our neighboring part of the Universe. Its presence has been detected in other stars and galaxies. In his book, Zirker reviews the origin and the evolution of magnetic field in these various astronomical objects. He describes how in some cases, a magnetic field may help with formation of a star from the proto-stellar cloud material; yet in other cases, it may inhibit a star's formation. In addition, the author clarifies various similarities and differences between the Sun and other stars: how, similar to the Sun, many other stars have starspots, which may be much greater in size than the largest sunspots; how some of the other stars exhibit activity cycles similar to the solar cycle, while other stars appear magnetically inactive.

Yet, it is important to note that as stars and galaxies evolve, their

magnetic fields transform as well; so, the author then continues with the description of magnetic field topologies in peculiar stars, white dwarfs, pulsars, and neutron stars. In the final chapters of this book, Zirker ultimately explores the nature of weak magnetic fields that are present in our own and other galaxies. There, he specifically describes the concept of the so-called Biermann Battery, which is the separation of electric charges in the early Universe that could have created the seed magnetic field. Using popular and accessible language, the author describes some intricate physical processes such as ambipolar diffusion, Faraday rotation, and the duality of electricity and magnetism.

In summary, any astronomy enthusiast will enjoy reading this book. It could also be used as supplementary reading material in undergraduate-level astronomy courses. In fact, some of my colleagues already use this book in the undergraduate courses that they teach. One day, when I was talking to Professor James McAteer, my colleague who teaches at the New Mexico State University, he pulled out Zirker's *The Magnetic Universe* and asked if I had a chance to read it yet. I said that I have. "I am using it for my undergraduate astronomy class. I think this is an excellent book," he said. I replied that I could not agree more.

Alexei A. Pevtsov
National Solar Observatory
pevtsov@noao.edu

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BOOK REVIEW

Spirit Voices: The First Live Conversation between Worlds by Mark L. Cowden. Anomalist Books, 2011. 184 pp. $14.95 (paperback). ISBN 978-1933665542.

The author of *Spirit Voices*, Mark L. Cowden, is, according to the biography on his website, an author, entertainment journalist, and TV paranormal investigator. He has been studying paranormal accounts in the UK and Ireland for more than 10 years, and he has worked as a paranormal forensic specialist for the paranormal TV show *Northern Ireland's Greatest Haunts* (Cowden no date).

Spirit Voices chronicles Cowden's personal experiences with ostensible ghostly encounters, instrumental transcommunication (ITC), and electronic voice phenomena (EVP). The author starts his story by describing a series of unusual events he experienced at a converted Mill in Belfast, Ireland, and continues through his time with a paranormal investigation team, his recurring role on a reality television ghost-hunting program, and finally culminates with a description of what the author describes as the first-ever documented case of a living person having a live two-way conversation with the spirit world with cameras rolling.

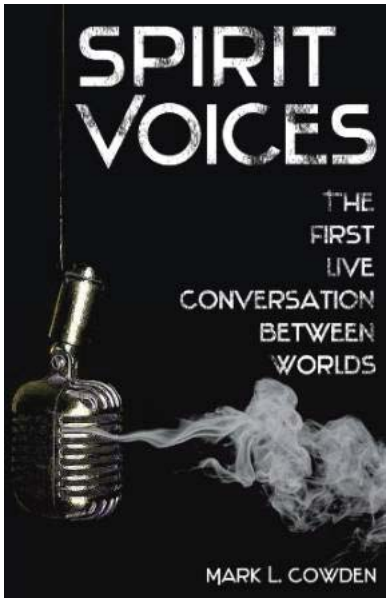
It is worth noting here that, as a recurring theme throughout the book, Cowden stresses the need for investigators to pursue their own spiritual paths and that the incorporation of spirituality into the investigation process is essential for success. To assist readers along this path, the book includes a short Appendix with suggestions for one's personal spiritual development and includes basic information on meditation, visualization, and dowsing.

While the book is mainly a chronological account of Cowden's experiences, he also takes us on a couple of side trips to provide some insights into his approach and process. Specifically:

In Chapter 2: A Moral Dilemma, Cowden discusses how he reconciles his belief in God and his personal spirituality with the unfavorable views of spirit communication held by most religions. He concludes that direct spirit communication, which could promote self-enlightenment and a personal relationship with God, potentially undermines the controlling interests of institutionalized religion. He also dismisses any allegation that engaging in spirit communication could be considered a sin.

In Chapter 5: The Paranormal Investigation Group, Cowden takes some time to critique the current state of paranormal investigation teams. He cites their overall lack of training and credibility, and compares their organizational structures to what might be found on a fictional starship. He also, justifiably, raises concerns about the potential hazards of untrained teams intervening in the personal lives of paranormal experiencers, noting that many paranormal experiences may be coupled with psychological issues that these teams are ill-equipped to handle. [For a more complete, albeit irreverent, discussion of this topic, I suggest *Paranormal Pandemic* (Ohlde & Mullaly 2014).] Despite his clear reservations about paranormal investigative teams, Cowden eventually joins one that he feels is more credible than others he has encountered based on a number of factors including the professional appearance of the group's website. He was also impressed by their focus on only investigating public locations and historical sites and not private homes.

In Chapter 10: The ITC Orchestra, Cowden describes a rather novel EVP recording method. He starts this Chapter with an interesting observation, and one that I have found in my own research, which is that there may not be a one-size-fits-all approach to ITC. Different operators may obtain different results with different types of equipment based on their own personal strengths, weaknesses, and belief systems. In addition, the author points out the need to understand that the communicating personalities may also have different abilities and limitations that could affect their abilities to interact with the recording equipment being used. To address this, the author suggests using one's own personal spiritual insight or intuition to best match the recording technique to the operator, the location, and the intended target personality. In considering limitations of ITC and EVP recording, the author hypothesizes that some EVP may be present in high-end and low-end audio frequencies—those just on the edge of human perception. The author's solution to this problem is to incorporate both a violin and a cello to act as "natural amplifiers" (p. 134). This arrangement is what the author refers to as the "ITC Orchestra." Of course, this approach is predicated on the unverified assumption that EVP is actually an acoustic phenomena and not the result of direct interaction with the recording equipment. Unfortunately, the author states that he "won't go into the exact setup" (p. 135) but does provide a brief description of how the ITC Orchestra is typically deployed. No specific details are included about the recording hardware or software used in the process nor any details provided as to how the resulting recordings are analyzed for the presence of EVP. This omission of detail by the author effectively makes any replication of the processes difficult if not impossible. In addition, based on the description



that is provided, the process seems to be lacking any specific controls that might help prevent the recording of extraneous sounds. The author concedes that the procedure may not guarantee successful EVP recording but maintains the conviction that "the more spiritually involved the operator, the greater chance of success" (p. 136).

In the next chapter the author describes a successful recording session with the ITC Orchestra (again, without any specific details of the equipment, setup, or procedures) at Prehen House, an 18th-century mansion in Northern Ireland. In this case, the author concludes that some of the recorded voices are of conversation that took place in the mansion sometime in the past. The author then provides the following commentary:

> Science has no interest in the human spirit or indeed the paranormal, but I have witnessed and recorded these phenomena on a number of occasions, as have hundreds of other people. As far as I'm concerned, paranormal occurrences have already been proven. They have happened too many times in history in front of too many witnesses to be discounted. The proof has been taken out of the hands of science. The rest of us will simply accept that and move on. (p. 143)

This broad statement about what science is and isn't interested in is simply untrue. With this single paragraph, the author unfairly dismisses more than 100 years of general psychical and parapsychological research, not to mention the specific research that has been conducted on ITC/EVP. Those interested in a comprehensive review of the state of EVP/ITC research are encouraged to read the Leary and Butler (2015) chapter in *Parapsychology: A Handbook for the 21st Century*.

I'll speculate that the author's disinterest in the scientific method may explain the lack of details provided when it comes to specific procedures or equipment. These omissions are unfortunate. The author may have developed a system that could be profoundly useful both for researchers and for those who might benefit emotionally or spiritually from meaningful after-death communications. By withholding this information, the author is

forcing anyone with a sincere interest in the field to recreate his processes with little meaningful guidance.

The final chapter describes a real-time, 40-minute EVP conversation recorded during the filming of an episode of a paranormal TV show. While the author claims that this recording session provides proof of spirit communication, the lack of a detailed description makes it difficult to assess its authenticity, so any further discussion of it in this Review would be of little value.

In his book *Is There an Afterlife? A Comprehensive Overview of the Evidence*, David Fontana (2005) notes that ITC research has been criticized because (a) conversations may not be collected under controlled conditions by independent observers and (b) full details of experimental protocols may not be provided in reports of the phenomena. While the author of *Spirit Voices* provides some interesting examples and approaches to EVP/ITC, unfortunately he does little to address these criticisms, thus making this book's overall contribution to the field limited.

Mark Boccuzzi
mark@windbridge.org

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Ohlde, J. P., & Mullaly, K. (2013). *Paranormal Pandemic*. Richmond, VA: Iron Cauldron Books.

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BOOK REVIEW

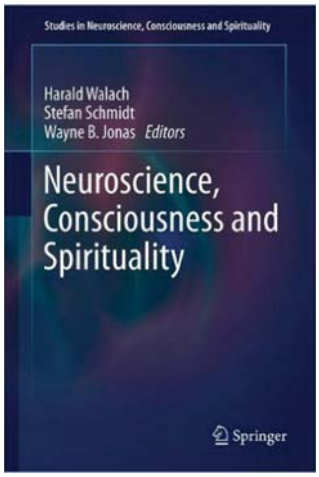
Neuroscience, Consciousness, and Spirituality edited by Harald Walach, Stephen Schmidt, and Wayne Jonas (Book 1 in *Series in Neuroscience, Consciousness, and Spirituality*). Springer 2011. 300 pp. $173 (hardcover). ISBN 978-9400720787.

Neuroscience, *Consciousness*, *and Spirituality* is an outstanding, edited book addressing brain processes as they relate to the phenomenon of consciousness and also to various spiritual experiences. The book's chapters address essential issues with regard to this important intersection of future scholarship. The initial chapter provides a circumscription of the overall topics covered and also reviews important definitions of religion, spirituality, science, and consciousness. One of the unique aspects of this chapter, and many of those that follow, is a reflection on historical perspectives such as those developed by Francis Bacon, Franz Brentano, Rene Descartes, and Immanuel Kant. These references are important for putting many of the discussions into the appropriate context.

Several chapters address meditation and its effect on consciousness and the brain. Mindfulness is considered as well as more general spiritual practices including how rituals helped to advance the human species by supporting social groups and healing. The concept of healing practices is the focus of several chapters on rituals, meditation, Sufism, and the potential healing properties of the brain and consciousness itself.

There are two chapters with similar titles, with the first titled Neuroscience and Spirituality: Findings and Consequences, and the second one later in the book titled Towards a Neuroscience of Spirituality. Interestingly, the first chapter discusses a number of specific neuroscientific aspects of spirituality including neuroimaging and the importance of key structures such as the temporal lobes, limbic system, and prefrontal cortex. The latter chapter mentions little about the specific neuroscientific aspects of spirituality but rather tries to differentiate it from a neuroscience of psychology. Both chapters are complementary in engaging the topic, but might have been better connected in the book.

There is a chapter on the neurophysiological correlates in experienced meditators using electroencephalography. This chapter primarily presents a research study with methods and results, but also provides some interesting data in the context of the rest of the book. Another chapter specifically on brain



structure and meditation reviews a number of research studies regarding how specific brain regions are involved with meditation practices focusing primarily on structural changes. Another set of chapters addresses the important issues of consciousness. This includes a discussion of the "hard problem" of consciousness, that is, how consciousness might actually arise within the brain. This has been one of the great questions for both philosophy and science and may be a problem that persists far into the future. However, the chapters of this book help to frame the question and provide an integrative, multidisciplinary approach to resolving this question. Several chapters also explore the potential for consciousness to be nonlocal and extend beyond merely the neurophysiological processes of the brain. Whether consciousness has some ethereal quality that goes beyond the brain's functions is unknown. However, the topic of spirituality and near-death experiences that appear to take a person's consciousness beyond their brain provides important information about this problem. Such research may ultimately lead to a paradigm shift in science, consciousness studies, and philosophy. A new model of consciousness is eventually proposed that explores the various possibilities relating consciousness, spirituality, and the brain.

Overall, this is an important work that provides the reader with a great deal to think about and establishes the current state of the science for consciousness, the brain, and spirituality. One critique might be that there is an overall absence of the topic of "neurotheology" as a field already exploring many of these issues linking religious and spiritual phenomena with the brain and psychology. Perhaps the main criticism is that the chapters are not grouped together according to common topics, and so they are sometimes difficult to link together well. However, taken together, the chapters certainly provide a wide survey of this area of study and challenge the reader to consider the essential relationship between the brain, consciousness, and spirituality.

Andrew Newberg
Myrna Brind Center of Integrative Medicine
Thomas Jefferson University
Andrew.Newberg@jefferson.edu

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BOOK REVIEW

Enquête sur 150 Ans de Parapsychologie en France: La Légende de l'Esprit [An Inquiry of 150 Years of Parapsychology in France: The Legend of the Mind] by Renaud Evrard. Escalquens, France: Trajectoire, 2016. 479 pp. €25.

Enquête sur 150 Ans de Parapsychologie en France is a history of various aspects of French psychical research. In spite of the previous work of authors such as Brady, Brower, Lachapelle, Le Maléfan, Méheust, and Plas, Evrard has much to say about many individuals, institutions, investigations, and issues, not to mention time periods, not covered by these authors.

Enquête has ten chapters focusing on the work of: Pierre Curie, Agénor de Gasparin, Pierre Janet, Eugène Osty, Timothée Puel, Charles Richet, René Sudre, René Warcollier, and two later figures: François Favre and Nicolas Maillard. Evrard's discussion not only covers the actual parapsychological work of these individuals, but also includes various social and institutional aspects related to them and to their times.

The book is at its best in terms of social aspects of French psychical research, particularly issues such as conflicts and criticisms. Examples of this include problems within the Institut Métapsychique International, such as those dealing with Jean Meyer and Hubert Forestier. Evrard presents information about how Richet was perceived, and about controversies surrounding his work, particularly his observations of materializations with medium Marthe Béraud, which brought him criticism from many writers who assumed he had been deceived. In fact, this critical literature, some of which appeared in popular magazines and newspapers, created strong negative images of psychical research among the scientific and general public. Evrard actually concludes that the end result was that many individuals believed that Richet was fooled by a young girl at Algiers. Furthermore, he stated, summarizing the opinion of many: "In 1905 Richet's metapsychics was considered one of the menaces against reason" (p. 203).

In addition to the above-mentioned individuals, Evrard also presents information about other persons. Examples are discussions of Robert Amadou, Henri Bergson, Rémy Chauvin, Bernard de Cressac, Gustave Geley, Paul Gibier, Joseph Maxwell, Marc Thury, Robert Tocquet, and Mario Varvoglis. I find Gibier and Maxwell particularly interesting. Both men authored influential books, as seen in *Le Spiritisme* (Gibier 1886) and

Les Phénomènes Psychiques (Maxwell 1903). Among other contributions, Gibier reported remarkable materialization phenomena he obtained with Mrs. Salmon, the pseudonym of Carrie Sawyer (Gibier 1901), and Maxwell (1903) discussed mediumistic personification.

I was also glad to see discussions of individuals such as Timothée Puel and François Favre who are not generally known outside France. Evrard also writes about figures who are well-known, but who do not receive much discussion in modern writings, at least not whole chapters (Osty, Sudre, Warcollier). The author writes that after his initial work Warcollier became interested in the dynamics of the unconscious regarding telepathy:

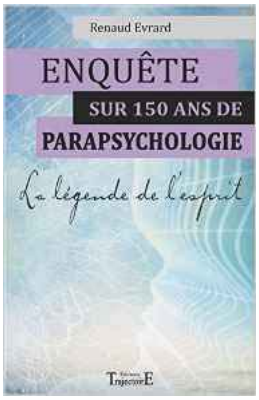
> In support of his reflections, he gave some examples of telepathy "of the poorly perceived," or "of the recently forgotten," and of cases in which what appeared to be transmitted was not what the emitter wanted to transmit . . . [but consisted of] information lying in its subconscious while focusing attention on something else. . . . The dream was a point of departure for Warcollier, following Freud . . . Warcollier proposed to analyze telepathic communication like dreams. (p. 369)

Such analyses included various processes: Among them, instances of imagery associations and distortion.

Fascinating discussions of all these figures present a complex picture of the past, one formed as much by the influence of personal and professional factors as by the actual work conducted. While Evrard explores these issues, he also offers information about events such as the international congresses of psychology and the presence of psychical research in their programs, and about several important institutions.

One of the latter was the Institut Général Psychologique, a group that included psychic phenomena together with various psychological topics. As time went on, the Institut shed psychical research from its programs. The *Bulletin* of the Institut included the famous report about seances with Eusapia Palladino held between 1905 and 1908 authored by Jules Courtier (1908). The study is an unique one in the mediumistic literature for various reasons. One is that the researchers not only studied the physical phenomena of Palladino, but they also investigated aspects of her psychology, physiology, and the surrounding physical environment, such as heat, electricity, and magnetism. In addition, the *Bulletin* had a few other papers about topics such as the action of the hand on the growth of plants (Favre 1905).

Furthermore, Evrard has much to say about other topics of general interest for those seriously interested in history. These include issues that distort views of the past (e.g., presentism, "great man" history), and the topics of demarcation and reflexivity. Interestingly, Evrard briefly



discusses his own involvement in parapsychology as a potentially limiting factor in his writing. He is aware that some may see him as a member of the culture he is trying to study, and that consequently his discourse may be perceived as lacking objectivity, as an example of "partisan propaganda" (p. 29). Evrard opposes this, pointing out that he has worked independently of groups and specific ideas, trying to place himself in the middle of internal and external perspectives with regard to parapsychology. Such a position is a difficult, but a fairly common one in the history of science, where the distinction between practitioner and professional historian still exists. Many biologists, physicians, physicists, and psychologists, to name a few professions, have contributed and still contribute to the history of their disciplines. Sometimes, particularly when they write in disciplinary journals or books, they have agendas that justify areas of research, research programs, and theoretical models. Evrard has his own clear investments in parapsychology as a field, as seen in his work on behalf of the field via the Institut Métapsychique International and, more recently, the Parapsychological Association. But this hardly disqualifies him for the task at hand. In fact, I have not found evidence of a partisan view in his book. On the contrary, sometimes he seems to be ultra-objective, as when he raises unanswerable questions, as opposed to possible interpretations, which he also presents. All in all, a good balance.

Although I can hardly criticize the author for this, I would have liked to see more in the book about specific issues that interest me. This includes a more detailed discussion of Richet's actual work reported in his classic paper "La Suggestion Mentale et le Calcul des Probabilités" (Richet 1884), an influential pioneering article in which Richet reported statistically evaluated experiments of "mental suggestion," but which also included discussions of other topics generally ignored by later commentators (on these topics see Alvarado 2008). Similarly, more could have been said about Janet's use of ideas from Frederic W. H. Myers. Janet stated: "To my knowledge, the author who has contributed the most to develop the scientific study of spiritistic phenomena is certainly M. Fr. Myers" (Janet 1889:403). But the influence Myers had on Janet was limited to ideas of subconscious functioning that did not include "supernormal" phenomena such as telepathy. This was a selective use of Myers that was not unique to Janet, as seen in the work of others, among them Alfred Binet (Alvarado 2010).

Another issue is the organization of the chapters. Although they are

very informative, the narrative in many chapters about specific individuals is frequently interrupted by long sections, sometimes appearing in gray columns, about various other persons, issues, or organizations. Several chapters lose their focus with the inclusion of too much peripheral information. Although I actually enjoyed and learned much from these sections, I am concerned that others may consider the material to be strangely placed extended footnotes or appendices.

In addition to discussions of the actual French psychical work, the great value of this work lies in the rich description of social aspects, and the recognition of the sociological and epistemological issues associated with the subject. While the problems are not solved, as Evrard is aware, he illuminates the elements forming the complex tapestry of what Richet and so many others in France called "la métapsychique," and on the development of parapsychology in general.

Carlos S. Alvarado
Research Fellow
Parapsychology Foundation, New York City
carlos@theazire.org

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BOOK REVIEW

ESP Wars East & West: An Account of the Military Use of Psychic Espionage as Narrated by the Key Russian and American Players
by Edwin C. May, Victor Rubel, Lloyd Auerbach, and Joe McMoneagle. Crossroads, 2016. 410 pp. $19.99 (paperback). ISBN 978-1941408797.

ESP Wars offers a unique perspective on the research, development, and application of psychic capabilities during the period of the Cold War. It is, however, quite controversial when it comes to details regarding the American side of these activities. One issue the reader may encounter is the narrative voice. Mostly written in the first person, I often found myself wondering who was speaking. Having communicated with most of the authors, I now know that Auerbach was brought in to clean up what was admittedly a very messy early draft of this book.

While examining the roots of the so-called ESP wars, the authors correctly note that the use of psychics is nearly as old as conflict itself. Mystics, oracles, and other religious leaders were often consulted before battles in attempts to divine the outcome and to seek advice from external sources regarding the advisability of engaging in war. Recounted are stories of the Oracle of Delphi asking Apollo for guidance, the efforts of King Cyrus, founder of the Persian Empire, and even biblical quotes detailing the use of psychics prior to combat. Russian traditions of use of psychics include employing shamans for support of operations, a methodology that continues among indigenous people to this day. Even the Nazi fascination with the occult is conveyed as this interesting section brings the reader up to date with a historical overview not generally known outside of mythologists and a few conspiracy theorists.

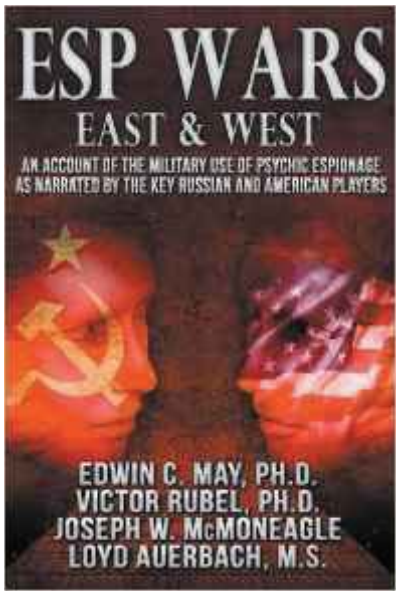
A significant problem that stands out in both East and West camps is that they often encountered bureaucratic nightmares. In all cases, support for the programs appears to have been personality-dependent; a door that swung both ways. That means that when high level officials supported the use of psychics, programs flourished. Under opponents, they died. While many readers may believe that participation in the remote viewing program, eventually known as Star Gate, was alluring and fulfilling, the reality was often far different. There was a constant struggle for both organizational survival and acceptance. Legendary Remote Viewer 001, Joe McMoneagle, once described to me the work environment saying that every day was "like being in a f*****g knife fight in a phone booth."

The Soviet/Russian participants experienced similar organizational issues. Referring to the Soviet era (1970s–1980s), it was noted that, "The lives of psychics and research parapsychologists were very difficult during those days." They were allowed to conduct specific experiments but were warned of severe consequences if they exceeded their authorized limits. As a control measure, the KGB kept tabs on their work.

One key difference in psi research efforts between the U.S. and the Soviet Union was their emphasis on the development of psychotronic weapons. These were hardware systems designed to influence or control minds and possibly adversely affect the target's health. It was hypothesized that the victim could be driven to suicide or accidental death. Interestingly, the book describes psychotronic devices as "non-lethal weaponry," a term rarely used at that time, and not generally associated with psi research. The authors also indicate this research was done by secret institutes of the Soviet military and not by the KGB. They also note that an integrated ESP and psychotronic weapons program could not exist as the Central Committee of the Communist Party considered parapsychology to be "inconsistent with ideological dogma." Worth remembering is that the U.S. did conduct some mind-altering experiments, such as those of MK Ultra. However, those were chemical in nature requiring direct ingestion of the drugs. While not successful, the Soviet psychotronic weapons approach entailed a remote capability, rather than physical contact with the victim.

It is later reported that large-scale testing for ESP was conducted in Russia. Professor Vyachesiav Zvonikov found that "about 1.5 percent of Russians possessed extrasensory abilities." Having tested thousands of subjects, he also indicated that there were regions in Russia where the number of people with those capabilities were significantly higher. He also tested many psychotronic weapons and found most of them to be "pure rubbish." He did not dismiss them totally, but stated that he did not have time to test all of the ones provided.

Significantly, KGB Major General Nikolai Sham, himself a proponent for study of psi phenomena, indicated that during the Soviet era "There was nothing comparable to the U.S. Star Gate program." That does suggest that much of the popular hype in the West was wrong. Many of us always thought this was an area of concentration. The popular book *Psychic Discoveries Behind the Iron Curtain* did a lot to foster the notion of Soviet superiority in that area of research. Sham's pronouncement also runs counter to statements by KGB defector Nikolai Khokhlov in which he claimed experiments had demonstrated a lethal capability in lab animals. Worth noting is that Khokhlov, who defected in 1954, based his information on secondhand sources but he was believed at the time.



Another difference between the Russian and U.S. programs was proximity to targets. Based on nonlocal consciousness theory, American remote viewers usually operated from Ft. Meade. Surprising to the Americans, General Sham informs the reader that during the wars in Chechnya the Russians moved their psychics to the immediate area of combat operations. Sham too noted that Marxist–Leninist ideology constrained their efforts. For that reason the emphasis on psychotronic weapons was easier to research.

In his Foreword, General Sham raises a point rarely discussed relative to remote viewing. He states, "unique techniques of developing extraordinary human abilities and qualitatively increasing intellectual and ***spiritual levels*** (emphasis added) were developed and carefully tested in practice." The concept of spiritual development is not common in any of the literature on remote viewing.

The book takes an unfortunate turn when the authors denigrate the efforts of the Army managers of the project. They state that involvement with Star Gate was a "career-ender." That was true in some cases, but not all, as presupposed by the comment. At least one of the managers went on to be promoted to full colonel in a later assignment. May generally blames the Army for the failures of the program and references "the overall poor management of the Ft. Meade Unit and the lax and mostly inappropriate protocols" as institutional shortcomings. He goes on to state that the unit suffered from the "assignment of uninterested or incompetent commanders." Having discussed this issue with several people familiar with the situation, it is safe to state that that view is not universally held and considered to be quite biased.

Possibly more inflammatory are the comments regarding Ingo Swann and the remote viewers trained by him. Readers need to know that Ingo Swann, an accomplished artist from New York City, was one of the original remote viewers tested by Stanford Research Institute. He demonstrated a number of spectacular successes, including reporting the rings of Jupiter prior to their discovery when Pioneer 10 flew by the planet in 1973.

The book vociferously attacks the training method developed by Swann, claiming he did not understand the significance of operant conditioning or the power of nonverbal communication and clues. The authors note that, "Going the way Ingo proceeded makes it (the training) a major disaster." They also state that with the development of Ingo's methodology, "one can say this borders upon noncompliance of the contract at best and outright fraud at worst." That is strong verbiage and significant to thousands of people who have been trained in a manner that is directly derived from Ingo's protocols. Controversially, the book notes that, "Very few, if any, of the successes came from Ingo-trained people." Addressing the negative credibility associated by some leaders of the Intelligence Community, it is stated, "This attitude can be traced directly back to Swann and his unsupervised indoctrination of the Army and DIA personnel. The fault for this lies directly with the SRI management of the program." This comment presumably targets Dr. Hal Puthoff, who initiated the program with laser physicist Russell Targ.

The technique Ingo Swann developed was known as Coordinate Remote Viewing, or CRV. There exists a substantial discussion as to whether or not remote viewing is a trainable skill, or if only those with innate capabilities can be successful. The debate about the scientific efficacy of CRV has also raged openly. In an online publication called *Eight Martinis: The State of the Art of Remote Viewing*, Issue 13 (October 2015), Dr. Puthoff addressed many of these issues. Regarding CRV, he stated "For scientific evaluation, yes, strict double-blind protocols were used. Furthermore, in nearly all application of CRV to intelligence targets, I insisted on double-blind protocols so that if results were positive, there would be no gainsaying the result was based on the possibility of leakage of information to the remote viewer by anyone present." (The entire interview can be seen at http://www.eightmartinis.com/eight-martinis-issue-13.) The material in that publication contradicts many of the comments and castigations in the book.

The demise of the American program is accurately covered in fair detail. During a period of declining budgets, there was great consternation about the viability and continuation of the remote viewing program publicly known as Star Gate. Senior leaders of both the CIA and the DIA were lined up against the program while influential members of Congress supported the effort. It is reported that things got so bad that the commander of the DIA, a lieutenant general, was threatened with *Contempt of Congress* charges if he continued to fail to accept funding approved for the remote viewing project. That was followed by a decision to move the project to the CIA, but Director John Deutch was dead-set against acquiring responsibility. The approach, even though mandated by Congress, was a classic maneuver designed to

kill any project; i.e. they would study it. Of course, the outcome of the study by the independent body was predetermined. It is noted that about 35 sealed boxes of remote viewing material were shipped to the CIA to support the study. The contractor's findings were that the evidence did not warrant support of either the military or Intelligence Community. Rather than being a conscientious, independent effort, it was later learned that none of the boxes provided containing program records and results was ever opened. Clearly prejudice won out over science.

This book does offer a very interesting look into the background of the use of psychics in warfare. In the end, it appears that the rampant speculation about a psi race between East and West was more hype than reality. For most readers, it is worth perusing for historical information not generally available. It is a commendable effort to have both sides of a conflict reviewing their efforts.

John Alexander

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BOOK REVIEW

The Project Alpha Papers edited by Peter R. Phillips, Prologue by Lance Storm. The Australian Institute for Parapsychological Research, 2015. http://www.aiprinc.org/the-project-alpha-papers/

The electronic archival document The Project Alpha Papers is a collection of 18 articles relevant to "Project Alpha," an intervention designed and executed by the magician James Randi and his confederates. The target of the intervention was the McDonnell Laboratory for Psychical Research (known as the "MacLab") located at Washington University, St. Louis, Missouri. This document was originally conceptualized as a book by Michael Thalbourne, an Australian parapsychologist and scholar, but he died before he could finish the task. The erstwhile director of the Laboratory, Peter Phillips, assembled Thalbourne's material and produced an archive for the website of the Australian Institute for Parapsychological Research, and it is available there. All the articles were written and published in the 1980s, except for an article by Thalbourne, which was delayed until 1995. Phillips produced an eBook, *Companion to the Project Alpha Papers*, which is available at a modest price. This archive is thorough and well-collated; this review will not describe all of the contents but will focus on some highlights, especially those of which I have firsthand knowledge. It will also raise questions as to why Randi's hoax was not detected earlier, given the many clues, some of which were supplied by Randi himself.

In the companion piece, Phillips describes how the magician James Randi sent two of his confederates (Steve Shaw and Michael Edwards, AKA "The Alpha Boys") to his laboratory to simulate psychic effects by trickery, suspecting that the staff would not be able to detect fraud without the aid of an expert conjuror. In Phillips' words, "The laboratory staff was indeed initially deceived, but later took Randi's advice . . . and went on to do experiments that were free from fraud." This contention is in sharp disagreement with popular press accounts that featured articles claiming that a pair of neophyte magicians had hoodwinked mature scientists. Phillips attempts to set the record straight, especially in the wake of the 2014 biofilm *An Honest Liar*, in which Project Alpha is prominently featured. Phillips observes that he was not invited to appear in the film.

In his Prologue, Storm observes that Randi offered his advice, suspecting that the MacLab crew would not accept it. "The researchers

were, indeed, deceived at the beginning, but took Randi's advice in the summer of 1981." Under Thalbourne's direction, the "MacLab staff then conducted experiments free of fraud, saw no psychic effects, and ceased research with these subjects in 1982." In the following Introduction, Phillips observes that Thalbourne was "never deceived" and initiated the archive and an accompanying website because he felt his scientific reputation had been unjustly damaged.

In a second Introduction, Phillips pays tribute to James S. McDonnell, founder of an aircraft company in St. Louis that was eventually acquired by Boeing. "Mr. Mac," as he was known, worked hard to establish a parapsychological research center at Washington University, where his efforts met with considerable opposition. Mr. Mac sought the advice of several parapsychologists including myself. In fact, he flew me to St. Louis where I transferred to his private Lear jet for a dinner meeting and a seminar with several of his colleagues. My advice was for the future "MacLab" to focus on one aspect of parapsychology and to do so in some depth. I did not mention macro-psychokinesis (PK) (i.e. major anomalous movements of sizable objects), but this was the eventual choice.

Phillips describes how a committee of university scientists unanimously voted to decline Mr. Mac's offer, causing Mr. Mac to persuade the Chancellor to approach Phillips directly. This led to a spirited debate among members of Phillips' own department (physics), after which a vote was taken with an affirmative outcome. The ensuing lab was named the McDonnell Laboratory for Psychical Research, or "The MacLab." Phillips observes that he was "ambivalent" about situating this lab in the Department of Physics and wishes that "someone more upbeat" had been selected to head the project. (He adds that Mr. Mac was more fortunate with his Alma Mater, Princeton University, where Robert Jahn was able to conduct historic experiments for more than twenty-five years.) The original agreement was to continue the MacLab for five years. However, Mr. Mac's passing in 1980 "ensured that the laboratory in St. Louis would not continue." This statement puts to rest the often-repeated claim that Randi's hoax shut down the lab (in August of 1983); at worst, it may have derailed attempts to get an extension—even though further funds would not have been easily available without Mr. Mac spearheading the efforts.

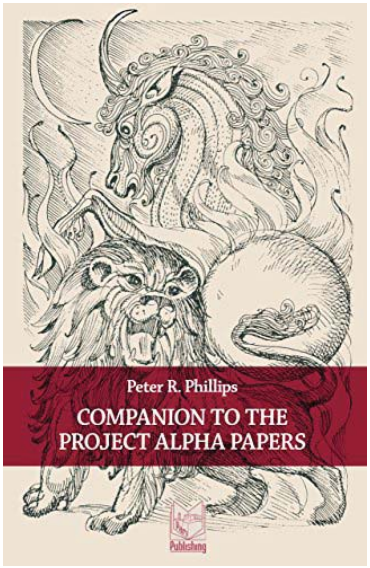
Phillips never asked my advice as to what aspect of psi would give the most promising results, but observes that it was Robert McConnell, the first president of the Parapsychological Association, who suggested metal bending. Phillips describes his own background in electronics and physics, and how this equipped him to tackle the field of macro-PK. In retrospect, Phillips concludes that psi lies outside the scope of physics, and even outside

of the reductionistic model that many parapsychologists endorse, such as Charles Honorton, who is quoted as saying "If it's not reductionistic, it's not science" (p. 18). Instead, Philips proposes a "two state solution" in which mainstream science would acknowledge that "there are laws beyond those that physics has established—laws, moreover, that science can never fully comprehend. Phillips states that parapsychologists need to abandon their hope of becoming part of mainstream science as it now stands, although they can rightly "expect to be given the kind of respect that scientists normally receive" (p. 18). This perspective is only given a few paragraphs but is so provocative that it deserves to be expanded into a lengthy article. For me, it was one of the most valuable parts of the archive.

Phillips notes that Randi "sent two young men to us, Mike Edwards and Steve Shaw, each claiming to be a metal bender" (p. 22). Actually, the so-called "Alpha Boys" had responded to media solicitations, each independently insofar as the MacLab staff was concerned, but they were already part of Randi's team. Indeed, Randi approached Phillips once he claimed to have heard about the MacLab's focus on macro-PK, offering to be of assistance. In retrospect, the proverbial dots were in place but nobody at the MacLab had connected them.

Phillips and his staff began to work with the Alpha Boys informally, so as not to make Type One errors, or false positives, the initial acceptance of phenomena as genuine macro-PK that could subsequently be invalidated. Phillips points out that the alternative would have been Type Two errors, false negatives, incorrectly concluding that macro-PK was absent. Phillips cites a letter from Randi advocating "starting out with essentially loose controls . . . and gradually tightening up" (p. 26). Hence, there were 13 research sessions during three visits, each of them open to possible deception. During this time, the Alpha Boys surreptitiously entered the laboratory at night through an opened window and simulated instances of PK-like phenomena that were discovered by the MacLab staff the following morning. Phillips, upon observing these effects, called upon a colleague to tell him that he had been fooled "by a couple of young rascals who entered by the window" (p. 27). Phillips did not mention this interpretation to the MacLab staff because he did not see "any real motivation" for trick-playing on the part of the "Alpha Boys." To me, this was a puzzling decision. Even if the motivation was unclear, the behavior—even as an immature prank—should have been communicated to the staff. Frankly, I would have sent the Alpha Boys packing following this blatantly unprofessional incident.

Phillips divides the MacLab's interaction with the Alpha Boys into two parts. The first led up to the Parapsychological Association convention in 1981, during which "we were primarily trying to find conditions under



which [the participants] could display their abilities." That meeting was held in Syracuse, New York, and Phillips presented a short videotape of the Alpha Boys' ostensible PK along with a tape sent by Randi containing similar effects. Phillips introduced the tapes by terming the effects "suggestive" and asking for suggestions on how to proceed. The response of experienced parapsychologists was skeptical. Robert Morris and Charles Honorton told Phillips that Randi was planning a publicity foray with the Alpha Boys as its centerpiece. They did not tell him that they had been tipped off by Marcello Truzzi, who had overheard a discussion by two of Randi's colleagues. Randi was present at the convention but made no mention of what later became known as "Project Alpha." The research brief published in the PA proceedings by Phillips and Mark Shafer (a MacLab staff member) used the term "exploratory," a wise choice because the positive macro-PK results therein were likely fraudulent.

Phillips' correspondence with Randi was more extensive than I had realized; it even included a 1980 Christmas card from Randi in a Santa Claus cap accompanied by the message, "You'd better watch out." Phillips admits that during this first phase of the project, the Alpha Boys "deceived us," and these deceptions are described in a detailed paper in this Archive. During his discourse, Phillips often breaks the narrative with comments starting, "Dear Reader, you may be wondering . . . " or something similar, making "in hindsight" comments. One of these comments refers to a "physicist of good common standing" who "saw what was going on right away." The physicist (not a parapsychologist) is not named, nor is the reason divulged why his observations were not taken more seriously. Phillips asked for advice because he felt "unsuited" to "direct this laboratory" (p. 22). It is to Phillips' credit that his comments are characterized by modesty and a minimum of blame assignment.

Following the PA convention, the second part of the process was initiated. The Alpha Boys were told that the time for exploratory work was past, and that future experiments would be conducted with adequate controls. The macro-PK results disappeared and work was discontinued

in 1982. Phillips chose not to include private correspondence in this monograph, and the decision was probably a proper one. If he had included such documents, he would probably have cited a letter that William Braud wrote to Michael Thalbourne on March 28, 1983, describing a visit that Braud and I made to the MacLab in February, 1982. The joint visit was serendipitous; we had both been invited to the MacLab and simply appeared at the same time, although Braud's time there was longer than mine. In the letter, Braud describes what led to our conclusion that the Alpha Boys were part of a hoax. Braud, through a one-way vision window, observed one of the young magicians manipulate "what appeared to be an invisible thread . . . , tossing the thread over an imaginary object and maneuvering the thread and object with his fingers." I reached my conclusions following interviews with the Alpha Boys, closely observing their body language. In addition, I took notes regarding their statements; one of them claimed that they had been tested at parapsychology labs "all over the country" and that they had been accepted "from a pool of several hundred who had applied." In actuality, they had made brief visits to the New Frontiers organization in Wisconsin and to the psychiatrist Berthold Schwartz in Florida, both of whom were visited by Phillips whose reaction was less than impressive (p. 31). The "several hundred" applicants who responded to the announcements in various periodicals were more like a few dozen. These claims and behaviors were so outrageous one could make the case that the Alpha Boys wanted to be detected, as they were tired of the charade now that stringent controls had been imposed on the experimental sessions.

When the Alpha Boys made derogatory comments about Randi (whom they called "The Amusing Randi"), Braud and I mentioned the possibility that they were the magician's "plants." Here we missed our chance. According to Randi, his confederates had been instructed to immediately admit they were indeed magicians who were working with Randi should anyone have asked them a direct question. We did not ask a direct question, and the Alpha Boys made some humorous comments and then shifted to other topics of conversation. Phillips was not present at the time, but Braud and I shared our concerns with MacLab staff members. One of them mentioned that the manipulation of the imaginary thread was habitual "playacting" that had been noted before, while another one reminded us that there were instances in the history of psychical research in which participants cheated but nonetheless possessed actual psi talents as well. We left the matter at that but were unconvinced that the Alpha Boys had any psi ability whatsoever.

My own involvement with Project Alpha was not over. The Institute of Noetic Sciences had asked me to lead a group of its members to Brazil and Peru in early 1983, where we visited historic sites, claimant mediums, and

psychic claimants. Before arriving in Peru, a local shaman, Francisco, had asked for the birthdates of each member of our troupe. Upon meeting us, he gave us each a small sculpture crafted from tinfoil and a short statement, in Spanish. Almost everyone received a very pleasant and positive forecast, but mine read "Misunderstanding. Disgrace." A few days later, on our flight back to the United States, a member of our group walked to my seat and excitedly told me, "Stan, you are quoted in *The New York Times*!" She showed me the February 15th article, included in this monograph, titled "Magician's Efforts to Foil Scientists Raises Questions." Following my visit to the MacLab and in light of Braud and my conclusions, I suspected that Randi might discontinue the project at any time. Before I left for South America, I left a message with Robert Van de Castle, the public relations director of the Parapsychological Association (PA) (of which I was the then current president). I told him to release the letter to any journalist who wanted a statement from me or the PA about what was later called "Project Alpha." My memo duly noted that Phillips and the MacLab staff had never made unequivocal claims about the veracity of the Alpha Boys, and that their current research protocols were designed to guard against fraud. I also reiterated my long-standing insistence that magicians with expertise in close-up legerdemain be consulted whenever parapsychologists investigated macro-PK.

William Broad, who wrote the article for *The New York Times,* did not consult the PA nor did any of the other journalists who covered the story. To the contrary, Broad claimed that I had written Randi a letter calling the project a "magnificent experiment which was much needed." Obviously, I could not have written this letter because I was abroad at the time. I complained to the newspaper, and on August 16, 1983, it published my statement that I had been misquoted. But the damage had been done. I received a number of letters from prominent PA members condemning me for such an inappropriate comment. Fortunately, some of these letters began by stating, "If this quotation is true," leaving open the possibility that it was an error. According to Phillips, Broad claims he obtained the quotation from Randi (not an example of first-class journalism) and concludes "its true origin remains a mystery." However, I have in my possession a letter (March 28, 1983) from Randi in which he acknowledges that the statement was made by Mark Shafer, and apologized "for the error and trust that you will forgive it." The Peruvian shaman had been right. Misunderstanding. Disgrace.

Phillips is correct in stating that I wrote an account of Project Alpha for the *Newsletter of the Association of Humanistic Psychology* (AHP). But he is wrong in stating that I wrote it for the benefit of the PA membership,

as few of them read the *Newsletter*. Instead, I wrote it for AHP members. Furthermore, I checked its accuracy with both Phillips and Randi, and each of the protagonists agreed that my account was correct. In fact, Phillips cites some items from my article in his introductory material. My document is included in this archive under the title "The Randi Caper" (Krippner 1984).

In William Braud's previously cited 1983 letter, he made it clear that neither of us felt the Alpha Boys were legitimate "psychics," and were not even examples of "psychic claimants" who sometimes "cheated"—as one staff member suggested. I still have my notes from that visit. I also have a press release from September 1, 1981, in which Phillips and Shafer noted that Steve Shaw's performance had been "inconclusive," and a letter from Phillips to me from May 20, 1983, bemoaning the report that some parapsychologists knew about the hoax and even "supported" Randi. I have no evidence concerning the latter claim, but, as noted earlier, some parapsychologists did know about the hoax and I have no idea why they did not immediately fully inform Phillips.

As I was the President of the Parapsychological Association at the time, a few PA members wrote me angry letters regarding Randi's unethical behavior and that he may have violated federal laws. Evan Harris Walker wrote me, on March 5, 1983, "If these allegations are true, as some of these activities involved interstate communications and travel, they would constitute violations of federal laws." However, Phillips notes in the archive that Randi is not a member of any organization that would consider his actions illegal or unethical. For this reason, I declined Walker's request that I instigate legal action. In addition, I knew that that the PA lacked financial resources to take this route with an outcome that would have, at best, limited value. It is also why I used the term "caper" instead of "hoax," when I wrote my newsletter article.

The 1983 convention of the Parapsychological Association was held at Fairleigh Dickinson University in New Jersey. As President, I had introduced a resolution (which was approved) that parapsychologists, when dealing with ostensible macro-PK, have a magician present or enlist his or her services as a consultant. Randi was present at the conference and invited John Beloff, the well-known Scottish parapsychologist, and myself to his nearby home for dinner. Before dinner he impeccably performed a card trick that shook Beloff visibly, although I took it in stride. When I returned home, I consulted my collection of books on sleight of hand and also talked with Dr. Arthur Hastings, a PA member and a talented magician. I wrote Randi a scenario telling him how I thought he had performed the trick. He later told me that I had "almost figured it out" and that he would never perform that trick for me again or I would fill in the missing piece. Quite a compliment!

More to the point, Beloff and Randi discussed a young man who claimed to be able to bend metal objects in a sealed cube. Initially, his attempts seemed to be successful, even though he "worked" on the metal at his home. Beloff's associate Deborah Delanoy later wrote (1987) "The cube appeared to be intact, and we could not detect any obvious tampering. . . . Subsequently, the cube was sent to Mr. Randi for examination. Mr. Randi returned the cube, saying it had definitely been dismantled and reassembled. Upon further study of the cube . . . the method of reassembly . . . appeared most evident. . . . An identical . . . cube . . . was subsequently procured and sent to Mr. Randi for 'fraud-proofing'. . . . Mr. Randi also sent another 'fraud-proofed' item." The research participant "never did succeed in bending either of these objects" (p. 248). At this point, Randi mentioned that John Taylor, a mathematical physicist at Kings College, London, had asked for Randi's help in designing a foolproof tube for an investigation he was carrying out with boys who claimed that they could bend metal. Randi then announced (to the best of my recollection), "This is the successful conclusion of Project Beta. Investigators of paranormal phenomena have finally asked my advice, intending to follow it." In an August 18 letter to me, Randi wrote "I've sent a test protocol off to John [Taylor], and will be preparing a set of tubes for him shortly. It will be interesting to know the result of his test with his new subject. Sometime later, Randi informed me that he had never heard from Taylor, who, in the meantime, had lost interest in parapsychology and debunked its accumulated data. Beloff and his colleagues, as noted above, followed Randi's advice and duly reported the results.

There had been rumors about "Project Beta" for several months, and many parapsychologists feared that their laboratory would be the next target. After Beloff and I informed them of Randi's announcement, they probably breathed a sigh of relief.

Of course, Phillips had asked for Randi's advice, but Randi did not think his suggestions had been taken seriously. In a July 10, 1983, letter to me, he stated, "Phillips only tightened controls AT MY SUGGESTION after the Syracuse convention. Up until then he had ignored my caveats and suggestions, but upon seeing the reaction to my videotape in conjunction with his, he was rightly alarmed , and called back for revision the written report he had issued, inserting the modifiers 'apparently' and 'ostensible'—as well as others. The "controls against trickery were tightened when I INSISTED on showing him evidence against the validity of what he had observed!" This account does not contradict what Phillips wrote in his Introduction to the archive but, if accurate, does provide a somewhat different perspective.

So what can be said about Project Alpha after all these years? The

purpose of Phillips' archive was to vindicate Michael Thalbourne and in that task it succeeds. It presents a plausible rationale that macro-PK could be investigated at first with loose controls and if promising results resulted then the controls should be tightened. It also belies Martin Gardner's claim that "magicians are the enemy of parapsychology." Marcello Truzzi and Randi himself said the opposite. However, it does call for vigilance. When Randi or someone of his fame (and/or infamy) enters the scene, the controls should be tightened promptly. Phillips' behavior was thoroughly professional, but was not always fully cautionary, something he infers in his frequent comments to the readers of the archival material.

Readers of this archive can reach their own conclusions, but at the very least they will find the narrative, and the accompanying documents, provocative. They will also realize that Randi is essentially an entertainer, as his film biography described him—"an honest liar." Parapsychology is a multidisciplinary field and no one person can cover all of the bases on such a complex phenomenon as psi. Indeed, psi researchers need all the help they can get, and sleight-of-hand artists will often find a role that they can play better than anyone else.

Stanley Krippner

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THE INSTITUTE FOR VENTURE SCIENCE ANNOUNCES
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FOR IMMEDIATE RELEASE

Contact: Dr. Gerald Pollack, Executive Director
Email: admin@ivsci.org
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Seattle, WA – 26 April 2016

The Institute for Venture Science (IVS), a Seattle based non-profit, today announced the opening of its first round of pre-proposal competition for scientific grants.

The IVS funds promising ideas that challenge conventional scientific thinking. The organization seeks to identify ideas with the highest potential to replace paradigms that have outlived their usefulness. All areas of natural science are considered. Dr. Gerald Pollack, the Executive Director of the Institute commented, "We do not fund technology development, but only fundamental science — the more fundamental, the better. We are seeking proposals with the highest capacity to shake the earth."

A key aspect of the IVS plan is to fund multiple laboratories worldwide that follow the same theme. That approach helps build a critical mass, assuring that promising new paradigms cannot be easily ignored. Challengers will have a fighting chance to gain traction. This approach is expected to facilitate major breakthroughs, possibly even scientific revolutions.

Pre-proposal instructions are available at
http://www.theinstituteforventurescience.net/#!preproposal/cifs.

Chairman of the Board of Directors, Dr. James Ryder stated, "As the number of submissions we can review during this initial round will be limited to 200, early submissions are encouraged."

Further information on the Institute can obtained by visiting www.IVSCI.org or by email to admin@ivsci.org.

SSE ASPIRING EXPLORERS PROGRAM

The SSE has established an Aspiring Explorers Prize for meritorious student research projects judged to be the most original and well-executed submission in subject areas of interest to the SSE. A committee is in place to review all entries and determine the winner, who will receive an award of $500 and have the opportunity to present a talk describing the project at the annual meeting, for which the Society will cover her/his registration fee. Submissions must be made per the guidelines and deadline as stated on the SSE website "Call for Papers" for the conference you are considering attending in order to be eligible for that year's prize.

If your paper is selected for the Aspiring Explorer Award, you will be either invited to present your talk at the meeting or able to submit your paper as a poster session. We are very excited about doing poster sessions now, so please let your fellow student colleagues and professors know about this.
http://www.scientificexploration.org/2016-conference

In addition, the SSE is also offering a 50% discount on future meeting registrations for any student member who brings one student friend to our conferences (one discount per student). We are eager to see student clubs or SSE discussion groups established at various academic institutions or in local communities. Contact us at sseaspiringexplorers@gmail.com to start your own group!

C. M. Chantal Toporow, Ph.D., SSE Education Officer
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Life and Mind — Scientific Challenges

10th Biennial European Conference of the Society for Scientific Exploration

Sigtuna, Sweden, October 13 – 15 2016

http://www.scientificexploration.org/sweden-2016

The 10th Biennial European Conference of the Society for Scientific Exploration is being organized in collaboration with the Swedish Society for Psychical Research (SSPR) and the research center Agora for Biosystems at the **Sigtuna Foundation** October 13–15, 2016 (Thursday morning through Saturday noon). The Sigtuna foundation (website: sigtunastiftelsen.se/) is a private cultural foundation, whose principle aim is to inspire human thought and reflection, and to stimulate and facilitate dialogue, encounters, and bridge building. Founded in 1917, it grew out of a student movement that sought to revitalize both the Church of Sweden and society at large by fostering a creative and fruitful exchange between people of faith and secularists, between religion and science, culture, and the arts.

Sigtuna is the oldest town in Sweden (980 AD), has the most runic stones, and is close to Uppsala, which has the oldest university in Scandinavia (Uppsala University was founded in 1477 and has a track record of numerous Noble Prices). Sigtuna has played an important role in Swedish history. Sigtuna is also close to the capital city, Stockholm, and its major airport Arlanda. Local Hosts are SSE European Representative Anders Rydberg anders.rydberg@angstrom.uu.se or anders.rydberg@sse-europe-2016.eu and the Program Chair, and President for the SSPR, Göran Brusewitz goran.brusewitz@bredband.net or goran.brusewitz@sse-europe-2016.eu

KEYNOTE SPEAKERS

Stuart Hameroff, anesthesiologist, director of the Center for Consciousness Studies and professor at the University of Arizona, Tucson, USA. Professor Hameroff is best known for his studies and theories on a quantum basis of consciousness.

Johnjoe McFadden, professor of Molecular Genetics at the University of Surrey, United Kingdom. Professor McFadden is best known for his studies on the electromagnetic basis of consciousness.

Rupert Sheldrake, a British biologist and author, and best known for his hypothesis of morphic fields and resonances, which leads to a vision of a living, developing universe with its own inherent memory.

A Panel discussion on Parapsychology and Consciousness will be held with tentative panellists Professor Dick J. Bierman, Professor Etzel Cardeña, Professor Adrian Parker, Professor William Bengston, Assistant Professor Jan Dalkvist, and Dr. Rupert Sheldrake.

A Panel discussion on Quantum Biology and Consciousness will be held with tentative panellists Professor Johnjoe McFadden, Professor Stuart Hameroff, Dr. Rupert Sheldrake, and Professor Hans Liljenström.

CALL FOR PAPERS

Papers in the areas of Quantum Biology, Brain and Mind, and Consciousness, and related areas are welcome. Abstracts (non-student abstracts) for contributed papers should be sent to the Program Chairman: Göran Brusewitz goran.brusewitz@bredband.net or goran.brusewitz@sse-europe-2016.eu

Student abstracts should be sent to the SSE Education Chair, Dr. Chantal Toporow, at sseaspiringexplorers@gmail.com. Electronic submission is required. The Title should be short and informative. Please include Author name and Affiliation, and contact information. Abstracts should be 300 to 500 words (one page of single-spaced text), and should summarize the main points of the paper. Plain text as the body of the e-mail is preferred. If special formatting is required for intelligibility, please submit a Word document. The cutoff date for submissions is June 15th, 2016. Please note in the submission if you prefer oral or poster presentation.

RECEPTION & OUTINGS

Welcome Reception: Wednesday, October 12, starting at 7 p.m.

Field Trip: SSE's traditional recreational excursion will be to Uppsala, home of botanist Carl von Linné and Uppsala University. Uppsala Cathedral (see photo) houses the grave of scientist/mystic Emanuel Swedenborg. Old Uppsala is rich in archaeological remains and has 3 royal mounds.

Banquet: Friday night, October 14.

IMPORTANT DATES for EURO-MEETING

Paper submission due: June 15, 2016
Notification of paper acceptances: July 1, 2016
Early fee deadline for registration: July 15, 2016
Last day for hotel registration at the Sigtuna Foundation: July 15, 2016
Last day for hotel registration at the Sigtuna Hostel: Sept. 15, 2016
Conference: October 13–15 (Thurs. morning through Saturday noon)

ACCOMMODATIONS & TRANSPORTATION

The conference/hotel venue is the **Sigtuna Foundation** (Sigtuna-stiftelsen) in Sigtuna. +46-859258900; info@sigtunastiftelsen.se sigtunastiftelsen.se.

A large block of rooms has been reserved (arrival Oct. 12 and departure Oct. 15) a special rate of 1203 Skr ($144) (single room) and 1642 Skr (double room) incl. breakfast. Reservation should be made 3 months in advance (by July 15) to receive this rate. Please call or email the hotel.

In addition, 20 rooms have been reserved at the Sigtuna Hostel and Folk High School, Sigtuna. +46-859258300. Email: vandrarhem@sigtunafolkhogskola.se. The price is 755 Skr (single room) ($90) and 1070 Skr (double room) incl. breakfast. Reservation should be made 1 month in advance (by Sept. 15). Please call or email hotel to reserve your rooms. The hostel is close to Lake Mälaren and to the Sigtuna Foundation (walking distance).

If you are looking for even cheaper accommodation, check out destinationsigtuna.se/en/. If you are still looking for accommodation, please e-mail Anders Rydberg or Göran Brusewitz. We can supply more suggestions.

The venue is close to Stockholm/Arlanda airport (15 min. by taxi). There is a special taxi price from Arlanda to Sigtuna Foundation of 310 Skr ($37): call Taxi 020, at +46-20–202020, www.taxi020.se

There are buses from Arlanda to the Sigtuna Foundation. Bus Number 579 takes you directly to Sigtuna (+ walk circa 850 m). sl.se/in-english/. Contact the Sigtuna Foundation for more info. sigtunastiftelsen.se. +46-8592589.

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