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EDITORIAL

The philosopher Ludwig Wittgenstein once wrote, “A curious analogy could be based on the fact that even the hugest telescope has to have an eye-piece no larger than the human eye” (Wittgenstein 1980:17e). It’s an intriguing comment, and (like many of Wittgenstein’s) its import isn’t altogether clear. For me, though, it calls to mind an insight apparently embodied (perhaps, unwittingly) in a short story, “Ask a Foolish Question,” by science-fiction writer Robert Sheckley.¹

It’s clear from Sheckley’s body of fiction that he knew quite a bit of philosophy, and “Ask a Foolish Question” seems to dramatize certain venerable themes concerning conceptual relativity and the nature of truth. Although I think Sheckley draws the wrong conclusion at the end of his story and may in fact have missed the central point he so cleverly illustrates, the dilemma of his characters might interest and be of value to *JSE* readers who aspire to draw grand conclusions from their studies of scientific anomalies.

Sheckley imagined that a race of super beings had uncovered the ultimate nature of reality and had constructed a device, Answerer, to provide that knowledge to whomever sought it. (Sheckley doesn’t seem to realize that his story actually illustrates why this is impossible.) The story, then, concerns several dramatically different races of beings, including humans, heading toward Answerer, all of them eager to pose their ultimate questions.

The problem, however, is that because these organisms are such radically different forms of life, their distinctive and interrelated descriptive categories, overall conceptual schemes, and even the phenomena and regularities they can experience, differ radically as well. For example, the members of one race were so big that they could leap from one star to another. These beings were concerned with their lifelong and only partially grasped activity of collecting purple, which was present throughout the universe, which somehow governed their lives, and which they were slowly building into an enormous mound whose purpose was also not clear to them. They also spoke a variety of contextually appropriate languages, each presumably with its own idiosyncratic syntax and semantics—that is, ways of parsing and organizing the world as they experience it. For example, these creatures spoke the language of imminent decision, the tongue of light banter, the vernacular of decision-to-fact, and the tongue of arguments.

Another race was governed by the rule of eighteen, according to which when there are eighteen, a nineteenth will appear. These creatures knew that the stars were cold, but they did not know why, just as they didn’t know why the

rule of eighteen was a natural law. And for them there was no distance, although there were other places where they could appear.

And then there were humans, also heading toward Answerer. Moreover, all the travelers believed that Answerer had been built by a race not unlike their own.

In Sheckley's story, each group of beings has a frustrating encounter with Answerer. In every case, Answerer tells them their questions rest on organism-relative assumptions that it and its creators reject. Answerer couldn't say what purple was or why the race that collected it was building a mound of the substance. It couldn't explain why, when eighteen gather, a nineteenth is produced, or why the stars are cold, or why those creatures were fat there and thin here. Answerer couldn't even answer the human visitors' questions, "Is the universe expanding?" and "What is death?" For Answerer, the concepts/descriptive categories used in all these questions were profoundly inadequate for conveying genuine knowledge.

Unfortunately, Sheckley confusedly ends his story with the conclusion that, in order to ask the right question, one must already know most of the answer. But that's not quite right. What the story seems instead to illustrate is that there *cannot* be such a thing as an objectively privileged right answer—including those dispensed by Answerer. The moral should have been that no set of questions, including those to which Answerer was designed to respond, is perspective-free, and no perspective on the universe can be independent of some relevant lifeform's idiosyncratic organism, perceptual modalities, history, and current situation. But then no perspective on the universe can be all-encompassing, capturing every possible discernable phenomenon or meaningful natural regularity.

Answerer tells his visitors that their questions and concepts are mere "partialities" at best, as if Answerer's own perspective transcends the limitations of the organisms posing their questions. But those limitations result from at least two related states of affairs, which unavoidably affect Answerer and its creators as well as the galactic travelers. First, the visitors are all organically restricted in the range of phenomena they can experience. Second, the language they use for articulating and grasping what they call knowledge, and the descriptive categories they employ, are all abstractions focusing on certain aspects of their idiosyncratically experienced world to the exclusion of others. In fact, as the philosopher C. S. Peirce recognized, by the time you're old enough to conduct a scientific investigation or do epistemology, you're already "laden with an immense mass of cognition already formed, of which you cannot divest yourself if you would" (Peirce, 1963, paragraph 416). To use a familiar philosophical image, our combined organic constitution and conceptual framework is analogous to a pair of tinted glasses that we can't

remove. Everything we experience and try to analyze comes pre-tinted, pre-conceptualized, and there's not a thing we can do to escape it. It's why classic philosophical attempts at rational reconstructions of knowledge have been such spectacular failures—for example, empiricist efforts to build up knowledge from uninterpreted sense-data. As Peirce recognized, “there is but one state of mind from which you can ‘set out’ [to do philosophy or science], namely, the very state of mind in which you actually find yourself at the time you do ‘set out’,” and at that point “our very percepts are the results of cognitive elaboration” (Peirce, 1963). This is why many philosophers, including Kant and some of his less rationalist pragmatist successors, believed that it was the business of science to study the world as we experience it (i.e. inescapably tinted), and it was the job of philosophy to study the nature of the tinted glasses.

Now Sheckley apparently wants us to believe that the humans and other visitors to Answerer suffer from conceptual limitations traceable to their distinctive organic constitutions and perceptual modalities. But of course, *any* organism must be constrained in that way, including the members of the race that built Answerer. Visitors to Answerer didn't ask the *objectively* wrong question. The questions which Answerer was designed to accept would be no more privileged or inherently deep than those which Answerer rejected. A more plausible explanation for Answerer's inability to deal with visitors' questions would be that there's no way to translate neatly (or without residue) between Answerer's conceptual framework and those of its interlocutors. In fact, it's reasonable to suggest that the only difference between the race that built Answerer and those whose members visited it in search of ultimate knowledge is that Answerer's creators were satisfied—perhaps only at that time—that they understood nature as they experienced it. And of course, that's a position which scientists have taken, and later rejected, repeatedly over the centuries.

So is there a lesson here for the study of scientific anomalies? Many of those working in areas of frontier science are understandably tempted to speculate about the implications of their research for our understanding of nature. Some even aspire, foolishly I think (as Sheckley's story unwittingly illustrates), to formulate a theory of everything. Sheckley's story, and various additional philosophical considerations, seem to show that our grasp of reality is doomed to be partial at best, and that this grasp must inevitably be couched in terms idiosyncratic both to one's form of life and to one's cognitive history.

So perhaps Sheckley's story can serve as a cautionary tale, reminding us not to succumb to a kind of scientific or metaphysical hubris. Whatever key we might think we've found to unlock nature's secrets, we'll never wind up either with an all-encompassing description of nature or one incapable of revision or further refinement. Those goals seem simply to be naive and forever out of reach.

Nevertheless, I feel strongly tempted to put a positive spin on this, and it's not because I'm an exemplar of a sunny disposition (in fact, that would violate the professional philosopher's imperative to be curmudgeonly). I think Sheckley's story also reminds us that there will *always* be more to learn about the universe. Despite the aforementioned inevitable limitations on our understanding of nature, as we evolve both organically and conceptually, we will hopefully devise increasingly useful sets of conceptual grids for grasping and manipulating the world around us. And if (as I believe) there's no reason to think this evolutionary process can ever end, we can look forward to more anomalies, more mysteries, and the possibility of further and exciting refinement of our knowledge, restricted as it must be in any case.

Note

- ¹ The story first appeared in *Science Fiction Stories No. 1* in 1953. It is available online at several sites and has since been anthologized often. See for example Sheckley, 1955, 1975.

STEPHEN E. BRAUDE

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RESEARCH

**Objective Analyses of Reported Real-Time Audio
Instrumental Transcommunication
and Matched Control Sessions: A Pilot Study**

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This study was funded by the Sarah Estep Memorial Research Fund of the Association TransCommunication (ATransC) [formerly the American Association of Electronic Voice Phenomena (AA-EVP)].

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Abstract—This study asked: Can the presence of instrumental transcommunication (ITC) be objectively detected in sessions collected by an experienced operator using EVPMaker software producing a random stream of allophones (short speech elements)? Several aspects of ten Active Sessions were examined: (1) the distribution of the allophones generated; (2) independent, blinded listening panel interpretations of session samples; (3) content analysis of questions posed by the operator and her perceived responses; and (4) automated interpretation of session samples using speech recognition software (SRS). For analyses (1) and (2), 10 ITC-free Control Sessions collected by the investigators were used for comparison, and it was determined that no differences existed between the Active and Control Sessions regarding: (a) the allophones present and (b) the proportions of participants who recognized words in the samples. Analysis (3) revealed that the responses perceived by the operator did not consistently contain information that logically matched her questions, and analysis (4) demonstrated that SRS was unable to detect the phrases perceived by the operator. Future studies may wish to focus on the psychology and motivation of ITC operators; the impact of the perceived communication; and the potentially psi-conductive effects of using EVPMaker to acquire veridical information.

Keywords: electronic voice phenomena—instrumental transcommunication—EVP—ITC—speech recognition software—listening panel

Introduction

In the quest to detect and communicate with deceased individuals (called discarnates), a wide range of tools and devices have been developed. The earliest forms of spirit communication ranged from the use of hallucinogens to achieve a communication-conductive altered state of consciousness to simple tools such as the planchette which moved a writing instrument across paper

when touched by the fingertips of operators. As technology has advanced, so has the sophistication and complexity of these communication devices. Today, the use of different technologies to facilitate discarnate communication and interaction is known as instrumental transcommunication (ITC).

ITC has been defined as “communication beyond (trans) our known reality through instruments or technical devices” (Cardoso, 2003:1). Specifically, ITC is the process of capturing the voices, images, or other aspects of ethereal entities (be they discarnates or other non-corporal entities) through the use of different technologies. Unlike the more traditional methods used to capture electronic voice phenomena (EVP) in which voices are said to appear on recordings when no voices were heard while the recording was being made, some ITC techniques allow for immediate feedback which may facilitate real-time communication. (For a thorough discussion of the history of EVP and ITC, see Barušs, 2001, Butler & Butler, 2004, Fontana, 2005, Laszlo, 2008.)

ITC research to date has been criticized because 1) conversations may not be collected under controlled conditions by independent observers and 2) full details of experimental protocols may not be provided (e.g., Fontana, 2005:380). The current study was designed to address both of these concerns and focused on a relatively new ITC method which uses EVPMaker, a free software program developed and distributed by Stephan Bion (2010a). The software loads a digital audio file into a buffer in the computer’s memory and then plays back randomly ordered short segments of the file.

Originally, EVPMaker software was used as a random source of background noise when recording for traditional EVP. More recently, EVPMaker operators have begun loading the software with a specially created audio file that contains 72 allophones (short speech elements) digitally generated by a SpeakJet voice and sound synthesizer chip (Magnevation, Capshaw, AL, <http://www.magnevation.com/SpeakJet.swf>) to generate “a robotic-like random voice” (Bion, 2010b). EVPMaker operators have claimed that they can hear meaningful, real-time responses in the EVPMaker output to questions that they ask aloud when using this EVPMaker plus SpeakJet Allophone File configuration (e.g., Downey, 2010). Unlike previous ITC collection methods in which software was not used, sessions using this configuration provide a new opportunity for objective scientific analysis of communication because (1) real-time communication is experienced, (2) EVPMaker output files can be statistically analyzed, and (3) the voice produced during EVPMaker sessions is consistent, allowing for objective analysis with voice recognition software. In an attempt to objectively test for the presence of ITC in this scenario, the present study analyzed real-time ITC sessions recorded by an experienced EVPMaker operator (described in more detail in Materials and Methods, in the Operator section) in which the operator-claimed contact with an external entity was established and conversations took place.

Recording a Typical EVPMaker + SpeakJet Allophone ITC Session

In her practice, the operator who participated in this study normally utilizes two computers to record ITC sessions. The first computer runs the EVPMaker software which has been loaded with the SpeakJet allophone audio file to produce a stream of randomly selected allophones heard through the computer's speakers. The second computer is used to audio record the session (including the output from EVPMaker and the questions or comments she utters aloud) from the computer's microphone. During the session, the operator may perceive recognizable words or phrases (which we call *utterances*) being "spoken" by the contacted entity in the EVPMaker output.

Problems with This Method and the Need for Additional Controls. From a research perspective, this ITC recording method requires more controls to ensure that the operator 1) is consistently following the recording method and 2) is not tampering with the data. To address these issues, the investigators developed and pre-tested a dedicated computer system referred to as a Standardized Data Collection Platform (SDCP) which the operator used while recording sessions for this study. The SDCP incorporated stealth security and system auditing features which allowed investigators to verify that recording protocols had been followed and to ensure that the integrity of the data for each recording session had not been compromised (a detailed discussion of the SDCP is included below).

Optimizing Data Collection

As has been previously noted, "negative results from a study using methods that did not appropriately optimize the experimental environment and positive results from a study that did not maximize all possible controls are equally ineffective in establishing new scientific knowledge" (Beischel, 2007/2008:40). In addition to the implemented controls listed above, the investigators incorporated the following elements in order to ensure that the current study provided the most favorable conditions for ITC to occur:

- 1) The investigators did not attempt to conduct and record ITC sessions on their own. The experimental sessions were recorded by an experienced operator who was allowed to record the ITC session in her "natural environment" without direct oversight or supervision.
- 2) The operator was allowed to conduct as many ITC sessions as she wished with no specific end date given. Her instructions were to (a) provide the investigators with 10 sessions (referred to as Active Sessions) in which she believed that ITC occurred and (b) provide the investigators with the files (e.g., EVPMaker output files, audio recordings, and her transcripts of the sessions) from all collected sessions, even those which did not contain ITC.

3) The investigators gave no instructions as to how the ITC sessions should proceed. Before data collection began, the operator explained that her sessions are conversational in style; that is she asks a question, waits for a response, and then asks a new or follow-up question or responds to an utterance she hears in the EVPMaker output stream. In order not to impose any artificial restrictions on the process, the investigators gave no instructions to the operator as to (a) how these conversations should be structured, (b) what types of questions should be asked, or (c) what information (i.e. veridical or non-veridical) should be acquired during the sessions. The operator was simply to follow her own process and let the conversations unfold as they would in any session she would normally record.

Objectively Testing for the Presence of ITC

It is an implicit assumption in ITC research that the recognizable utterances recorded during an ITC session are the result of some type of external influence on the recording system. The source of this influence is assumed to be an external entity such as a discarnate or other ethereal entity. Alternative explanations include mind-machine interaction (e.g., Radin & Utts, 1989) between the operator and the ITC technology being used (which in this case is EVPMaker), random chance, and pareidolia (the tendency to interpret vague or random stimuli as meaningful) (e.g., Zusne & Jones, 1989, Banks, 2001). Thus, the research question for this study asked:

Can the presence of ITC be objectively detected in real-time ITC sessions recorded by an experienced EVPMaker operator in which the operator claims successful contact with an external entity has occurred?

In order to objectively determine the existence of ITC in the Active EVPMaker Sessions collected by the operator while addressing the alternative explanations listed above, the investigators subjected the Active Sessions to the following analyses:

1. Statistical Analyses of Allophones. It was hypothesized that if external influence (regardless of source) was affecting the Active Sessions collected by the operator, the frequency, number, and distribution of the allophones generated by EVPMaker (which should be a random process) would deviate from chance expectation.

2. Blinded Listening Panel with Randomized Matched Controls. It was hypothesized that issues of pareidolia might be addressed by comparing blinded participants' interpretations of the utterances from Active Sessions to samples of the EVPMaker output from Control Sessions in which no operator was present.

3. Content Analysis of Operator Questions and Perceived Responses. It

was hypothesized that should ITC occur, utterances identified by the operator in the Active Sessions might be meaningful when reviewed in the context of the questions she posed.

4. Automated Interpretation of Utterances Using Speech Recognition Software. It was hypothesized that issues of pareidolia could further be addressed by removing the human element from the process of identifying and interpreting utterances. Because the EVPMaker output in this study always uses the same “voice” produced by the SpeakJet chip, speech recognition software could be trained to recognize the SpeakJet voice and analyze utterances in the Active Sessions.

Materials and Methods

The philosophy behind the protocol development for this study emphasized the need for off-the-shelf, readily accessible materials and software so that the study could be easily replicated by other researchers.

Operator

The operator in this study was recommended by the granting organization, the Association TransCommunication (ATransC) [formerly the American Association of Electronic Voice Phenomena (AA-EVP)]. She is an ATransC Certified Proxy Practitioner, defined by ATransC as a member or practitioner who has “demonstrated the ability and willingness to attempt contact with loved ones [on] behalf of others” (ATransC, 2010). Other qualifications defined by ATransC include “at least four successful contacts via EVP [on] behalf of sitters which have resulted in a letter of testimonial indicating that the sitter correctly heard the EVP and expressed thanks to the practitioner” and an “understanding of the characteristics of EVP and ability to distinguish false positive results” (ATransC, 2010). The operator is considered by ATransC to be an expert in the collection and interpretation of ITC real-time communication sessions using the EVPMaker plus SpeakJet Allophone File configuration. Further information about the operator is not included here in order to protect her privacy and for confidentiality.

EVPMaker Software

EVPMaker version 2.2 (<http://www.stefanbion.de/evpmaker/evpminst.exe>) was loaded with the SpeakJet Allophone audio file (<http://www.tonbandstimmen.de/files/speakjet/SpeakJetAllophones.wav>) as the audio source. “EVPMaker . . . divides any recording of speech into short segments and then plays them back continuously in random order. The resulting ‘gibberish’ still sounds like speech, but can’t be understood anymore” (Bion, 2010a).

SpeakJet Activity Board and Software

The SpeakJet Activity Center (SAC) (Magnevation, Capshaw, AL, <http://www.magnevation.com/descriptionactivitycenter.htm>) is a self-contained development board which connects to a computer via its RS232 port and can be sent command codes to generate groups of allophones (i.e. to produce audible words). Magnevation Phrase Translator software version 1.14 was used to manage communication between the host computer and the SAC and to send command codes to the SpeakJet chip.

Audacity Software

Audacity (<http://audacity.sourceforge.net/>) is free, open-source audio recording and editing software. Audacity was used in this study to isolate session samples for use in the listening panel (described below) and speech recognition software analyses.

Speech Recognition Software

Dragon NaturallySpeaking version 9 Preferred Speech Recognition Software (Nuance Communications, Burlington, MA, <http://www.nuance.com/naturallyspeaking/>) was used to analyze the EVPMaker output. This package reports 99% accuracy, has a vocabulary of more than 300,000 words, requires minimal training, and was specifically designed to import and transcribe audio WAV files, the file type produced by EVPMaker.

The Standardized Data Collection Platform (SDCP)

The Standardized Data Collection Platform (SDCP) was used to collect experimental EVPMaker sessions and save the session files in a controlled and secure environment. The SDCP consisted of an ultra-portable Eee PC 900 laptop computer (ASUS, Fremont, CA, <http://usa.asus.com>) fitted with a 320 GB Passport portable USB hard drive (Western Digital, Lake Forest, CA, <http://www.wdc.com/en/>). The only application software installed after purchase was EVPMaker version 2.2 and the SpeakJet allophone data file. The SDCP was hand-delivered to the operator's home by an investigator (author MB) at the start of data collection. After the system was installed and the operator trained in its use, the operator conducted a test session with the investigator present. According to the operator, communication was possible using the SDCP.

SDCP Security Software. One of the criticisms aimed at previous ITC research calls attention to potential tampering of the source material so that it produces the desired result. This was especially of concern in this study given that the data were collected at the operator's home without direct observation or

supervision by the investigators. To ensure the integrity of the data, the SDCP was equipped with Spector Pro version 6.0 software (SpectorSoft, Vero Beach, FL, <http://www.spectorsoft.com>) to track keystrokes and system events (e.g., mouse clicks, file reads/writes) which ensured that the files on the SDCP were not altered and that recording protocols were followed; that is to guard against fraud and user error. During the study, only the investigators were aware of the type of security software installed on the SDCP. Additionally, the wireless Internet transceiver on the system was disabled to prevent the SDCP from being connected to the Internet during data collection. Finally, comparisons were made between the files saved on the SDCP and those mailed to the investigators by the operator (described below).

Collecting the Control ITC Sessions

Prior to collection of Active Sessions by the operator (described below), Control Sessions in which no operator was present were collected using the SDCP. Control Sessions were collected first in case the SDCP was damaged during the collection of the Active Sessions (e.g., in transit to/from the operator). In addition, concern was expressed by the granting organization that it might not be possible to collect true Control Sessions after the operator had used the SDCP. It was theorized that once the operator had established a communication link, the SDCP would continue to act as an “active station” which would continue to receive communication even in the absence of the operator, thus contaminating any future sessions.

Procedure. The first author (MB) collected 10 EVPMaker Control Sessions on the SDCP. EVPMaker software settings were configured to match those used by the operator in her ITC recording sessions (e.g., each session was three minutes in length, and the pseudo-random number generator function in EVPMaker was used). It is important to note that the SDCP speakers were turned off during the collection of the Control Sessions, and the investigator did not hear the sessions as they were recorded. In addition, those sessions have never been and will never be heard in their entirety by any person. These precautions were taken in an attempt to discourage potential ITC from occurring in the Control Sessions. The 10 original control files were removed from the SDCP external hard drive prior to its being delivered to the operator.

Collecting the Active Sessions with the Operator

Procedure. When recording each three-minute conversation, the operator used her personal computer to record the EVPMaker audio output and her spoken questions and commentary while a second computer (the SDCP) produced and saved the EVPMaker output. All the sessions attempted by the operator were

reported to contain two-way ITC conversations. After each conversation was recorded, the operator copied the EVPMaker session file from the SDCP to one of eleven flash drives supplied by the investigators and returned it by mail to the investigators; a backup copy of the file was saved on the SDCP. Using audio editing software on her personal computer, the operator also created an edited version of the conversation session that highlighted the sections in which she identified recognizable words and phrases (utterances). She also created a transcript of the conversation. The operator then emailed to the investigators (a) the raw, unedited recording of the session; (b) the edited recording of the session; and (c) a transcript of the conversation. After the data from the last conversation was sent, an investigator (MB) returned to the operator's home to retrieve the SDCP.

Security Review. Once the SDCP was back in the possession of the investigators, the security logs of the SDCP were reviewed for possible security violations. Output from the security software was compared to the protocol provided to the operator to ensure it was properly followed. In addition, system events logged by the security software were reviewed to ensure that no file or hardware tampering occurred. Other analyses performed to ensure consistency between the files saved on the SDCP and the files provided by the operator via email and on the flash drives included:

1. A comparison of the Active Session EVPMaker files saved by the operator on the SDCP and the copies sent to the investigators via US mail,
2. A comparison of the Active Session EVPMaker files and their associated unedited recorded audio files,
3. A comparison of the transcript files to the recorded audio files, and
4. A comparison of the unedited audio recordings and the edited audio recordings.

From these analyses, it was concluded that tampering with the data was highly unlikely and that the probability of fraud being involved in the collection of the Active Sessions by the operator was extremely low.

Analyses and Results

Allophones Generated in the Active Sessions

To compare the Active Sessions collected by the operator to the Control Sessions collected by the investigators, the following were examined: (a) the frequency of each allophone (including an additional non-audio-based control comparison), (b) the total number of allophones, and (c) the ranking of allophones compared to the ten most common sounds in English speech. These analyses are discussed

in turn below. Data are reported as mean \pm standard error of the mean (SEM).

Allophone Frequency. The first analysis assessed potential differences in the distribution of the 72 possible allophones in the Active and Control Sessions. It was hypothesized that if communication involving English words was present in the Active Sessions, certain allophones might be present more or less often than in the Control Sessions. To address this, the raw output from the original EVPMaker files was examined and the percent frequency of each allophone in each session was determined. The mean frequencies for each of the 72 allophones in the Active and Control Sessions were then compared by performing 72 t-tests (paired, two-tailed, $\alpha = 0.05$), one for each allophone. Due to the large number of analyses, a Bonferroni correction for multiple comparisons was performed and resulted in a new level of significance of 0.0007. At this new α , none of the differences in the frequencies of the 72 allophones reached significance.

Non-Audio-Based Isolated Controls. In order to test for the presence of external influence in the Control Sessions, a concern of the granting organization, a second set of control files was created without using EVPMaker. This employed a custom software tool developed by the first author (MB) that mimicked the random stream produced by EVPMaker but abstracted the output in such a way that it would discourage potential ITC. The software randomly generated numbers between 0 and 71 to mimic the output of the 72 allophones in EVPMaker. For example, the software tool would generate a number, say 23, and add one to a tally of the number of times 23 was generated. Thus, the stream of the numbers generated was never collected, only the tallies of how many times each number was generated; the order of the numbers (and their associated allophones) could never be reproduced. The software also randomly chose the total number of generated data points (i.e. tallied numbers) from values between the smallest and largest allophone counts in the 10 EVPMaker Control Sessions. This protocol was run a total of 10 times. For the analysis, the tallies of these “simulated allophones” were compared to the total number of allophones in a “session” to determine the percent frequency of each allophone in each session. The mean frequencies for each of the 72 allophones in the Control and these Isolated (or fabricated) Control Sessions were then compared by performing 72 t-tests (paired, two-tailed, Bonferroni corrected $\alpha = 0.0007$), one for each allophone. These analyses demonstrate that there were no differences in the frequency of the 72 allophones when comparing the Isolated Control Sessions and the “regular” Control Sessions. It was thus concluded that the “regular” Control Sessions most likely were not contaminated with ITC.

Total Number of Allophones. The next analysis addressed the hypothesis that if external forces (e.g., entity communication or investigator or participant conscious or unconscious intention) had influenced the output of the Active

Sessions, that may have caused alterations in the number of allophones present in the Active samples in comparison to the Controls (e.g., by “pushing” more allophones into a session or choosing more of the allophones that take longer to “pronounce,” etc.). To compare the mean number of total allophones per 3-minute session, a t-test (paired, two-tailed, $\alpha = 0.05$) was performed. The mean number of allophones did not differ between the Active ($1,676 \pm 7$) and Control ($1,670 \pm 3$) samples ($p = 0.38$).

Frequency of Allophones Compared to Common English Sounds. Also examined was whether the most common sounds in the English language appeared more frequently in the Active Sessions than in the Controls. The sounds ranked 1–10 in USA English are: *n* (as in *net*), *t* (as in *tip*), *i* (as in *in*), *u* (as in *up*), *s* (as in *sin*), *d* (as in *did*), *ee* (as in *eel*), *ie* (as in *pie*), *l* (as in *lift*), and *a* (as in *and*) (Zurinkas, 2004:10). The mean rank for these 10 sounds in the Active Sessions was 32 and was 28 for the Control Sessions. The frequency with which each of the top 10 English sounds was found in the Active and Control Sessions did not differ ($p = 0.69$).

Blinded On-Line Listening Panel with Randomized Matched Controls

Listening Panel Participants. Participants for the listening panel were recruited through the Windbridge Institute website, the AA-EVP *NewsJournal*, and the Forever Family Foundation *Signs of Life* Internet radio program; the recruitment information was then reposted on other websites featuring similar topics. Potential participants were instructed to submit their email addresses on a specific page on the Windbridge Institute website. A total of 275 email addresses were collected. When the study began, each potential participant received a personal email from the investigators with information on how to access the online survey (described below). A total of 132 surveys were collected. Of these, 98 contained usable data. Participants were removed if they did not provide complete data, if they did not answer an item regarding their primary spoken language, or if they indicated that American English was not their primary spoken language. The participants in this study ranged in age from 21 to 76 years (45.6 ± 1.3) and included 69 females (70%) and 29 males (30%). To ensure that all participants had the proper computer hardware and software to complete the online listening panel survey, they were asked to listen to a test audio sample and confirm that the sample played without problems before proceeding.

Listening Panel Method. One of the methods employed by EVP researchers in an attempt to establish objectivity in the interpretation of words and phrases captured during EVP recording sessions is the use of a listening panel (e.g., Butler, 2010). The core listening panel method usually involves a group of experienced individuals coming to consensus regarding the interpretation of a

short section of recorded EVP. Listening panel participants are then presented with the recording and asked to report any words that they recognize. The participant responses are then compared to the group's initial interpretation and the percentage of matching words is determined. The current study built on the core listening panel method with the addition of blinded controls, randomization of samples, and scoring methods based on previously published research.

The panel was conducted as an online survey. Although participants knew that they would be listening to samples of EVP recordings, they were blinded to the fact that half of the audio samples were controls collected without an operator present. To address issues of participant fatigue and survey item position effects, three different versions of the online survey were created. Each version presented the samples to the participants in a different, random order. Each participant was randomly assigned a survey version.

The listening panel consisted of 20 audio samples. Each sample was between 1.2 and 3.5 seconds in length. Ten of the samples were selected from words or phrases identified in real time by the operator during the Active Sessions. The other 10 samples were selected from the Control Sessions recorded by the investigators. For each sample, the participant was instructed to play the sample and report on what they heard. Participants could listen to a sample as many times as they wished before continuing. Participants were asked to indicate if they heard any recognizable words (Yes or No response) and report any words they heard by typing them into a dialog box.

Selecting and Isolating the Utterances. The method by which the samples for the listening panel were selected included several steps. First, the transcripts and notes for each Active Session that were provided by the operator with the session recordings were reviewed. Any utterances that the operator noted she recognized in real-time without the need for additional review after the session was completed were then identified. This included a total of 90 utterances across the 10 Active Sessions. Each utterance was then assigned a number, and one utterance from each of the Active Sessions was selected using an online random number generator (<http://www.random.org>).

The utterances in the Active Session recordings were then located, isolated, and prepared for use in the listening panel. To isolate an Active Session utterance, an unedited session recording file was loaded into Audacity audio editing software, the utterance and its start time and duration were identified, and the utterance was saved as its own audio recording in Mp3 format. This process resulted in 10 separate Mp3 audio files, each containing an Active Session utterance.

To create the matched controls, the section of each Control Session that matched the start time and duration of the corresponding Active utterance was selected. For example, the Session 1 Active Utterance started at 00:01:20.723097

and had a length of 1.31 seconds. To create the corresponding matched control, Control Session 1 was loaded into Audacity and a section of the file with the same start time and duration as the Active utterance was selected, copied, and converted into its own Mp3 file. This process was repeated for each session, resulting in 10 matched Control utterance audio files. It should be noted that these matched sections were the only portions of the Control Sessions ever played audibly.

Analysis of Yes/No Responses. Data from participants who did not answer the question “Did you hear any recognizable words in this audio sample?” for both an Active Session (e.g., Active Session 3) and its paired Control Session (e.g., Control Session 3) were removed from data analysis for that pair; their data from other pairs of samples in which both questions were answered (e.g., Active Session 7 and Control Session 7) remained in the data pool. In addition, participants who answered either “Yes” or “No” to this question remained in the pool; the only stipulation was whether both questions in a pair were answered. It should be noted that the 20 randomized samples in the listening panel survey were simply numbered 1–20, so participants were not aware of this pairing scheme and some simply chose to answer some items and not others. On average, 81 participants’ responses (min. = 78, max. = 83) were retained in the data pool for each of the 20 samples.

When asked the question “Did you hear any recognizable words in this audio sample?” an average of 73% of participants responded “Yes” for samples from the Active Sessions collected by the operator. In comparison, an average of 63% answered “Yes” for the Control samples. This difference is not significant ($p = 0.12$; one-tailed, paired t-test) which is somewhat surprising considering that the Active Session samples were “pre-screened” by a human listener; that is the Active samples were “chosen” by the operator based on her having perceived words therein, whereas the Control samples were chosen as matched samples and not based on the presence of any recognizable sounds. In addition, roughly half or more of participants heard recognizable words in each of the 20 samples regardless of whether they were Active or Control samples. Furthermore, the proportion of “Yes” responses in each group (Active and Control) was significantly larger than what could be expected by random (50/50) chance (binomial probability; $p < 0.000001$ for each group).

Analysis of Participant Responses vs. Operator Perception. For the 10 samples from the operator’s Active Sessions used in the listening panel, 599 responses from participants reporting to have heard recognizable words in a sample were gathered. Of the 599 responses, fewer than 10% were direct matches to the operator’s perception. In one of the samples (Session 4), 29% of participants who heard recognizable words reported hearing the identical words the operator heard (“You are here”), and in a second session (Session 6: “I’m

here for you”) 43% did. In the remaining eight samples, none of the participants reported hearing what the operator perceived.

Each of the participants’ responses was scored by the investigators as to how well it matched the operator’s perception of a sample. The scoring system was developed based on similar scales developed for remote viewing (Targ et al., 1995) and mediumship readings (Beischel, 2007/2008). Each of two investigators independently contemplated each participant response and provided a score as to how similar the sounds, syllables, and content were to the operator’s reported perception of that sample. In cases in which there were scoring discrepancies, the two investigators discussed the particular response until a consensus score was agreed upon. The scoring system employed the following ratings:

- 4: Direct match with no incorrect sounds, syllables, or content
- 3: Good match with relatively few incorrect sounds, syllables, or content
- 2: Mixture of matching and non-matching sounds, syllables, and content
- 1: Slight match with few matching sounds, syllables, and content
- 0: Poor match with very few to no matching sounds, syllables, and content

Using the same convention used in mediumship reading scoring methods, only mean scores of 3 or above demonstrate a true “hit.” The overall mean for the consensus scores for all of the 10 samples was 1.15 ± 0.05 , a value that falls well below the “hit” threshold. In addition, the high end of the 95% confidence interval of the scores (1.25) also failed to reach this limit.

One of the 10 samples—Session 6 (“I’m here for you”)—fell just under the “hit” threshold with a mean of $2.99 (\pm 0.12)$. However, it was determined that this value is a statistical outlier (i.e. outside of three times the interquartile range above or below the mean) and its removal from the data set should be considered. If the scores given to Session 6 are removed from the analysis, the resulting updated mean for the remaining nine samples falls from $1.15 (\pm 0.05)$ to $0.86 (\pm 0.05)$. This demonstrates that the perceptions of the listening panel received an average score lower than what was deemed a “slight match” to the operator’s perception.

Analysis of Responses to Control Samples. As stated above, the proportion of participants who reported hearing recognizable words in the samples from Active Sessions was no different than the proportion who recognized words in the Control Sessions. To investigate this further, the individual participants’ reports of what they heard for the two Control Sessions with the highest proportions of “Yes” responses were examined. For Control Session 3, 92% of participants claimed to recognize words and in Control Session 6, 95% of participants heard recognizable words. In Session 3, 100% of the participants

heard the word “I.” Of those participants, 58% heard “I do,” 12% heard “I’m” or “I am,” and 8% heard “I knew.” In Session 6, 92% of the participants who heard recognizable words heard the word “You.” Of those participants, 88% heard the phrase “You are,” 20% heard the words “You” and “light,” and 9% heard “You” and another “-ight” or “-ite” word.

From these data, it was concluded that there was substantial consensus among participants even in samples from Control Sessions composed of randomly ordered sounds. Thus, consensus among participants during the listening panel did not rule out pareidolia as a possible explanation for the perceived presence of ITC in the Active Sessions.

Content Analysis of Operator Questions and Perceived Responses

The next analysis involved addressing if the content of the responses perceived by the operator during the Active Sessions was contextually meaningful to her questions. Over the course of the 10 sessions, the operator perceived 124 answers to questions she had posed. A scoring system was developed to rate how well each answer logically matched the associated question; this system was based on a similar method used for item-by-item scoring in mediumship reading studies (Beischel, 2007/2008). The scoring system employed the following ratings:

- 3: Obvious fit (the perceived response is a direct answer to the posed question that does not require interpretation to make logical sense)
- 2: Fit requiring minimal interpretation (the perceived response indirectly answers the question and needs minimal interpretation or symbolism to make logical sense)
- 1: Fit requiring more than minimal interpretation (the perceived response indirectly answers the question and needs a greater degree of interpretation or symbolism to make logical sense)
- 0: No fit (perceived response is not a logical response to posed question)

Two investigators discussed the perceived responses to the operator’s questions and jointly determined a score for each. Of the 124 responses, roughly one-third (31%, 38) received a score of 0. Similarly, another third (34%, 42) received a score of 3. The remaining third of the responses (35%) received median scores of 1 (20) or 2 (24). The overall mean was 1.56 ± 0.11 , a score at the middle of the scoring range, and the higher end of the 95% confidence interval fell below 1.8. Based on the distribution of these scores, it was concluded that responses perceived by the operator did not consistently contain information that logically matched her questions.

Objective Interpretation of Utterances Using Speech Recognition Software

Training the Speech Recognition Software. The Dragon NaturallySpeaking speech recognition software (SRS) was trained to recognize the “voice” of the SpeakJet chip. The SRS manufacturer’s instructions requested that the intended speaker (in this case, the SpeakJet chip) read aloud a prepared script provided with the software. Thus, it was required that the chip “say” the training script to the SRS. This required that the script be exported out of the SRS as a text file and that each of the words in the script be converted manually into the “language” of sound commands recognized by the SpeakJet chip. It is important to note that the chip is not a text-to-speech converter. The chip “talks” by joining together text codes for individual speech-like sounds along with timing codes to produce sounds that resemble human (in this case English) speech. The text codes are entered into the Magnevation Phrase Translator control software and then converted into a series of numeric commands that are loaded into the chip. The chip then plays the sounds that correspond to these commands.

For example, the sentence “He felt he must have picked up and discarded over a thousand stones” from the training script was converted by the investigators into the following SpeakJet chip commands:

```
\HE \IY \P6 \FF \EH \LE \TT \P6 \HE \IY \P6 \MM \UX \
SE \TT \P6 \HE \SLOW \AY \VV \P6 \PE \IH \KO \TT \P6
\SLOW \UX \PO \P6 \SLOW \AY \SLOW \NE \OD \P6 \
DE \FAST \IH \SE \KE \AW \FAST \RR \DE \EH \ED \P6 \
SLOW \OW \FAST \VV \AXRR \P6 \UX \P6 \SLOW \TH \
FAST \AYWW \ZZ \FAST \AX \SLOW \NE \OD \P6 \SE \
TT \OWWW \NO \ZZ
```

Once all of the words were translated into these codes, they were copied and pasted into the Magnevation Phrase Translator software interface in small segments in order for the chip to “speak” them. The audio output of the Activity Board was connected to the microphone input jack of a second computer and the SpeakJet sounds recorded, creating the complete spoken script as a WAV file. This audio file was then imported into the SRS training module to train it to recognize the SpeakJet chip output.

Immediately after initial training, the audio file with the recorded script was imported into the transcription module of the SRS. The software converted the SpeakJet speech to text with an estimated accuracy of 80%. The mistakes the SRS made in converting the speech to text were corrected until it achieved an estimated accuracy of 95% and leveled off.

Testing Isolated Utterances. The segments from each of the 10 Active Sessions that were used as items in the listening panel were also analyzed by

the SRS. The coded SpeakJet chip translations of those phrases were further analyzed by the SRS. The same 0–4 scoring system that was used to score the listening panel participants' responses was then used to score how well the SRS translation matched (1) the original phrase perceived by the operator and (2) the output of the SpeakJet chip when programmed to speak the phrase the operator reported hearing.

The SRS translations of the output from the EVPMaker sessions collected by the operator received an average score of 1.5. The SRS translations of the coded SpeakJet chip output received a significantly higher average score of 3.8 ($p = 0.0002$). These data demonstrate that the SRS is capable of accurately translating those particular 10 phrases when coded and that the phrases perceived by the operator were not consistently present in the EVPMaker output.

Because (1) the SRS did not recognize the phrases perceived by the operator in the Active Sessions and (2) there were no relevant “target” phrases to which to compare SRS translations of the Control samples, no SRS analyses of the Control Sessions were performed.

SpeakJet Chip Translations. How the phrases heard by the operator and used in the listening panel compared to the SpeakJet Chip translations of those phrases was also examined. To do this, the specific allophone codes that created each utterance were separated out from the rest of the allophones in the session. Steps included listening to an Audacity audio file created from the EVPMaker file from each session, locating the segment in the session, noting the start time of the phrase and its duration, and using that information to locate the associated allophone codes in the EVPMaker file. The phrases heard by the operator were also coded into SpeakJet chip commands in the same way that the text used to train the speech recognition software was. The coded commands were then entered into the Magnevation Phrase Translator software and played by the SpeakJet chip to verify that they reflected those particular phrases.

Table 1 contains the actual allophones and the associated phonetic sounds that were played at the time that the operator heard each phrase as compared to the SpeakJet translations of those same phrases. It is evident from this comparison that these 10 phrases that the operator heard during the real-time EVPMaker Active Sessions were not present in the EVPMaker output at those times in the sessions. However, similar vowel sounds were often found in the output. For example, when the operator heard the phrase “you are here,” the allophones being “spoken” by EVPMaker actually “said” something like “ooch k hoe are teer.” Similarly, when the operator heard “I’m here for you,” EVPMaker was “saying” “I oo we’re kk door you.”

TABLE 1
The 10 Phrases Heard in Real-Time by the Operator and Used in a Listening Panel,
the Allophones “Spoken” by EVPMaker at Those Times (with the Associated Phonetic Pronunciations),
and the SpeakJet Chip Commands Required if the Chip Were To “Say” Those Phrases

Phrase Heard by the Operator	Allophones Generated by EVPMaker during That Segment of the Session (and associated phonetic sounds)	SpeakJet Chip Translation of the Phrase (“.” added between words for clarity)
Cut out the therapy	\WW \UW \UX \AXUW \OK \IH \AX \SH \KO \AXRR \WW \EB \IY (“woo uh ow ki ush er w bee”)	\KO \UX \TT - \AYWW \TT - \DH \UX - \TH \EYRR \UX \PE \IY
I’m at our circle	\OHIY \NE \SE \EH \DO \OB \TH \LO \AW \JH \RR \DH \OWWW (“ines eh d b th law jr tho”)	\OHIY \MM - \AY \SLOW \TT - \AWRR - \SO \AXRR \KO \UH \LO
Their people are still talking	\AXRR \IYRR \OWWWW \AWRR \TH \ZH \OB \AXUW \SH \OH \GE \DH \NGE (“er ear o are th j b owsh h g thng”)	\SLOW \DH \EYRR - \PE \IY \PE \LE - \AWRR - \SE \TT \IH \LO - \TT \OH \KE \IH \NGE
You are here	\IHWV \CH \OK \HO \OW \AWRR \TU \IYRR (“ooch k hoe are teer”)	\IYUW - \AWRR - \HE \IYRR
People, they’re capable for bigger help	\HE \GO \TH \LE \EG \FF \AXRR \EB \EK \BO \NE \LE \MM \OWWWW \SO \WW \OWRR \BE \LE \RR \KO \EHLE* (“h g thl g fir bk bnl moswor blr kle”)	\PE \IY \PE \LE - \DH \EYRR - \KE \EYIY \PE \UX \BO \UX \LE - \FF \OWRR - \BE \IH \GE \AXRR - \HE \EHLE \PO
I’m here for you	\OHIY \UW \WW \IYRR \KO \EK \DO \OWRR \IYUW (“I oo we’re kk door yoo”)	\OHIY \MM - \HE \IYRR - \FF \OWRR - \IYUW
I will stop talking at you	\OHIH \LE \OG \OK \SH \UX \NE \UH \OW \PE \CH \IY \DE \EG \EY \ZH \HE \IYUW (“I llgk shun uh ope cheed gedge hoo”)	\OHIY - \WW \IH \LE - \SE \TT \OH \PO - \TT \OH \KE \IH \NGE - \AY \TT - \IYUW
You are a dear	\BE \IHWV \NO \CH \AWRR \ZH \PE \RR \EYIY \CH \UW \OK \IYRR (“boon char j pray choo keer”)	\IYUW - \AWRR - \EYIY - \DE \IYRR
Yes, oracle	\IYEH \TU \NO \NGO \OWRR \AW \LE \SO (“y t n ng or awls”)	\IYEH \SE \SE - \OWRR \UX \KO \UH \LO
Have a talk	\EH \GE \OWWWW \EYIY \BE \TH \SH \OH \OH \OB (“eh go abe th shob”)	\HE \AY \VW - \EYIY - \TT \OH \KE

* In the EVPMaker output, the command “EHLE” is erroneously listed as “EHL” which is not a command recognizable by the SpeakJet chip. Thus, if the commands listed in the EVPMaker output files are played through the SpeakJet chip, the chip does not play any of the “EHLE” sounds. That sound is coded by a number in the EVPMaker software (not by the EHLE command) so it is included in the EVPMaker audio output, but trying to replicate the output of an EVPMaker session using the output commands is not possible without editing. This command is erroneously listed as “EHL” in Table C of the SpeakJet User Manual, which is where this error may have arisen.

Discussion

Conclusions

This pilot study (1) attempted to create optimal conditions under which an experienced EVPMaker operator could successfully record EVPMaker conversations; the design also (2) established proper experimental controls that ensured the integrity of the data. Based on general feedback from the operator and her confirmation that a conversation was recorded in each of the 10 Active Sessions as well as a review of the SDCP security system and a cross-check of all data supplied by the operator, the investigators have a high level of confidence that these two objectives were met.

In order to answer the research question—*Can the presence of ITC be objectively detected in real-time ITC sessions recorded by an experienced EVPMaker operator in which the operator claims successful contact with an external entity has occurred?*—this study:

1. compared EVPMaker Active Sessions collected by an operator to Control Sessions collected by the investigators,
2. analyzed the responses from participants in a listening panel regarding their perceptions of samples from the Active and Control Sessions,
3. analyzed how the responses perceived by the operator logically matched her posed questions, and
4. employed speech recognition software to provide a perceptual bias-free analysis of samples from the Active Sessions.

To compare the content of the Active and Control Sessions, the following were examined: (a) the frequency of each allophone (including an additional non-audio-based Control comparison), (b) the total number of allophones, and (c) the ranking of allophones compared to the ten most common sounds in English speech. For each of those analyses comparing the Active and Control Sessions, no differences were found. It was also determined that the Control Sessions collected by the investigators were most likely not influenced by external forces.

No differences were noted in the responses of listening panel participants to samples from Active Sessions and those from Control Sessions. The proportions of participants who reported hearing recognizable words were similar for both types of session. Furthermore, of the responses from participants who reported hearing recognizable words in an Active sample (60 ± 4.6), fewer than 10% were direct matches to the operator's perception, and in 8 of the 10 samples from Active Sessions none of the participants reported hearing what the operator perceived. When each participant response was scored for how well it matched

the operator's perception, the overall mean for the consensus scores as well as the 95% confidence interval fell well below the conventional "hit" threshold. Additionally, after removing one outlier datum, none of the remaining nine individual samples received an average score that achieved a level that could be deemed a "hit."

In addition, at least roughly half of the participants heard recognizable words in each of the 20 samples regardless of whether they were from Active or Control Sessions. In other words, there was roughly a 50% chance that a participant would hear recognizable words in any EVPMaker output. This finding is, of course, based on the assumption that the Controls used in the study did not contain ITC. However, given that there were no differences found between the EVPMaker Controls and the non-audio-based Isolated Controls, the investigators have a high degree of confidence that the EVPMaker Controls were not contaminated.

In the examination of the individual participants' reports of what they heard for the two Control Sessions with the highest proportions of participant word recognition, it was determined that there was substantial consensus among participants even in samples from Control Sessions composed of randomly ordered sounds. Thus, consensus among participants during a listening panel does not provide evidence for anomalous communication or messages generated by EVPMaker using the SpeakJet Allophone file.

In conclusion, after detailed analysis of the Active Sessions provided by the operator and the Control Sessions created by the investigators, it was discovered that there were no differences between the sessions. The Active and Control EVPMaker Sessions were identical with regard to the frequency of the allophones, the total number of allophones, the presence of the sounds most commonly heard in English speech, and recognition by listening panel participants. Taking all of these analyses into account, the presence of ITC in the Active Sessions was not objectively detectable.

Furthermore, the analysis of the operator's questions and the perceived answers in the Active Sessions revealed that the responses did not consistently contain information that logically matched the questions. The operator perceived a response that was relevant to the question she had posed—regardless of whether or not that response was detectable in the EVPMaker output—roughly one-third of the time. These data suggest that the interpretation of EVPMaker conversations is a subjective process, the content of which is meaningful primarily (and perhaps solely) to the operator.

Finally, the segments from each of the 10 Active Sessions that were used as items in the listening panel were also analyzed by speech recognition software (SRS) and scored for how well the SRS translation matched (1) the original phrase heard by the operator or (2) the output of the SpeakJet chip when

programmed to speak that phrase. The SRS translations of the output from the EVPMaker sessions collected by the operator received a significantly lower mean score than the SRS translations of the coded SpeakJet chip output. This demonstrates that the phrases reported in real-time by the operator were not consistently present in the EVPMaker output. This indicates that the recognition of these phrases is highly subjective.

Recommendations for Future Research

One of the goals of this study was to develop and apply new data collection and analysis methods to ITC research to help inform larger-scale studies in the future. We recommend that researchers interested in replicating and extending this study increase the number of experienced operators—if possible—in future studies. As this method of ITC collection becomes more popular, a larger pool of operators with sufficient and successful experience may become available.

As stated above, it appears that the interpretation of EVPMaker conversations is a subjective process and the content may be meaningful solely to the operator. While addressing this hypothesis was outside the scope of this study, it is interesting to speculate that the EVPMaker recording experience may be similar to the use of other divining or spirit communication tools such as Tarot cards, Rune stones, Scrying, the *I Ching*, etc. These types of tools provide a symbolic language that the practitioner can use to form a connection or acquire information that might not be accessible through “normal” means. The EVPMaker software loaded with the SpeakJet allophone file may provide operators with a tool that allows them to receive messages in a language specific to each of them and their individual frames of reference. Thus, researchers may wish to investigate the potentially psi-conducive effects of using EVPMaker to acquire veridical non-local information.

In addition, rather than looking at the engineering, technical, or signal processing aspects of EVPMaker communication, future studies may instead choose to focus on the experiences, psychology, and motivation of the operators; the meaning and content of the communication; and how that communication impacts the lives of those who receive it.

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RESEARCH

Measurement Controls in Anomalies Research**WALTER E. DIBBLE, JR.****WILLIAM A. TILLER**

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Abstract—Members of the Society for Scientific Exploration have expressed considerable concern regarding proper control measures in research of anomalies (subtle energy research, etc.). This is quite proper and deserves some comment from us since the topic applies so well to the work we are conducting in “conditioned spaces.” Also, the need by researchers for good “anomaly detectors” is paramount and is intimately connected to the search for good controls. Both issues are addressed in this communication.

The Fundamental Equation

The basic equation we have been using for years in our IHD (intention host device) to evaluate all anomalous results from the research we have been conducting is as follows (Tiller, 2007, 2010a),

$$Q_M = Q_e + \alpha_{\text{eff}} Q_m \quad (1)$$

where $\alpha_{\text{eff}} Q_m$ is usually a time-dependent function of sigmoidal or exponential form (a front-clipped sigmoid). In this zeroth-order approximation equation, the quantity Q_M represents a measured value derived from using **any** kind of sensor/detector. The quantity Q_e represents a measured value from a sensor/detector that is not affected in any way by any anomaly-producing factor or influence. The quantity Q_e is a measurement result that is normally produced by conventional equipment in conventional laboratories by conventional scientists/technicians. On the other hand, Q_m represents something very different. This quantity represents a component of any measurement, Q_M which **is** affected by anomaly-producing factors or influences.

In our IHD work (see Appendix 1), we are talking about two uniquely different domains of nature. The first domain is the domain of the conventional

(solely our distance–time reference frame), and the second domain is the domain where, relative to the first domain, anomalies are detected. The coefficient, α_{eff} , is the quantity that connects the two domains; hence, it is a time-dependent coupling coefficient. When this coefficient is zero, $Q_M = Q_e$ and no anomalies are detected (anomalies may not be detected even when α_{eff} is non-zero, if the sensor used cannot detect them, see below). Our fundamental assumption/axiom is that, for conventional laboratories using conventional equipment operated by conventional scientists/technicians, $\alpha_{\text{eff}} = 0$. For any “real” laboratory, this condition will not precisely hold, but this is the ideal condition for any control laboratory. Based on our experience, control laboratories are to be valued for their capability for producing measurement values consistent with the Q_e component in Equation 1.

Real Experimental Measurements

For any real measurements, as opposed to the ideal condition mentioned above, Q_M may have a Q_m component as well as a Q_e component. In our experience with “conditioned” spaces, there may be a variety of partially coupled states ($\alpha_{\text{eff}} \neq 0$) to consider. Just how do we, working in such a partially coupled environment, sort these two out? This is really where the rubber hits the road in any serious anomaly research.

The primary thermodynamic intensive variables of our normal reality are temperature, pressure, and composition. Anomalies can affect any of these quantities, but we have chosen to focus on temperature and composition. A variety of sensors are available to measure temperature and composition. For all of these, what is really measured is some quantity that is a function of temperature or the composition component of interest. Thus, there is much, much more involved than just measuring temperature or composition in the design and construction of each particular sensor. Each of the measurement components, individually, can be affected by anomalies. What we usually observe is a sum total effect. Ultimately, the individual component contributions to an anomalous measurement will need to be sorted out as well.

That being said, let us examine some real applications that allow us to address the control issue more completely. A composition sensor that we like to use is a pH-electrode. This sensor has a number of components but can, with proper use, yield an accurate value for the pH of an aqueous solution (Pajunen, Purnell, Dibble, & Tiller, 2009). For the pH application, Equation 1 yields

$$\text{pH}_M = \text{pH}_{U(1)} + \alpha'_{\text{eff}} \text{pH}_m. \quad (2)$$

In this expression of Equation 1, we have just replaced Q_M and Q_m with pH_M and pH_m , respectively. In this case, $pH_{U(1)}$ is a value of pH unaffected by any anomaly-producing factor or influence, consistent with Equation 1. For the definition of any kind of anomaly using this sensor, we are interested in the value of pH_M minus $pH_{U(1)}$. This value we sometimes refer to as ΔpH which equals $\alpha'_{\text{eff}} pH_m$. We use α'_{eff} to designate a different coupling coefficient than the generic one used in Equation 1.

The remaining issue is how to determine a value for $pH_{U(1)}$ that any measurement of ΔpH depends on. This can be done by the choice of an appropriate measurement medium. Ideally this is a medium for which one can independently calculate a pH value as a function of temperature. For a variety of reasons (see Appendix 2), we chose to use pure water in equilibrium with air as our medium (Tiller, Dibble, & Kohane, 2001). For this particular medium, the equilibrium pH can be calculated as a function of temperature using only thermodynamic data (Appendix 2). This data includes equilibrium constants measured reproducibly in a number of different laboratories. The fundamental assumption used here is that these equilibrium constants were measured using conventional equipment operated by conventional scientists/technicians in laboratories where $\alpha'_{\text{eff}} = 0$. Our results are only as good as this assumption, but we assert that it is a good one.

So what constitutes a control here? In this case, the control is the thermodynamic data reported from a number of different laboratories which we assume are located in spaces where $\alpha'_{\text{eff}} = 0$. The thermodynamic data is usually reported in compendia compiled using certain standards. If a lab were partially coupled ($\alpha'_{\text{eff}} \neq 0$), it is less likely that results from that lab would compare well with uncoupled lab results and such results would not as likely be included in the various compendia of thermodynamic data.

Real Anomaly Examples Using the pH-Sensor

In the case of Equation 2, an anomaly is defined when there is a marked difference between the pH_M and $pH_{U(1)}$ values. However, there can be more to it than that as illustrated by some recent examples. In Figure 1 we plot pH results from Conditioned Space A where anomalies of various sorts are present. The lower curve is the pH calculated from thermodynamic data as a function of the measured water temperature (see Appendix 2). The wavy nature of these curves is due to the diurnal temperature variation at this site. The measured temperature dependence of pH_M is much higher than it should be (the ratio $pH_M/pH_{U(1)}$). To illustrate, if we take the ratio of pH amplitudes (trough to peak) between hours 285 to 293, we find it to be 0.21/0.033, or about 6.4. The overall rise in pH_M is also six times what it should be for the overall temperature increase. From the temperature low at hour 168 to the high at hour 293, $pH_{U(1)}$ increases only from

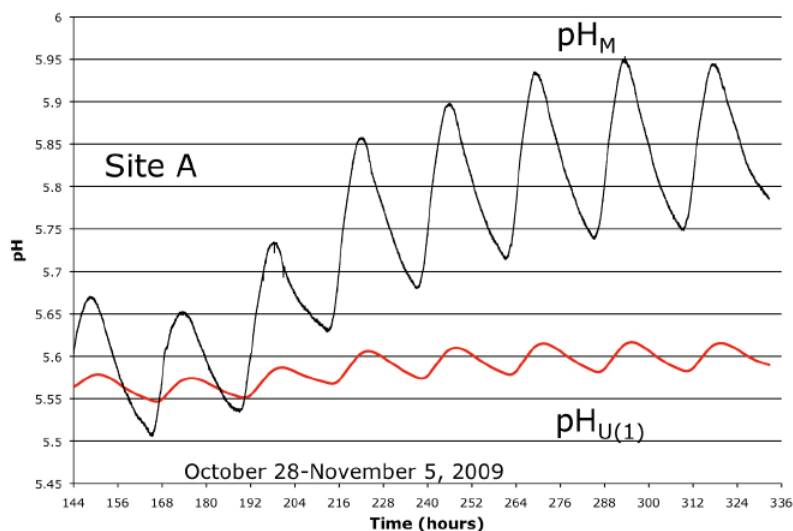


Figure 1. pH vs. time for site A (Equation 2 defines pH_M).

5.545 to 5.614, or about 0.07 pH units. On the other hand, pH_M increases 0.44 pH units over the same time interval (from 5.51 to 5.95), for a ratio of $\text{pH}_M/\text{pH}_{U(1)}$ of 6.3. Such amplification (more than six times!) is highly anomalous. Figure 2 shows the opposite case in another conditioned space. Here, the measured pH varies with temperature about 1/3 as much as it should. (It is also not exactly in phase with temperature, but that is another anomaly story.) Thus, this pH-temperature dependence can be considerably greater or less than what it should be compared to a control (that is in conditioned, partially coupled spaces where $\alpha'_{\text{eff}} \neq 0$). Figure 1 and Figure 2 represent just a small sample of the kinds of anomalies that can be revealed in conditioned spaces using this particular type of sensor. In these cases, the control using thermodynamic data is clearly very useful.

Temperature Sensor Controls and Detectors

Temperature sensors can also be used in anomaly research but the controls are different and more difficult to define. From Equation 1, we have, for a temperature sensor, the following analogous result:

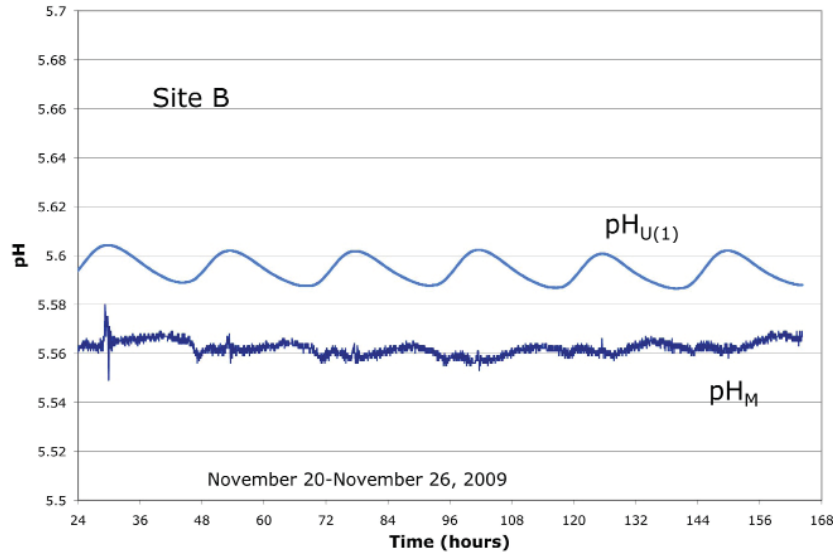


Figure 2. pH vs. time for site B, November 2009.

$$T_M = T_e + \alpha''_{\text{eff}} T_m. \quad (3)$$

In this case, a different coupling coefficient, α''_{eff} is designated so as to not confuse it with the others. Again, we have the problem of separating out T_e from an actual temperature, T_M , measured using various kinds of temperature sensors.

The practical solution to this problem is to look for a temperature sensor that does not respond to any anomaly-producing factor or influence. In other words, we look first for a good control sensor that will allow us to determine an accurate value for T_e only. On the other hand, we are also looking for a temperature sensor that responds well to our anomaly-producing factors. This equation, therefore, demonstrates that a good detector of temperature anomalies involves both a sensor that can be used as a control (measures T_e accurately) and one that responds to T_m (i.e. two different sensors). Once these two sensors have been identified, a quantitative picture of a temperature anomaly can be revealed by subtracting T_e from T_M .

We are fortunate in that we can create spaces that have values of $\alpha_{\text{eff}} \neq 0$ for the space (two examples are shown in Figure 1 and Figure 2). This allows us to test a variety of temperature sensors to see how they respond in such an

environment. Research on these sensors is in progress. We have recently been successful, using temperature calibration techniques, in identifying the types and kinds of temperature sensors necessary to satisfy the constraints of Equation 3. Also, since pH_M is a function of the measured temperature, there is also a component T_m that will affect the pH measurement as well. Thus, we have an important dual purpose for performing temperature sensor experiments in conditioned spaces.

Entanglement Issues Involved in Defining Controls

From the foregoing, it can be seen that controls can take different forms in experiments on anomalies. One example was the use of thermodynamic data and another was the identification of sensors that do not respond at all to anomaly-producing factors. A different control needing discussion is the experimental control space. In such a space, α_{eff} in Equation 1 is zero and no anomalies are observed. In our experience in trying to locate and utilize such spaces, we found that serious spatial and sometimes temporal entanglement occurs with our “conditioned” spaces rendering such spaces useless (as controls). This effect (Tiller, Dibble, & Fandel, 2005) shows how macroscopic entanglement must be addressed in any serious anomaly research (Tiller, 2010b:508–510). We are also searching for a means to “erase” space “conditioning” and find that to do so requires much more understanding of all the processes involved than we currently possess.

Spatial Entanglement

Early on in our research involving conditioned spaces produced by operating intention-imprinted electrical devices (IIEDs) (Tiller, Dibble, & Kohane, 2001, Tiller, Dibble, & Fandel, 2005, Tiller, 2007), we found that it was not possible to cleanly isolate imprinted devices from un-imprinted devices (UEDs). After a period of time, the UEDs also became imprinted to a certain extent. This was our first introduction to macroscopic entanglement. We experimented with various types of shielding methods, also with varying degrees of success. It appeared to us, after some experience with these kinds of devices, that some entanglement resulted from electromagnetic carrier wave sources. As a result, we designed some shielding to block a portion of this. However, the interesting part of this information entanglement could not be blocked.

A Recent Case Study

A recent example of such entanglement using the pH-sensor detection system involved monitoring the pH of highly purified water simultaneously at sites about 90 miles apart. One site, C, is in the mountains northeast of Phoenix,

Arizona, in a very small shed at an elevation of 5,000 feet with power but no atmospheric controls (no heating or A/C). The other site, D, is in an industrial area of Phoenix in a large industrial building with A/C capability. We were running similar IIEDs at both sites, a unique feature we consider to be the source of the entanglement between these two sites.

From Equation 2, we defined $\Delta pH (= pH_M - pH_{U(1)})$ to be a value we could use as an indicator of conditioned spaces or spaces where anomalies are detected. We converted this value to an excess energy (excess thermodynamic free energy) (Tiller, Dibble, & Fandel, 2005, Tiller, 2007) with energy units (milli-electron volts) that everyone is familiar with (ΔpH is unfamiliar to most as an indicator quantity). This value we have designated as $\delta G^*_{H^+}$, and it can be thought of as the energy equivalent of the ΔpH values derived from Equation 2. The subscript H^+ refers to the fact that we derive this $\delta G^*_{H^+}$ value for the aqueous hydrogen ion from pH measurements. Using this excess free energy, we plot in Figure 3 how weekly averages of this $\delta G^*_{H^+}$ value correlate for the two sites C and D. As can be seen in Figure 3, there was not a very high correlation initially, but after a short time a strong negative correlation developed. This correlation abruptly shifted to a strong positive value after about six weeks. The high correlations indicate a high degree of entanglement between these widely separated sites. The change in the sign of correlations such as these appears to

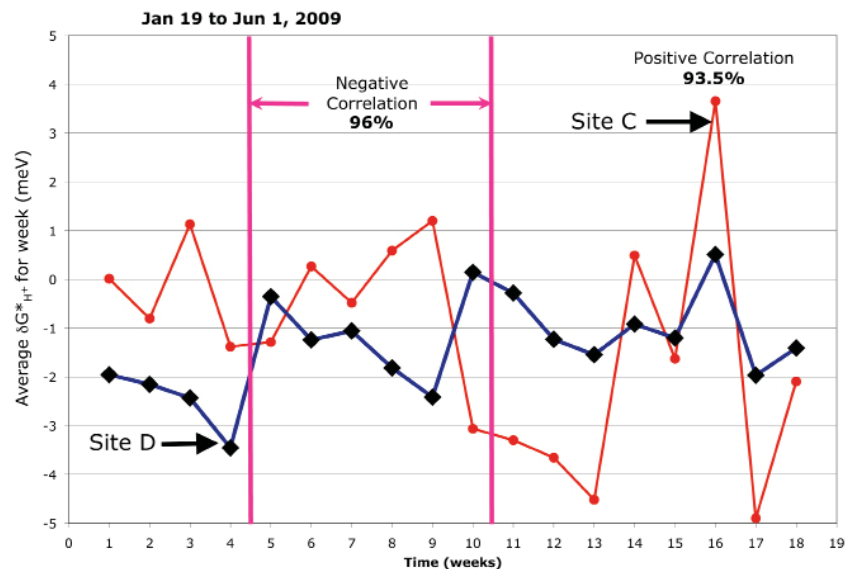


Figure 3. Average weekly values of $\delta G^*_{H^+}$ plotted vs. time.

happen often in conditioned spaces as a result of macroscopic, room-temperature entanglement. The mechanism producing these correlation sign changes is presently unknown and probably relates to anomaly-producing factors not understood fully. However, the existence of the correlation sign changing strongly suggests a non-physical origin.

Air Temperature Entanglement

In Figure 1 the scale is insufficient to reveal that the two pH values displayed are not precisely in phase (pH_M and $pH_{U(1)}$). However, on closer inspection this becomes clearer. A better example of this phenomenon is given in Figure 4. In this system the air temperature changes diurnally as a result of the solar heating cycle. Changes in air temperature are transmitted to the water from the air via heat flow. Because of finite heat flow rates and large differences in specific heat per unit volume, the change in water temperature lags significantly behind the change in air temperature, as can be observed in Figure 4.

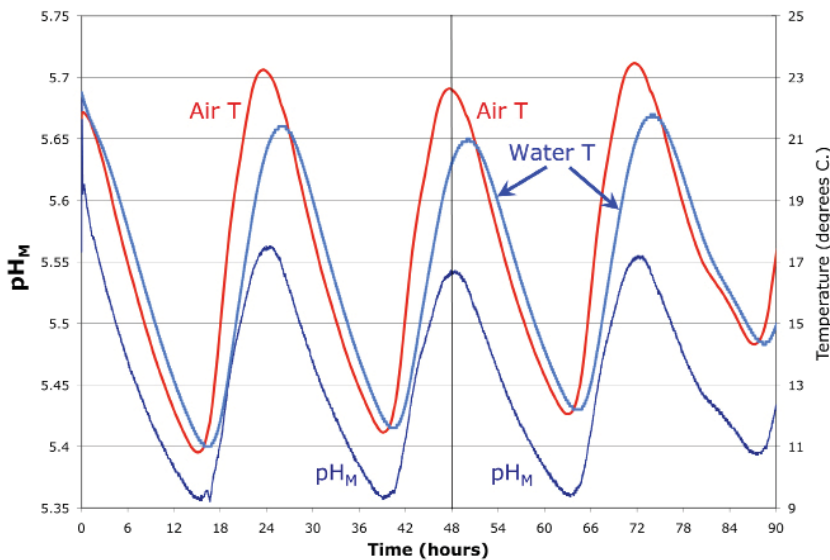


Figure 4. pH and temperature vs. time at site A (April 22–26, 2010).

Table 1 shows the time differences between the highs and lows in air and water temperatures and the corresponding highs and lows in pH as depicted in Figure 4. The pH extremes all occur, in time, between the extremes in air

TABLE 1
Time Differences (Δt) in Minutes between Extrema in pH
and Extrema for Air vs. Water Temperatures
(from Figure 4, note the sign differences)

Figure 4 Extremum	Δt [pH(t) – Air T(t)]	Δt [pH(t) – Water T(t)]
Low 1	+13	–64
Low 2	+1	–80
Low 3	+14	–60
Low 4	+18	–57
High 1	+39	–93
High 2	+33	–115
High 3	+28	–112

and water temperature. This is shown in Table 1, where the time difference between the pH extremes and the air temperature extremes (time of pH extreme minus time of air temperature extreme in minutes) is positive, meaning that the air temperature extremes lead the pH extremes, in time. On the other hand, the pH extremes clearly lead the extremes in water temperature (negative time difference). As revealed in Table 1, the pH extremes are all significantly closer, in time, to the air temperature. Also these differences vary depending on whether the extremum is a high or a low. This effect needs further study and evaluation.

Correlation coefficients calculated for the 90-hour time period shown in Figure 4 indicate a similar out-of-phase condition. The pH is about 97% correlated with the air temperature and only 90% correlated to water temperature. This situation is reversed in conventional spaces where the pH is closely correlated with water temperature. In a normal space, the air temperature leads the water temperature (as it does in this case) and the pH change correlates with the water temperature change only ($\text{pH} = f(T_{\text{water}})$ and $\text{pH} \neq f(T_{\text{air}})$). The water temperature will always be correlated with the air temperature (heat flows from the air to the water and out again, forced by variation in air temperature). Thus, the pH correlation with the air temperature is the significant (anomalous) correlation here.

The pH-electrode is totally submersed in water (about one quarter liter) near the center of the container. We know from thermodynamics how the water

pH varies with the water temperature. However, from Figure 4, we see that the pH is much more in-phase with the air temperature, not the water temperature! When every peak or trough in temperature is examined carefully, as revealed in Table 1, the extremes in pH align much better with those of the air temperature. There is much less of a time lag between peaks and troughs in air temperature and pH. This pH correlation with air temperature does not happen in conventional, un-conditioned spaces where the pH is a function of water temperature not air temperature. At site A, the type of phase shifts that are so visually compelling in Figure 4 have been measured for more than 7,000 hours. At another “conditioned” site (roughly 40 meters away), less pronounced but quantitatively significant correlations between the pH and air temperature have been measured for more than 40,000 hours.

We see such pH behavior commonly in spaces conditioned by IIEDs, and it is one of the hallmarks of what we call space conditioning. Figure 4 is one of the better examples of the phenomenon. What this behavior reveals is one aspect of how macroscopic entanglement manifests in such spaces. In this case, the pH of water becomes strongly entangled with the air temperature and is one example of how “action at a distance” via entanglement can work in conditioned spaces.

Discussion

Equation 1 reveals just where the control comes in to an approximate evaluation of anomalous phenomena. There also exists in the expression a term defining where the anomalous component may enter. However, nature is more complicated than a simple expression such as Equation 1, and the existence of macroscopic entanglement demonstrates the importance of the further work needed to add other elements, something beyond the scope of this paper.

It seems clear from these few examples how difficult it becomes to define a “control” space or laboratory in environments that are specifically created to manifest such anomalous behavior. One problem occurs when macroscopic entanglement is established in such environments. The air temperature entanglement described above makes the definition of an appropriate temperature control difficult. If the pH does not vary with the water temperature but instead shifts to varying with the air temperature (Figure 4), then shouldn’t one be using the air temperature to define $pH_{U(1)}$ in such cases? The question of what temperature to use goes back to Equation 2 and Equation 3. The measured pH is a function of temperature as well as α'_{eff} for the pH measurement. The measured temperature is a function of α''_{eff} for the temperature measurement. All these quantities are entangled in a very complex way that has yet to be fully understood.

We have measured temperature using a variety of sensors in a conditioned space (red-spirit, mercury, thermister, and thermocouple) and find that, in such

spaces, the difference in temperatures between sensors is invariably greater than in other “more conventional” spaces. The search for the best temperature control in such spaces has yielded another reliable and exciting subtle energy detection system.

Where Does Equation 1 Come From?

By now, we hope the reader of this paper has come to appreciate that there are practical uses for an expression such as Equation 1 to evaluate anomalous phenomena, at least for the IHD (Intention-host Device) experiments. Not the least of these is establishing a basis for defining what the controls are. Now we would like to show some of the theoretical background used in defining this expression that, hopefully, will further suggest the richness of the approach that can be used.

About 13 years ago, one of us proposed that science consider the utility of using a specific duplex space RF consisting of two, **reciprocal**, four-dimensional subspaces, one of which is distance/time (Tiller, 1997:54–100). The reciprocal domain subspace is a frequency domain that can be linked to the spacetime subspace via α_{eff} . The origin of Equation 1 comes from the mathematics presented first in Chapters 7 and 8 of Tiller, Dibble, and Kohane (2001).

The very important mathematical property of a duplex space consisting of two reciprocal subspaces, is that a unique quality functioning in one subspace has an equilibrium quantitative connection to its conjugate quality in the reciprocal subspace via a type of equilibrium Fourier transform (FT) pair relationship; such a pair of equations can be generalized to any number of dimensions as shown in Tiller, Dibble, and Kohane (2001:304–305).

This means that if we calculate a mathematical description of a quality in one subspace, one can, in principle, calculate the equilibrium conjugate quality in the other subspace. However, in our duplex space case, a coupling substance must be present to allow a substance quality of one subspace to actually interact with the conjugate substance quality of the reciprocal subspace substance. We thus need to define and name this coupling substance which we label “deltrons.” Without this kind of deltron coupling, the thermodynamic equilibrium between the two uniquely different kinds of substance could never be achieved (Tiller & Dibble, 2007). To begin to illustrate this interaction, we use Figure 5. The top portion shows in (b) a Gaussian-shaped packet of R-space substance, $g(k_x)$, while (a) shows an FT wave packet of Gaussian envelope shape in spacetime (D-space). The bottom portion of Figure 5 shows in (c) a spherical particle of D-space substance, while (d) shows its $g(k_R)/2\pi R^2$ analogue in reciprocal space. Here, items (b) and (c) are substances while items (a) and (d) are only calculated ghosts (virtual substances). However, when sufficient deltrons are added, the substances a and b plus c and d can interact with each other (provided

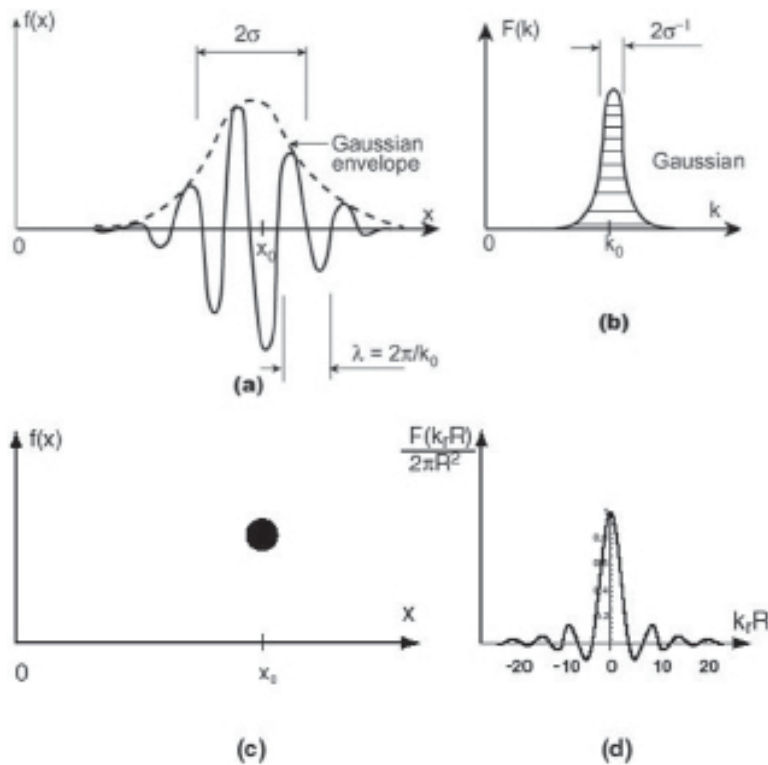


Figure 5. Classical Fourier Transform: D-space/R-space pairs
 (a) a "ghost" calculated D-space wavegroup for
 (b) a real R-space, Gaussian substance packet,
 (c) a real D-space 2-D particle of radius R, and
 (d) its "ghost" calculated R-space conjugate wavegroup.
 For an atom, one would choose $R \sim 10^{-8}$ cm.

we use the same geometrical shapes), and one has functional de Broglie particle/pilot wave systems (White Paper V, <http://www.tiller.org>) in both subspaces that can seek thermodynamic equilibrium between its distinguishable parts.

In our mathematical formalism, the quantitative relationship between the interacting substances of the two, reciprocal subspaces are given in one dimension, where $s = \text{any of } x, y, z, t$, by

$$C_{\delta}(s, k_s) f(s) = \frac{1}{(2\pi)^{1/2}} \int_{-\infty}^{\infty} g(k_s) e^{-i2\pi s \cdot k_s} dk_s \quad (4a)$$

and

$$g(k_s) = \frac{1}{(2\pi)^{1/2}} \int_{-\infty}^{\infty} C_{\delta}(s, k_s) f(s) e^{i2\pi s \cdot k_s} ds \quad (4b)$$

This pair of equations is importantly different from the standard FT pair because of our presently unknown deltron activation function, $C_{\delta}(s, k_s)$, which one might consider expanding as an orthonormal set of functions in both s and k_s . In the zeroth-order approximation, only the constant term in C_{δ} is retained, and this has been labeled α_{eff} in Equation 1.

It should also be understood by the reader that if one substitutes $Q_e(t)$ for $f(s)$ and t for s in Equation 4b,

$$Q_m = \int_{R\text{-space}} I(k_t) dk_t \quad \text{and} \quad I(k_t) = g(k_t) g^*(k_t) \quad (5)$$

where $I(k_t)$ is the intensity and g^* is the complex conjugate of g . Further, although Q_e is sometimes a mathematical scalar, Q_m is always a mathematical vector or a tensor. Appendix 3 illustrates how Equation 4 and Equation 5 are utilized with $\text{pH}_M(t)$ experimental data to gain useful insights on our general IHD research.

A Further Word About Anomalies, Anomalous Phenomena, and the Working Hypothesis Reference Frames Constructed To Model Them

We have been engaged in measuring a variety of anomalous physical–chemical behavior in spaces “conditioned” by an IHD (Intention-Host Device). This measured behavior is well-defined with such large effect-size, it is quite beyond the consciousness-correlated physical phenomena defined by Jahn and Dunne (2008) that require evaluation using rigorous statistical methods. For the most part, the details regarding the IHD and its operation are beyond the scope of this paper. We are primarily interested in categorizing and understanding the anomalies produced by this device in communications such as this. This general approach would apply to anomalies produced by a broad range of other devices with similar (albeit mysterious) operating principles. As a first step, we have generated Equation 1 from a zeroth-order approximation of a more general theory that allows us to begin the evaluation process. We think that others engaged in anomalies research may be able to make some use of this approach in their work.

Anomalies we have identified would be considered the “Not-OK” or “Sleeping” variety as defined by Sturrock (2007). Atmanspacher (2009) would probably consider them to be his “Anomalies in No-Man’s Land.” These characterizations illustrate some of the terminology that indicates anomalies that are outside conventionally accepted theoretical understanding. However, we prefer to divide anomalies of the types discussed by Sturrock (2007), Jahn and Dunne (2008), and Atmanspacher (2009) into two much more basic and meaningful groups.

Group A Anomalies. Group A anomalies would be those that can be considered to be spacetime anomalies that are accessible to spacetime models including quantum mechanics (QM). If the anomaly can ultimately (if not at the present time) be explained using QM, then it is a Group A anomaly. These phenomena can normally be described using potential functions that are space and time dependent.

Group B Anomalies. Group B anomalies would include those that exist outside spacetime and that are not accessible to models grounded in spacetime such as QM. Group B anomalies cannot be explained using QM, and they cannot be described using potential functions that are space and time dependent.

We very much appreciate the comments on this issue by Werbos (2001) that definitely apply to the Group B-type anomalies:

Many people . . . have expressed hope that quantum mechanics might explain things like remote viewing or like the collective unconscious of Jung—wild, crazy things. I would like to point out that no form of quantum mechanics can explain something like remote viewing. It doesn’t matter whether you take

Bohmian or my kind or Schwinger's kind or Copenhagen. . . . because all these different forms of quantum mechanics produce about the same quantum electrodynamics. . . . they yield the same predictions, essentially, for the case of quantum electrodynamics (QED). If you consider electrodynamics, that is not enough to generate remote viewing. We know what is possible with QED. The world has spent billions of dollars trying to use QED in the military to see things far away. We cannot do it. So if you want to explain strange things like remote viewing, the only way is by assuming strange force fields and strange signal processing. You have a choice. There is a great chasm. It is a binary choice. You cannot do it a fuzzy way. Either you give up on these phenomena—you give up on all that stuff—or else you have to open yourself up to really crazy things, much more than just quantum theory.

Radin (1997) also addressed the issue of future models involving Group B anomalies thusly:

As some of the stranger aspects of quantum mechanics are clarified and tested, we're finding that our understanding of the physical world is becoming more compatible with psi. An adequate theory of psi, however, will almost certainly not be quantum theory as it is presently understood. Instead, existing quantum theory will ultimately be seen as a special case of how nonliving matter behaves under certain circumstances. Living systems may require an altogether new theory. Quantum theory says nothing about higher-level concepts such as meaning and purpose, yet real-world, "raw" psi phenomena seem to be intimately related to these concepts.

We particularly resonate with the view of Radin (1997) that QM will ultimately be shown to be a special case of a much broader theory yet to be fully revealed but one that applies to all matter, living and non-living. We think that particle-wave duality, discovered by physicists of the last century, will ultimately be seen as the "shadow" cast into spacetime from the higher dimensional non-spacetime domains.

Getting back to our earlier experimental work (Tiller, Dibble, & Kohane, 2001, Tiller, Dibble, & Fandel, 2005, Tiller, 2007, Tiller, *White Paper XIII*), we discovered the presence of many different types of anomalies that ultimately deserve serious attention but are beyond the scope of this paper (Tiller & Dibble, 2001). However, two major anomalies associated with large values of α_{eff} should at least be mentioned here. These are (1) the DC magnetic field polarity effect (Tiller, Dibble, & Kohane, 2001:173, 206–216) which is consistent with "lifting" an experimental space from the U(1) electromagnetic (EM) Gauge symmetry state (designated by us as the uncoupled state of physical reality) to the SU(2) EM Gauge symmetry state (Tiller, 2007:71–72) (designated by us as the coupled state of physical reality) and (2) the presence of very low frequency oscillations (10^{-1} to 10^{-4} Hz) of all property measurements of water

(pH, air temperature, water temperature, and electrical conductivity) (Tiller, Dibble, & Kohane, 2001:176–180, 194–204). Fourier analysis of the oscillation wave shapes show nesting of all the various properties with each other at one physical location and, within one type of property measurement, over separated locations up to 11 feet apart (Tiller, Dibble, & Kohane, 2001:176–180, 194–204). Appendix 4 provides a very brief introduction to Gauge symmetry state considerations.

In its search to understand nature’s manifold expressions, since the days of Decartes 400 years ago, orthodox science has utilized a distance–time-only reference frame (RF) for its investigations and has sought for internal self-consistency over a very large body of diverse phenomena relative to this RF. This has been a very successful strategy! However, natural phenomena such as consciousness, intention, emotion, mind, spirit, love, parapsychology, etc., do not appear to be distance/time-dependent, at least not the same way that the main body of this ~400 year long record of data-gathering has proved to be. Clearly, this tried-and-true RF used for today’s paradigm of quantum mechanics and relativistic mechanics is inadequate to handle this other large category of natural phenomena. Further, when one is considering complex living biological systems such as humans and other vertebrates, a mix of these two uniquely different classes of phenomena are entangled while serving the overall life process. All such systems must be considered as anomalous phenomena relative to today’s orthodox paradigm and RF. Under such a circumstance, the word *anomalous* loses its meaning and signals that it is time for an RF change.

Another key piece of understanding needed for readers of this paper is the relationship between the $\alpha_{\text{eff}} = 0$ condition to the uncoupled state of physical reality also given as the U(1) electromagnetic (EM) gauge symmetry state, our present-day normal reality. Also, the $0 < \alpha_{\text{eff}} < 1$ condition is the partially coupled state of physical reality, designated as the SU(2) EM gauge symmetry state. The letters, here, are from group theory notation, while the numbers refer to how many independent phase angles exist in that particular gauge state (Tiller & Dibble, 2007).

In Tiller, Dibble, and Fandel (2005:89–91), our studies strongly suggested that the human acupuncture meridian system is always functioning at a partially coupled state of physical reality with an $\alpha_{\text{eff}} > 0$. Thus, highly inner-self-managed humans, who have seriously practiced “inner-work,” are also able to “condition” a space by their own intentions and create a local $\alpha_{\text{eff}} > 0$ so that local anomalies can occur just as occurs with our IHDs.

The upshot of all this is that there are many origins for anomalous phenomena present in Equation 1. Clearly, all contributions of the $\alpha_{\text{eff}} Q_m$ type are anomalous because they originate from what one would label higher dimensional domains of reality than those investigated with today’s distance–time

only investigative tools (Q_c -type tools). Some purely Q_c -type phenomena may be considered to be anomalous because they behave in ways unexpected by orthodox science and need to be studied more thoroughly before one can see internally self-consistent connections to other well-known and already accepted distance–time dependent phenomena (Tiller & Dibble, 2007). An example that falls into this category would be a natural phenomenon that is an unappreciated member of a set of Onsager relationship systems. Here, the more complex do the force interconnections between various distance–time-dependent phenomena become, the more easily can a term or terms in a larger Onsager system matrix be misinterpreted.

Summary

In summary, we clearly believe that anomalies research is all about first finding good controls. This belief is fundamentally rooted in an understanding of Equation 1 and its implications. Without good controls, nothing quantitative can be said about any anomalous results. That having been said, one needs to realize what all the impediments are to finding good controls. The very nature of an “anomalous space” itself is one of these impediments. The particular qualities of these spaces produce entanglement effects that significantly complicate matters. An understanding of these effects is crucial to proper anomalies research, and we believe this communication is a step toward this goal.

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APPENDIX 1

A Brief Sample of Some IHD Research Results

In 1997, we decided to seriously test the unstated assumption of orthodox science, since the days of Descartes, that “no human qualities of consciousness, intention, emotion, mind, or spirit can significantly influence a well-designed target experiment in physical reality.” We carefully designed four uniquely different target experiments and a novel procedure for introducing a different specific intention, appropriate to each experiment, after background data had first been gathered on each target experiment. Each of these intention-host device (IHD) experiments was robustly successful (see below) proving unequivocally that, in today’s world, this unstated assumption of today’s orthodox science is very, very, wrong (Tiller, Dibble, & Kohane, 2001:84–87, Tiller, 2007:67, White Paper XIII).

The intentions for the four target experiments were:

- (1) to raise the pH of purified water by 1.0 pH units with no intentional chemical additions to the water,
- (2) to decrease the pH of purified water by 1.0 pH units with no intentional chemical additions to the water,
- (3) to increase the in vitro thermodynamic activity of a specific liver enzyme, ALP (alkaline phosphatase), by a significant amount via just a 30-minute exposure to an IHD-conditioned space, and
- (4) to increase the in vivo ratio of ATP to its chemical precursor, ADP, in the cells of fruit fly larvae by a significant amount and thus significantly reduce the larval development time to the adult fly stage via lifetime exposure of the larvae to an IHD-conditioned space.

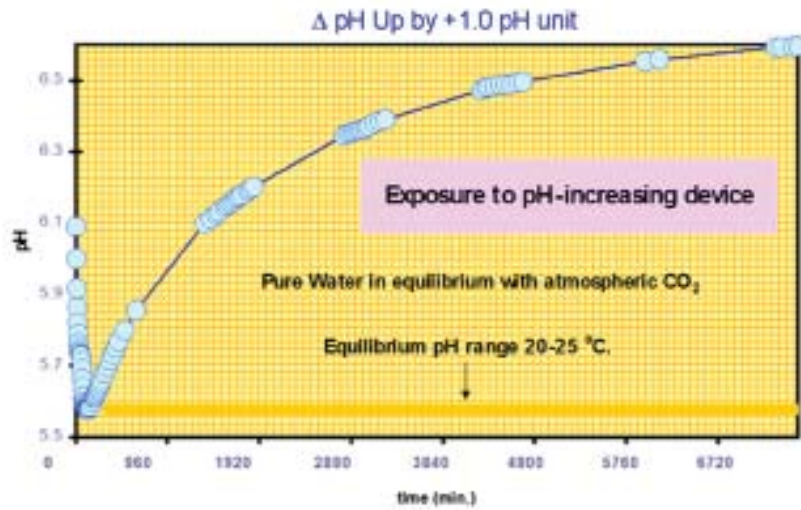


Figure 6. pH vs. time for pH-increasing experiment using an activated IHD.

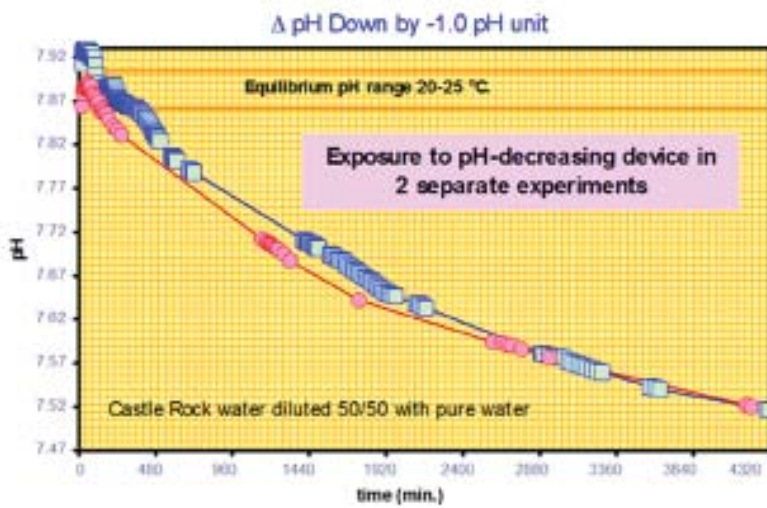


Figure 7. pH vs. time for pH-decreasing experiment using an activated IHD.

Figure 6 and Figure 7 show example results for target experiments (1) and (2) above. For target experiment (3) above, the chemical activity of ALP increased by ~25% – 30% at $p < 0.001$. For target experiment (4), the ATP/ADP

ratio increased by $\sim 10\% - 15\%$ at $p < 0.001$, and the larval lifetime decreased by $\sim 20\% - 25\%$ at $p < 0.001$.

Intention was added to each experiment via the continuous use of a simple electronic device wherein the specific intention was entangled with the device from a deep meditative state by four highly qualified meditators. Figure 8 illustrates the general time-dependent property measurement change, $Q_M(t)$, with processing time, t , with an activated IHD.

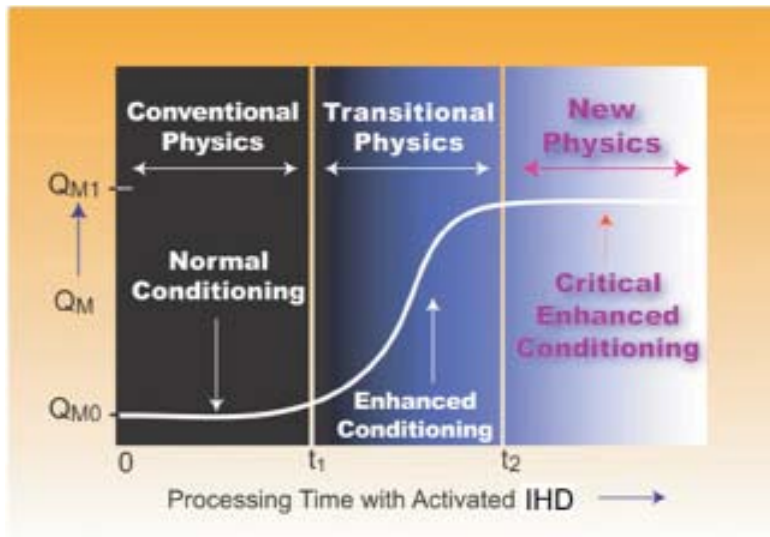
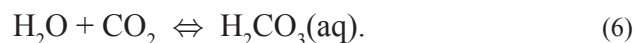


Figure 8. Property measurement change, $Q_M(t)$, vs. processing time, t , using an activated IHD.

APPENDIX 2

Calculation of pH of Purified Water, $\text{pH}_{\text{U}(1)}$

Since we use the value of $\text{pH}_{\text{U}(1)}$ as an important control, it is appropriate to discuss how we calculate it. In the main text, the value $\text{pH}_{\text{U}(1)}$ refers to the value of pH calculated using only thermodynamic data for a given temperature. This calculation assumes that equilibrium has been attained between the purified water and air. We perform this calculation using the four reaction equations discussed below and their equilibrium constants expressed in terms of their temperature dependences.



This first equation represents the dissolution of atmospheric CO_2 in water to form carbonic acid (CO_2 dissolved in water or $\text{CO}_2(\text{aq})$). The value of the partial pressure of atmospheric CO_2 needed to define the equilibrium constant relation is increasing all the time, the current value being just over 387 ppm. The value used to calculate the pH values, $\text{pH}_{\text{U}(1)}$, shown in Figure 1, Figure 2, Figure 3, Figure 4, and Figure 5, was 384 ppm, valid in October 2009. The equilibrium constant (simplified) expression for reaction Equation 6 is

$$K_{\text{H}} = [\text{CO}_2(\text{aq})]/[\text{CO}_2(\text{g})]. \quad (7)$$

The second and third equations involve the dissociation of carbonic acid:



and



The corresponding equilibrium constant expressions are

$$K_1 = [\text{H}^+] [\text{HCO}_3^-] / [\text{CO}_2(\text{aq})] \quad (10)$$

and

$$K_2 = [\text{H}^+] [\text{CO}_3^{2-}] / [\text{HCO}_3^-]. \quad (11)$$

The final reaction is the dissociation of water:



with its equilibrium constant

$$K_w = [\text{H}^+] [\text{OH}^-]. \quad (13)$$

The analytical expressions for the temperature dependence for these four equilibrium constants are taken from Stumm and Morgan (1996:979–981). The expression for alkalinity on page 170 of Stumm and Morgan (1996) is then used to calculate the pH at a given temperature. This is possible, assuming the alkalinity of pure water is zero, because the expression then reduces to just values of pH, equilibrium constants (as a function of temperature), and the partial pressure of atmospheric CO_2 . The pH is then calculated, iteratively, for a given temperature using the analytical expressions for the temperature dependences for all four equilibrium constants. All these calculations are performed using an Excel spreadsheet.

After a set of pH values for given temperatures is calculated this way, a chart of $\text{pH}_{\text{U(1)}}$ vs. temperature can be generated. For the temperature range we are normally interested in (16–32 °C), the relationship between pH and temperature calculated this way is nearly linear (goodness of linear fit = 99.95%). This linear relationship is then used to generate the $\text{pH}_{\text{U(1)}}$ curves of Figure 1, Figure 2, Figure 3, Figure 4, and Figure 5 using the measured water temperature. This methodology produces the same pH values for pure water that Stumm and Morgan (1996) calculate for rainwater using somewhat different techniques. The pH of rainwater, in equilibrium with the atmosphere, is a little over 5.6 at 20 °C and will continue to drop with time as the partial pressure of CO_2 increases.

Ancillary Issues

There are other gases in air than can influence the pH of the pure water exposed to it but have a negligible effect, compared to CO₂, unless they are artificially enhanced. This must be taken into account in some locations, such as working laboratories or manufacturing facilities, where water-soluble vapors of varying kinds are being produced. The only other caveat is that the pure water used in the measurement be purified to the point that the alkalinity is truly zero.

We prefer pure water as a pH measurement medium because, as shown above, its pH can be independently calculated as a function of temperature. Also the pH will be unaffected by evaporation as long as the evaporation rate is less than the equilibration rate between the water and the air. We facilitate this outcome by using lint-free tissue baffles between the water in a container and the air. If pure water is not used, the pH can be highly sensitive to the concentration of dissolved components (which will change via evaporation).

However, some care must be taken in the experimental measurement of the pH of pure water. High-quality measurement equipment is very important (Pajunen, Purnell, Dibble, & Tiller, 2009). Also we use pH buffers for pH-electrode calibration purposes that have been designed for measuring the pH of very dilute solutions such as pure water. ThermoOrion Pure Water buffers obtained from Fisher Scientific were used for all calibrations. Our common practice is to measure the pH continuously for one week, calibrate the pH-electrode, and then resume measurement using freshly prepared purified water. We feel this will minimize evaporation and possible contamination (dust, insects, etc.) problems but will also lead to a transitory period when the water reacts with the air to establish the equilibrium state for the average temperature. This transition period usually has a duration of 12–24 hours, which means that this early transitory data may not be very useful except possibly to provide some information on the kinetics of the process which can change under conditions where anomalies are present.

APPENDIX 3

One Application of Equation 4 and Equation 5

In our pH-replication experiments (for $\Delta\text{pH} = +1$ pH units), we found that they mostly conformed to the equation

$$pH_M(t) = pH_0 + \Delta pH (1 - e^{-\beta t}) \quad (14)$$

where $pH_0 = pH_{U(1)}$, provided highly purified water was used, while $\alpha'_{eff} pH_m = \Delta pH (1 - e^{-\beta t})$ and ΔpH was approximately the intention value (larger for below-ground sites and smaller for several stories' above-ground sites). In this equation, β is a constant, with respect to time, often determined by curve-fitting techniques, and t represents time.

From Equation 5,

$$\frac{dQ_m}{dk_t} = I(k_t) = g(k_t)g^*(k_t) \quad (15)$$

where

$$g(k_t) = R(k_t)e^{i\theta(k_t)} \quad (16)$$

Here, $g(k_t)$ is a vector of amplitude $R(k_t)$ and phase angle $\theta(k_t)$ with $i = \sqrt{-1}$. Also, k_t is a coordinate in frequency space (R-space) that has as analogues in direct space (D-space) the four coordinates x, y, z, t . Thus, k_t represents one of the frequency domain coordinates, $k_x, k_y, k_z,$ and k_t , which are all spatial or temporal frequencies. In Equation 15, $I(k_t)$ is the intensity value analogous to a magnitude but in the frequency domain.

In the zeroth-order approximation, Equation 4b yields

$$g(k_t) = \frac{-\alpha'_{eff} pH_0}{(2\pi)^{3/2} ik_t} (1 - e^{-i2\pi tk_t}) \quad (17)$$

Thus, from Equation 2 and Equation 14,

$$Q_m = \frac{\Delta pH}{\alpha'_{eff}} (1 - e^{-\beta t}) \quad (18)$$

so that

$$\begin{aligned} \frac{dQ_m}{dk_t} &= \frac{\Delta pH}{\alpha'_{eff}} t e^{-\beta t} \frac{d\beta}{dk_t} = g(k_t) g^*(k_t) \\ &= \frac{(\alpha'_{eff} pH_0)^2}{(2\pi)^3 k_t^2} (1 - e^{+i2\pi k_t t}) (1 - e^{-i2\pi k_t t}) \\ &= \frac{(\alpha'_{eff} pH_0)^2}{(2\pi)^3} \left[\frac{2 - (e^{+i2\pi k_t t} + e^{-i2\pi k_t t})}{k_t^2} \right] \end{aligned} \quad (19)$$

$$= \frac{2(\alpha'_{eff} pH_0)^2}{(2\pi)^3} \left[\frac{1 - \cosh(i2\pi k_t t)}{k_t^2} \right] \quad (20)$$

From Equations 19 and 20,

$$e^{-\beta t} d\beta = a \left[\frac{1 - \cosh(bk_t)}{k_t^2} \right] dk_t \quad (21)$$

where

$$a = \frac{2(\alpha'_{eff})^3 (pH_0)^2}{(2\pi)^3 t \Delta pH} \quad \text{and } b = 2\pi t. \quad (22)$$

Integrating Equation 21 yields

$$e^{-\beta t} = a \int \left[\frac{1 - \cosh(bk_t)}{k_t^2} \right] dk_t \quad (23)$$

where

$$d = -ta = \frac{-2(\alpha'_{eff})^3 (pH_0)^2}{(2\pi)^3 \Delta pH} \quad (24)$$

Experimentally, we find that each different site has a different value of β so that exploring the details of Equation 23 and Equation 24 can be expected to yield interesting relationships between the two reciprocal subspaces. In particular, one readily obtains an explicit expression for $(\alpha'_{eff})^3$ given by

$$\left(\alpha'_{eff}\right)^3 = \frac{-(2\pi)^3 \Delta pH e^{-\beta t}}{2(pH_0)^2 \int \left[\frac{1 - \cosh(bk_t)}{k_t^2} \right] dk_t} \quad (25)$$

Since $\cosh(ix) = \cos(x)$ with $x = 2\pi k_t$, Equation 25 becomes

$$\left(\alpha'_{eff}\right)^3 = \frac{-(2\pi)^2 \Delta pH e^{-\beta t}}{(pH_0)^2 \int_{2\pi k_t^*}^{2\pi k_t^{**}} \left(\frac{1 - \cos(x)}{x^2} \right) dx} \quad (26)$$

In the small limit approximation, $0 \leq x < 2$, the integral is better than 90% accurate when one expresses the cosine as a power series. Of course, at large x , the integral rapidly shrinks to \sim zero. Because of the negative sign, one must expect that α'_{eff} is mathematically complex in nature and can be quantitatively evaluated.

APPENDIX 4 A Brief Synopsis on Gauge Theory

Gauge theory development has probably been the most important advance in orthodox physics in the past 50 years. It deals with the interaction of external fields with internal symmetry states in nature (Moriyasu, 1983).

It deals with dynamic movement, in phase space, of the electron wave function phase angle, θ , with respect to the absence or detailed presence of an external field and the particular Gauge symmetry state that the electron may occupy. This is dependent on fiber bundle mathematics and group theory considerations leading to a unique locus of the particle's phase angle, θ , at each (x,y,z,t) point in spacetime. Our normal macroscopic physical reality exists in a U(1) gauge symmetry state because it involves only one type of relevant particle, the electron, whose phase angle, θ , moves in a planar ring in phase space

(see Figure 9). The SU(2) Gauge state involves two relevant phase angles, θ and ϕ , which move in a three-dimensional sphere in phase space at each (x,y,z,t) point as indicated in Figure 9.

For SU(n) Gauge states, $n^2 - 1$ parameters are involved in the relevant interaction so that, for $n = 2$, three parameters are critically involved. Thus, for the neutron/proton exchange reaction, this is an SU(2) Gauge state with the neutrino as the third parameter. In the case of an electron/magnetic monopole interaction it also produces an SU(2) Gauge state. What WAT has labeled a “deltron” is the third parameter needed to stabilize this particular symmetry state. Loss of the deltron from this complex leads to symmetry breaking from the self-coherent state to the free state (see Figure 9) and transition to a U(1) Gauge state for the electron plus a different type of U(1) Gauge state for the magnetic monopole (but undetectable via our orthodox spacetime instrumentation). A greatly expanded version of Gauge symmetry theory is provided in White Paper XIX available at <http://www.tiller.org>.

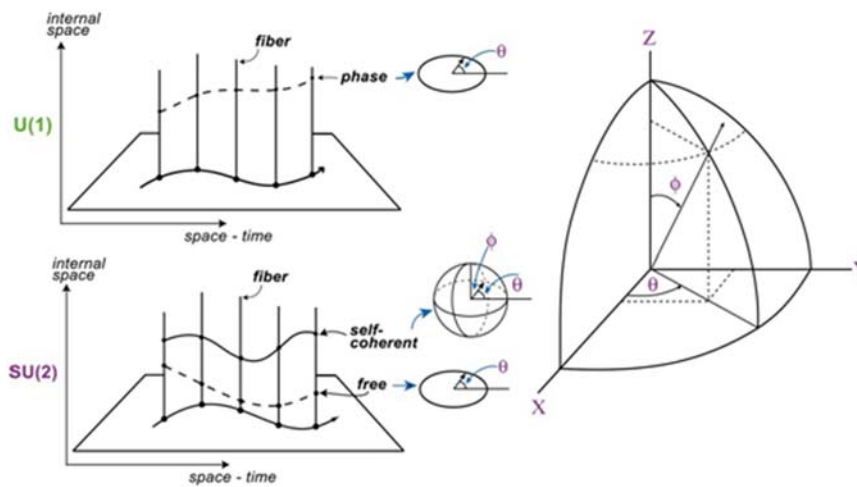


Figure 9. Fiber bundle representation above the spacetime background for both U(1) and SU(2) gauge symmetry states.

RESEARCH

Hessdalen Lights and Piezoelectricity from Rock Strain

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Abstract—Hessdalen lights (HL) are unexplained light balls usually seen in the valley of Hessdalen, Norway. Some theories, such as that of Takaki and Ikeya, explain HL as a product of piezoelectricity generated under a rock strain because many crystal rocks include quartz grains which produce an intense charge density. In this work, based on the dusty plasma theory of HL (Paiva and Taft), we suggest that piezoelectricity of quartz cannot explain a peculiar property assumed by the HL phenomenon—the presence of geometrical structures in its center.

Keywords: Hessdalen lights—piezoelectricity—dusty plasma

Introduction

Hessdalen lights (HL) are unexplained earthquake lights (EQL) usually seen in the valley of Hessdalen, Norway (Teodorani, 2004). They have the appearance of a glowing light ball with dimensions ranging from decimeters up to 30 m. In a few cases (at low levels of luminosity), they explicitly show visually some kind of geometric structure. The reason for these shapes is totally unknown. HL often shows strong pulsating magnetic perturbation of about 5 Hz (Teodorani, 2004). They are often accompanied by small, short-duration pulsating “spikes” in the HF and VLF radio ranges, sometimes showing Doppler features.

No existing theory or model can account for all the (and sometimes contradictory) observations of HL. One explanation attributes the phenomenon to an incompletely understood combustion process in air involving clouds of dust from the valley floor containing scandium (Bjorn, 2007). Some sightings, though, have been identified as misperceptions of astronomical bodies, aircraft,

car headlights, and mirages (Leone, 2003). A theory that has attracted great attention was proposed by Takaki and Ikeya (1998) and Teodorani (2004). It involves piezoelectricity generated under a rock strain. Change in seismic stress releases piezo-compensating, bound charges due to changes in the piezoelectric polarization of quartz grains in granitic rocks, which produces an intense electric field at the fault zone. In the specific Hessdalen area, where light phenomena are seen very often some meters over the ground, an electric triggering mechanism above might be produced by the existing high abundance of quartz, copper, and iron underground. When quartz is subjected to tectonic stress, it generates piezoelectricity (Lockner, Johnston, & Byerlee, 1983, Zou, 1995), while copper is an ideal electricity conductor and consequently might be an electrical amplifier of the HL phenomenon.

A dusty plasma is a plasma containing micrometer- or nanometer-sized particles suspended in it which also behaves like a plasma (Ivlev et al., 2000). Dust and dusty plasmas are quite natural in space. They are present in comets, planetary rings, zodiacal dust clouds, and interstellar clouds (Northrop, 1992). Dusty plasmas are found in the vicinity of artificial satellites and space stations (Robinson & Coakley, 1992) and in thermonuclear facilities with magnetic confinement (Winter & Gebauer, 1999). Dust grains immersed in plasma become charged. Electrostatic coupling between the grains can vary over a wide range so that the states of the dusty plasma can change from weakly coupled (gaseous) to crystalline, so-called “plasma crystal” or “Coulomb crystal” (Thomas et al., 1994).

In this work, based on the dusty plasma theory, we suggest that piezoelectricity (which produces an intense electric field at the ground during soil dislocation) does not explain topological structures assumed by the HL phenomenon at its low level of luminosity. The electric field created by this physical process is insufficient to produce geometric structures in the center of HL-like dusty plasma. Here we use a recent dusty plasma model of HL that explains several properties of the natural phenomenon (Paiva & Taft, 2010).

Calculations

The HL phenomenon is always preceded by short-lasting (on the order of a fraction of a second) flashes of light that appear everywhere in the valley. The Hessdalen area is likely to be one of these geophysically peculiar locations owing to the richness of quartz underground. Everywhere, both in the sky and close to the ground, flashes of light appear with durations of fractions of a second. Flashes are mostly orb-shaped, but sometimes very elongated shapes have been recorded as well. The presence in the valley of quartz mines suggests that the lights are powered electrically by piezoelectricity or the impact of cosmic rays. Some of the lights seem to be associated with radio emissions

(Teodorani, 2004, Zou, 1995) from low-energy plasmas which are possibly produced as aftereffects of tectonic strain.

The electric field in the air can be estimated considering the appearance of transient charges caused by the change of seismic stress, σ , and the decay of the change in a conductive earth with the dielectric constant, ϵ , and the resistivity, δ . The charges, q , may be expressed as:

$$\frac{dq}{dt} = -\alpha \left(\frac{dq}{dt} \right) - \frac{q}{\epsilon \rho \delta} \quad (1)$$

where α is the piezoelectric coefficient (Takaki & Ikeya, 1998). These charges cause the electric field in the air. Considering the stress drop $\Delta\sigma$, the stress change is $\sigma(t) = \Delta\sigma \exp(-t/\tau)$. The charge density is obtained from Equation 1 and is expressed as

$$q(t) = \alpha \sigma \frac{\epsilon \sigma}{\tau - \epsilon \delta} \times \left\{ \exp\left(-\frac{t}{\tau}\right) - \exp\left(-\frac{t}{\epsilon \delta}\right) \right\} \quad (2)$$

The charge relaxation time for electrostatic processes is $\epsilon \delta = 0.7 \mu\text{s}$ for a typical value of $\epsilon = 8\epsilon_0$ and $\delta = 10^4 \Omega\text{m}$ in granite. The piezoelectric coefficient is $\alpha = 4.6 \times 10^{-12} \text{ C/N}$ for quartz crystal in shear stress. The charge density was calculated using Equation 2 for the piezoelectric constant of quartz crystal, the dielectric constant, and the resistivity of granite. The maximum charge density, q_{max} , is given by (Takaki & Ikeya, 1998)

$$q_{\text{max}} = \alpha \Delta\sigma \left(\frac{\epsilon \delta}{\tau} \right)^{\frac{\tau}{\tau - \epsilon \delta}} \quad (3)$$

where τ is the displacement time which is on the order of $1\mu\text{s}$, and $\Delta\sigma = 10^7 \text{ N/m}^2$ is the effective stress drop. Inserting the values into Equation 3, we found $q_{\text{max}} = 1.4 \times 10^{-5} \text{ C}$. The electric field given by:

$$E_{\text{max}} = \frac{q_{\text{max}}}{4\pi\epsilon_0 R^2} \quad (4)$$

where R (on the order of meters) is the vertical high above the vein. Thus, we found $E \sim 1.5 \times 10^5 \text{ V/m}$ in the air on the vein. If a new physical process

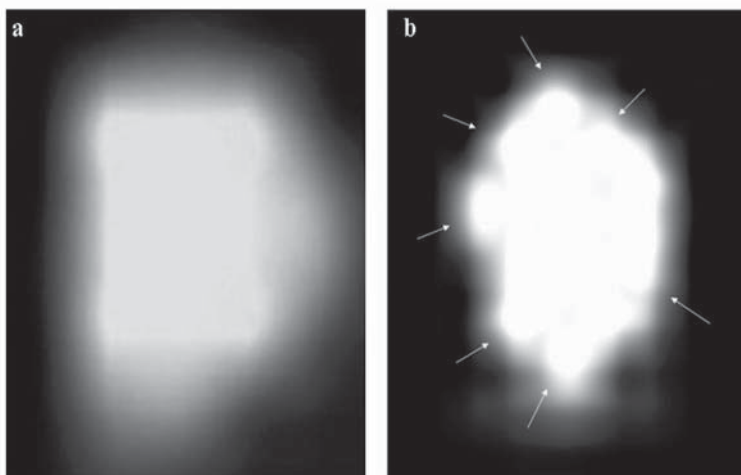


Figure 1. Hessdalen lights at low levels of luminosity show rectangular shapes.

(a) Rectangular shape recorded by conventional photography.

(b) Rectangular shape surrounded by spherical light balls indicated by arrows.

(Teodorani, 2004)

of ferroelectric orientation of piezo-compensating, bound charge pairs were present, an intense charge density would be produced (Brune, 1970). In our calculations, the charge was approximated for the charge density of $q = 1 \times 10^{-5} \text{ C/m}^2$ in the area of $10 \times 10 \text{ m}$ during $1 \times 10^{-6} \text{ s}$ in the calculation, which is sufficiently long for ionization to occur because electrons are accelerated to 94% of the final velocity within 10^{-8} s . Free electrons with the density of $4 \times 10^6 - 1 \times 10^7 \text{ electrons m}^{-3} \text{ s}^{-1}$ are generated by cosmic rays and natural radiation due to atmospheric radioactivity. The electric field generated by the seismically induced charges on the ground accelerates these electrons which ionize or excite N_2 and O_2 in the air and atoms in the atmospheric dust grains. The excited state of $\text{B}^3\Pi_g$ for an N_2 molecule has a lifetime of $8 \mu\text{s}$ and makes the electronic transition to the excited state of $\text{A}^3\Sigma_u^+$ observable (Radzig & Smirnov, 1985).

In most cases, HL (at high levels of luminosity), if seen from far away, have the appearance of a glowing light ball with no structure; in other cases (at low levels of luminosity), they explicitly show visually some kind of geometric structure (Teodorani, 2004). Rectangular shapes have been recorded as well (Figure 1). This shape (recorded on $1/30 \text{ s}$ video frames), in particular, is not simply a result of videocamera pixilation effects, since the same kind of shape is recorded by conventional photography.

Dust plasma theory predicts that there are plasma conditions where the

particles show collective behavior and all the particles are in a cloud that behaves like a fluid or solid. Sometimes all the particles are of approximately the same size, and then it is possible that the ensemble of particles gathers into a crystal that appears with the geometric structures in HL phenomenon.

To predict the possibility of geometrical structures in HL phenomenon through dust plasma theory, one parameter of importance is the *coupling parameter* Γ (also known as the plasma parameter or strength of interaction in a plasma; Thoma et al., 2005) of a collection of charged particles defined as the ratio of potential energy (PE), due to Coulomb interaction, to kinetic energy (KE):

$$\Gamma \equiv \frac{\langle PE \rangle}{\langle KE \rangle} \quad (5)$$

Coupling parameter Γ depends on the ratio of the square of the particle charge and particle temperature:

$$\Gamma \equiv \frac{(Q_p)^2}{4\pi\epsilon_0 a_p k_B T_p} e^{\left(\frac{a_p}{\lambda_D}\right)} \quad (6)$$

where Q_p is the charge on the grain, a_p is the interparticle distance, $k_B = 1.38 \times 10^{-23} \text{ m}^2 \text{ kg s}^{-2} \text{ K}^{-1}$ is the Boltzmann constant, $\epsilon_0 \sim 8.85 \times 10^{-12} \text{ F/m}$ is the vacuum permittivity, T_p is the particle temperature, and λ_D is the Debye length. The charge on an isolated grain particle in the dusty plasma is

$$Q_p = C\Phi_s \quad (7)$$

where $C = 4\pi\epsilon_0 r$ is the capacitance, r the particle's radius, and the particle surface potential in volts Φ_s can be calculated from

$$\Phi_s = \frac{Ze}{4\pi\epsilon_0 r} \quad (8)$$

where Z is the charge number of dust, and e is the elementary charge. Considering that HL is a free-floating light ball, the equivalence between gravitational and electrostatic forces should be observed. Thus, the charge of the dust grain can be determined from the balance of gravity and electric forces (Smirnov, 2000):

$$Z = \left(\frac{mg}{eE}\right) = \frac{4\pi r^3 \rho g}{3eE} \quad (9)$$

where g is freefall acceleration, ρ is the dust density, and E is the electric field (calculated in Equation 3). On the other hand, Debye length of the electrons is given by:

$$\lambda_D = \sqrt{\frac{\epsilon_0 k_B T}{e^2 n_e}} \quad (10)$$

where T is the mean temperature inferred for HL phenomena (Bjorn, 2007), and n_e is the electron density (electrons per m^3). Considering HL as a blackbody radiator with mean temperature $T = 5,000$ K, electron density can be estimated based on the solar photosphere. The Sun's photosphere has a temperature between 4,500 K and 6,000 K (with an effective temperature of 5,000 K) and mean electron density of 10^{18} m^{-3} (Vranjes & Poedts, 2007). Thus, let us consider electron density for HL as being $n_e \sim 10^{18} \text{ m}^{-3}$. For the sake of convenience assuming the steady state (initial) surface temperature of a particle to be $T_p = 350$ K (Stoffels et al., 1996), dust particle radius $r = 10 \times 10^{-6} \text{ m}$ [soil dust grain], typical interparticle distance of the order of $a_p = 100 \times 10^{-6} \text{ m}$ (Chu & Lin, 1994), Debye length $\lambda_D = 5 \times 10^{-6} \text{ m}$ (Equation 10), and dusty particle density $\rho = 3.5 \text{ kg m}^{-3}$ (for thortveitite, a common mineral in the Hessdalen valley; Anthony et al., 1995), we found through Equation 6 a coupling plasma parameter $\Gamma \sim 2 \times 10^{-3}$. Monte Carlo simulations showed that the charged species in a dusty plasma should form regular lattices (Coulomb Crystals) at $\Gamma \geq \Gamma_c$, where $\Gamma_c = 170$ (or $\Gamma_c \sim 178$). Since this value is very much lower than Γ_c , dust particles cannot crystallize. Thus, different geometric structures observed in HL phenomenon should not be explained by air ionization produced by an electric field during tectonic stress on quartz under the ground.

Conclusion

We conclude that theories that involve piezoelectricity generated under a quartz strain at the ground cannot explain the geometrical structures observed in HL phenomenon in its low level of luminosity. Here we use a recent dusty plasma model of HL that explains several properties of the natural phenomenon (Paiva & Taft, 2010). According to dusty plasma theory, geometrical structures in a plasma should occur when *coupling parameter* Γ (also known as the plasma parameter or strength of interaction in a plasma) is $\Gamma \geq \Gamma_c$ where $\Gamma_c = 170$ (or $\Gamma_c \sim 178$). We have found a coupling plasma parameter of $\Gamma \sim 2 \times 10^{-3}$ for dusty plasma within an electric field in the air produced by the tectonic stress, $E = 1.5 \times 10^5 \text{ V/m}$, which is insufficient to originate in (dusty) plasma geometrical structures observed in the center of some HL.

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RESEARCH

Retroactive Event Determination and the Interpretation of Macroscopic Quantum Superposition States in Consistent Histories and Relational Quantum Mechanics

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Abstract—The concept of “objective reality” is addressed, and an ontological model is suggested, in which correlations of events in the configuration space of the wave function are considered invariant with respect to changes of observer. It is suggested that these statements make the best sense when considered from within a fifth-dimensional framework, extrapolated from the four dimensions of spacetime in a direct way. A pair of postulates is then suggested which strengthens two current models of quantum theory into a broader picture, giving a physical interpretation of Macroscopic Quantum Superposition (MQS) states. Relational Quantum Mechanics (RQM) from Rovelli and Consistent Histories (“CH”) from Griffiths are discussed and related to the postulates. By dropping the assumption that unobserved macroscopic events are “in a definite state” determined independently of an observer, a surprising but consistent theory of quantum macroscopic reality is arrived at (with fewer fundamental assumptions about everyday reality) that does not contradict experiment or everyday experience. As a result, a concept herein termed “retroactive event determination” is extended from a quantum principle (in CH) to a macroscopic principle. Macroscopic events that have not been observed by a particular observer are free to be retroactively determined. The feasibility of applying the physics of quantum operators to macro systems is analyzed using the concept of “macro projectors.” Various concerns with this model are addressed, such as solipsism and decoherence of the wave function for macro objects. A discussion is also made of the philosophical context of the ideas suggested. Some experimental ideas are offered.

Keywords: Macroscopic quantum superposition—MQS—consistent histories—relational quantum mechanics—time—spacetime—retrocausation—framework—single-framework rule—macro pointers—synchronicity—meaningful coincidence—positivism—observer effect—measurement problem—delayed choice experiment—retroactive event determination—existential behavior—Many-Worlds model

The term 'happens' is restricted to the observation.

—Werner Heisenberg (1958)

Introduction

In this paper I tackle the much-debated concept of macroscopic quantum superposition states. While there is good reason to reject any ontological status for these (e.g., decoherence (Zurek, 2003) or the apparent definiteness of everyday experience), there is also the encouraging fact that MQS states have a fundamental place in the mathematics of Hilbert spaces, as can be seen in Griffiths (2002). In order to approach this, I begin in the next section, Objective Reality, with a discussion of “objective reality,” and propose that the individual experiences of a given observer cannot be considered part of this objective reality, because the perception of a definite reality (according to Relational quantum mechanics) will change under a change of observer. I find, however, that *correlations* among events will be invariant under such a change of viewpoint, and this leads us to extend our conception of spacetime from the four Einsteinian dimensions into a fifth dimension (a dimension of correlation of possibilities).

Motivated by this and on largely epistemological grounds, I propose (in the section Postulates) two postulates related to the macroscopic perspectives of multiple observers. I show that these postulates are fully consistent with the mathematical formalism of Consistent Histories. I look at these postulates from the point of view of a traditional delayed choice experiment, and then from a (possibly controversial) macroscopic situation.

In the section Macroscopic Quantum Superposition States, I attempt to provide some justification for the use of quantum operators on macroscopic systems. Specifically, I focus on the inevitable unitary evolution of a system into MQS states in certain common circumstances, and I analyze the emergence of macro projectors from these unitary evolutions. I argue that instead of basing the existence of MQS states on Heisenberg’s uncertainty principle and the phase states of individual micro systems, one can apply certain concepts of operators directly to these macro systems, and bypass some of the traditional difficulties with these concepts.

Of course, one should anticipate objections that the reader will have in applying quantum principles to macro events. In the section Concerns and Comparisons I discuss paradoxes of causality that might be of concern in this model. I also make note of the dimensionality problem associated with wave-function realism, comparisons with the Many-Worlds model, the concern of solipsism, and the well-known concerns regarding decoherence of quantum effects.

By its nature this paper strays outside of the pure physical sciences and

touches on philosophical and metaphysical ideas. It is important to realize the philosophical context in which these ideas fall, so I make an attempt in the section Philosophical Grounds to provide the reader with some comparisons to standard philosophical stances on these issues. I also address in the section Evidence and Verification some possibilities for experimental verification.

Objective Reality

Does there exist a Mind-Independent reality? What structures should be considered “real”? What aspects of the world can be considered “objective” and which must be “subjective”? These questions have long been debated, and I will not answer them in depth here. However, I do wish to take a stand and propose a model for the sake of supporting my later arguments.

In the Relational model given by Rovelli (1996), the state of any observable cannot be said to be absolute, but rather is determined only from the point of view of a given observer (i.e. it is relationally defined). Hence, every measurement is seen as a relational exchange of information between two entities that now form a relationship. These relationships could be called “relational data” about the world, but they cannot be seen as “absolute facts” (Rovelli, 1996), since they are only determined from a single observer’s perspective. This implies that a single definite event from one observer’s point of view (POV) will not be definite from the point of view of another observer. In the Relational model, even if one is discussing a system S which has been observed by a number of observers (P_i), and “fixed” for those observers into a definite state, it is *always* possible to select a larger perspective of some observer K who is outside of this system. For this other observer K , the state of the system S and all the observers P_i will all be undetermined¹ (but correlated)². The conclusion, then, is that single definite events from one POV can no longer be described as definite when one switches one’s POV or framework³ to that of another observer. I will venture to say that this means single definite events cannot be considered objectively real.

If definite events from a single POV cannot be considered “objectively real,” what then can? In the Relational model, each interaction results in a correlation of the state of two entities. Rovelli says:

P has information about the initial state (of S), and therefore has the information that the measurement (between Q and S) has been performed. The meaning of this is that she knows that the states of the S - Q systems are correlated, or, more precisely, she knows that if at a later time t_3 she asks a question to S concerning property A , and a question to Q concerning his knowledge about A , . . . she will get consistent results. (Rovelli, 1996:15)

In other words, one can know in absolute terms that a correlation has occurred, even if one cannot know what the definite state of the system is.

For instance, say S is a spin-1/2 particle being measured in the z direction. If P¹ measures S, he can certainly state that the correlated wave function for this combined system after the interaction can be written as in Equation 1:

$$|\psi\rangle = \frac{1}{\sqrt{2}}\{|S_+\rangle |P_+^1\rangle + |S_-\rangle |P_-^1\rangle\} \quad (1)$$

If another quantum entity P² measures the system, then the correlated wave function would unitarily evolve into a further correlated state (Equation 2):

$$|\psi\rangle = \frac{1}{\sqrt{2}}\{|S_+\rangle |P_+^1\rangle |P_+^2\rangle + |S_-\rangle |P_-^1\rangle |P_-^2\rangle\} \quad (2)$$

This correlation would be true from any of the perspectives P², P³, K, etc. Furthermore, from the perspective of the entity P¹, he himself would be in a definite state $|P_+^1\rangle$ (or $|P_-^1\rangle$), meaning he had measured $|S_+\rangle$ (or $|S_-\rangle$). So from that point of view, the system is in a definite state, and (more importantly) P and S are correlated.

The fact that two or more states are correlated, then, does not change when one switches from one to another POV. This is more than just “relational data.” I shall therefore (for the purposes of this paper) consider the correlations among events in spacetime to be considered “objectively real.”⁴

This declaration implies a sort of wave-function realism. I will delve more deeply into this in the section Philosophical Grounds. One of the main concerns with wave-function realism is that it supposedly introduces many extra dimensions into our ontology, since the dimension of the configuration space for a system of N particles contains 6N dimensions (Lewis, 2003) rather than the familiar three spatial dimensions. However, I think a different approach to this question of dimensionality could be helpful.

The argument goes like this. Let us begin by looking back at our definitions of the first four dimensions, and the physical properties these dimensions have. It is well-understood that a one-dimensional object (a line in Cartesian space) is a replication of a zero-dimensional object (a point)⁵, ad infinitum, into a “new” direction that doesn’t exist for the zero-dimensional point. Similarly, a two-dimensional plane can be thought of as a result of extending the one-dimensional line in a new direction that is not available to the line, and generating a set of “all possible versions” of the line. Moving further, a three-dimensional volume is a replication of all the possible two-dimensional planes, lined up in parallel. We can continue the description into the fourth (Einsteinian) dimension of time, by viewing time as the collection of all the possible versions of three-dimensional space, set side by side in an orderly fashion (which we experience one at a time, in order). The totality of time represents a collection of all the “versions” (i.e. days) of our three-dimensional world that exist over time.

Following this pattern, Bryanton (2006) concludes that there could be a structure which allows us to set all the possible four-dimensional worlds side by side in an orderly fashion. This would be a “dimension of possibilities,” the five-dimensional structure that supports the objective reality as defined above. For instance, a spin-1/2 particle which passes through a Stern-Gerlach magnet aligned in the z+ direction will now take up two “points” in the five-dimensional configuration space, corresponding to the two possible states it could be found in. Clearly, in three-dimensional space, a definite event can only be assigned one value of time for a given observer. Similarly, an observer can only experience one four-dimensional timeline, based on a single coordinate in five-dimensional space. I will posit that the analog of “location” within this five-dimensional configuration space refers to “where one resides” among the various possible correlations of events (i.e. which events have been observed by a given POV and which ones have not). Note that this property of five-dimensional location is a quantity that is relative to the observer. On the other hand, we can consider the *correlations* of four-dimensional events (i.e. statements about which entities have interacted) as “objects” in the five-dimensional space. Note that this property, based on our discussion above and to follow, is invariant among various observers.

The reader may see some clear connections to the Many-Worlds theory here, or have other objections. These comparisons and considerations will be addressed in the section Concerns and Comparisons. This description has been short and intentionally hand-wavy, in order to move on to my central point.

Postulates

The postulates offered below are not original ideas; they are gleaned from various sources,⁶ but their inclusion here in this particular order is intended to create a model that has a sort of completeness and can work together to provide greater insight into the nature of things. They are partly motivated on epistemological grounds, and so I am not claiming that just because the model presented is internally consistent that it is also a descriptive or “true” model of physical reality.

I suggest two basic principles:

Postulate 1:

- **Events are only “determined” or “undetermined” from a given observer’s perspective. The only events that are “determined” for an observer are those that have been observed⁷ by the observer. Those that are not yet observed are “undetermined.”**

“Undetermined” describes an event that still has multiple possible outcomes. It is more than the idea that I simply don’t know what has

happened yet. It is the fact that no definite statement can be made about the outcome of the event. I will use the phrase “it hasn’t actually ‘happened’ yet” (with ‘happened’ in quotes) to convey the notion that the outcome of the event remains undetermined *even if the event already took place*. This postulate implies that the state of any observable is relative to the observer.

Postulate 2:

- **There is no definitive absolute perspective. The universe can only be meaningfully described from one perspective (“framework”) at a time.**

This postulate says that there is no global, bird’s-eye perspective on our world that can see everything in a definite state. Definite states can only be experienced from a single perspective at a time, in which case Postulate 1 applies.

To understand the motivation for these principles, let’s first consider (as a metaphor) the approach that particle physicists use to predict the existence of virtual particles. Any particle that exists for a timescale shorter than that on which the fabric of the universe would allow it to be measured (via the Heisenberg Uncertainty relations) cannot be said either to exist or to not exist. One cannot prove that these quantum fluctuations do or don’t exist, so we have to assume that they do have some validity underneath the limits given by the uncertainty principle. Furthermore, we know that they have a tangible impact on the physics of the universe.⁸

In a similar way, we can consider MQS states more as logical conundrums rather than physical things, and yet arrive at a tangible physical result that has definite consequences. Just as one cannot peer within the Heisenberg limits to see virtual particles, via this metaphor one also cannot be *definite* about any event (macroscopic or otherwise) which one hasn’t observed. The only way to be definitely sure of the state of an event is to observe it in some fashion. So I claim here that unobserved events have an indeterminate nature, and that this fact can be included in reliable theories regarding observed events.⁹ This claim holds as long as the hypothetical MQS events cannot be shown *not* to exist. Until one observes a macroscopic object, one cannot actually say what state it is in, nor whether it is even in a definite state. One should not simply assume it is in some state if one is not oneself observing it. From a strict interpretation of Rovelli, it follows that even macroscopic objects have no observer-independent definite state.

For the following discussion, let’s use the delayed choice experiment by Jacques et al. (2006). Consider two correlated events, such as the measurement of photon S by Q and by P in the diagram (Figure 1). These events are correlated

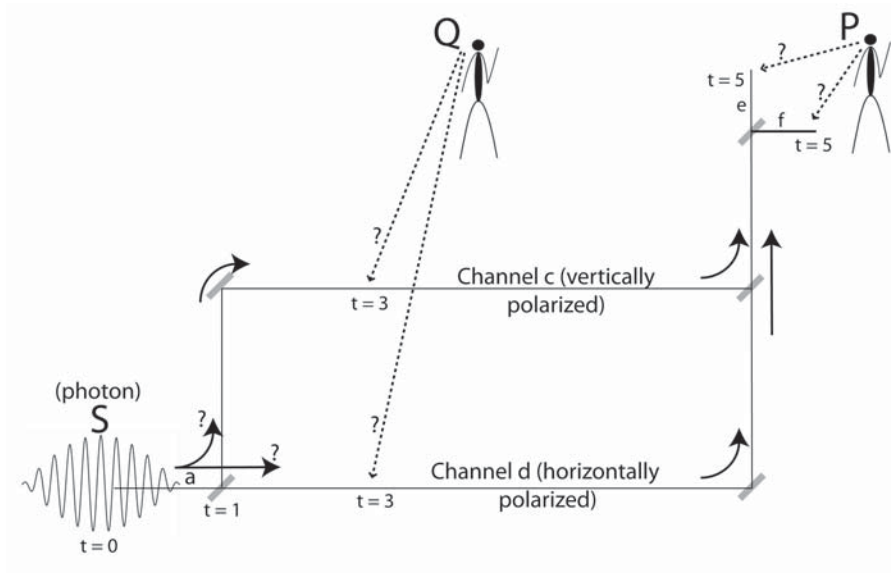


Figure 1. Schematic of the delayed choice experiment performed by Jacques et al.

in the sense that the measurement by Q will give a result that does not contradict the measurement by P. Our common sense tells us that the measurement by Q happens first, followed by P. Therefore, *if our measurement at P were to affect Q* (remember, Q happened first), we are stuck in a dilemma of acausality (Wheeler's delayed choice paradox).

Griffiths does a fine job of resolving this paradox, but I will attempt here to show how the proposed postulates interpret this situation. I have discussed Relational quantum mechanics at some length, and I now turn to Consistent Histories for some further clarification. Consistent Histories (Griffiths, 2002) theory postulates that we can look at the history of an unobserved particle S as a set (a "family") of possible histories, each of which must be internally consistent, according to certain mathematical requirements.¹⁰ The particular knowledge one has of a system determines the framework of possible histories that are available, and only one framework can be used in a given analysis in order to maintain a consistent (non-paradoxical) description of the system. This is the inspiration for the second postulate, which states that one can only describe the world from a single perspective at a time.

In my interpretation of the Consistent Histories formalism, one finds that there can be constructed certain frameworks in which events are not required to be determined at the moment they happen. Rather, the possible histories of

the system can be constructed in various ways, only some of which allow us to make concrete statements about certain properties of the particle S at certain times. Some of these will give us information, for instance Equation 3,¹¹ about the path a photon takes inside an interferometer, but will lead to superposition states in the output at time = 5, where the superposition states are defined as in Equation 4. This particular framework will give us definite information about the particle inside the detector, but it precludes information about the state of the particle in the output.¹² Another consistent history (Equation 5 and Equation 6) will give us definite information about the output of the interferometer, but not allow us to make specific claims about which path the photon took inside the device (for instance at time = 3).¹³ The critical assertion of Consistent Histories is that one cannot combine these two descriptions. There is no overview of the situation which would tell us how the photon behaved overall, both inside the device and at the output.

$$\begin{aligned} Y^c &= [0a] \odot [1c] \odot [2c] \odot [3c] \odot [4c] \odot [5\bar{c}] \odot [6\bar{c}] \\ Y^d &= [0a] \odot [1d] \odot [2d] \odot [3d] \odot [4d] \odot [5d] \odot [6d] \end{aligned} \quad (3)$$

$$\begin{aligned} |\bar{c}\rangle &= (|e\rangle + |f\rangle)/\sqrt{2} \\ |\bar{d}\rangle &= (-|e\rangle + |f\rangle)/\sqrt{2} \end{aligned} \quad (4)$$

$$\begin{aligned} Y^e &= [0a] \odot [1\bar{a}] \odot [2\bar{a}] \odot [3\bar{q}] \odot [4\bar{q}] \odot [5e] \odot [6e] \\ Y^f &= [0a] \odot [1\bar{a}] \odot [2\bar{a}] \odot [3\bar{q}] \odot [4\bar{q}] \odot [5f] \odot [6f] \end{aligned} \quad (5)$$

$$\begin{aligned} |\bar{a}\rangle &= (|c\rangle + |d\rangle)/\sqrt{2} \\ |\bar{q}\rangle &= (e^{i\phi_c}|c\rangle + e^{i\phi_d}|d\rangle)/\sqrt{2} \end{aligned} \quad (6)$$

Let's consider the perspectives of person P and person Q in examining the previous equations. Each of them should be assumed to get a definite result from their measurement.¹⁴ We see then that Q's measurement at time 3 utilizes the information in the framework (Equation 3), because this is the only framework that can give him definite information at that time. Person Q will not be able to make a definite statement about the state of the system at time 5 because of the superposition state at that time, according to this framework. On the other hand, P's measurement at time 5 requires a different framework to get a definite result (Equation 5), which will allow him no definite description of the state of the system at time 3. We see that each observer has a different perspective, from

which certain events are determined and others are undetermined. Griffiths goes to great efforts to show that no paradox is generated so long as one restricts oneself to one framework at a time.

Finally, let's consider this situation from the POV of an outside observer, K. Observer K will walk into the lab room with no knowledge of the states of S, P, or Q. The framework which K would employ to describe the situation could be something like Equation 7.

$$\begin{aligned} Z^a &= [0S_0, Q_0, P_0] \odot [1S_1, Q_0, P_0] \odot [3S_1, Q_1, P_0] \odot [5S_1, Q_1, P_1] \\ Z^b &= [0S_0, Q_0, P_0] \odot [1S_2, Q_0, P_0] \odot [3S_2, Q_2, P_0] \odot [5S_2, Q_2, P_2] \end{aligned} \quad (7)$$

This description shows that K has no knowledge of the *results* of the measurements by P and Q, but he can be certain that the measurements of P and Q were made, because their states remain correlated to those of S throughout both histories. Furthermore, it is only at time = 5 that K makes an observation¹⁶ of the whole system and gets a definite result for the state of the system. Only at this point would he be able to confirm that S, P, and Q are all in definite states. Notice that all the events at time = {0, 1, 2, 3, 4, 5} now become retroactively determined, from the POV of observer K. This is a central conclusion of this paper, clearly visible in CH, that I refer to as Retroactive Event Determination (RED).

Notice that I have opted for the word “determined” and very carefully avoided the use of the word “affected,” because it would be erroneous (and against the intent of the CH formalism) to say that our choice of framework retroactively *affected* the system in question. Rather I am pointing out that the different families of histories that can be constructed for a given situation will result in different information that can be gleaned about the system. Returning back to our earlier discussion, one can say that **from K's POV the measurements by P and Q don't actually ‘happen’ when they happen.**¹⁷

This line of thought may bring up the objection that K could hypothetically observe Q's measurement secretly, so that when P makes his measurement, event Q has already been determined in some “absolute” sense, even though P may not know it. This, however, is exactly the point of Rovelli's Relational quantum interpretation, in which any exchange of relevant information between K and Q, whether secretive or not, results in a correlation of the states of K and Q. As a result, when P measures the photon S, they are actually measuring a wave function that represents the correlated states of S, Q, and K. Any measurement by P will therefore always produce results that are consistent with

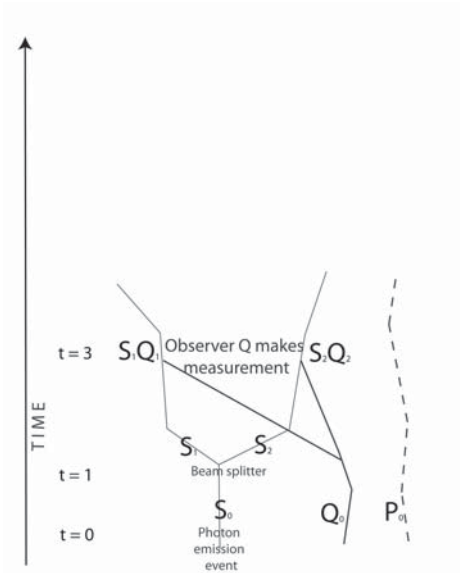


Figure 2. (Left) A “5-D wave function tree” representation of the light in the Jacques et al. experiment, from the perspective of P. (Right) The worldline of P is shown as a dashed line to the right.

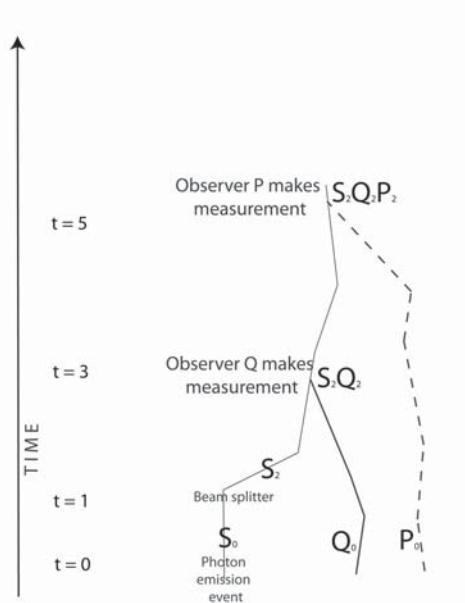


Figure 3. At the moment of measurement by P, the photon is observed in a particular state. All other possible states for the wave function disappear from P’s point of view. The events at t = 1,3 are retroactively determined at the moment of measurement.

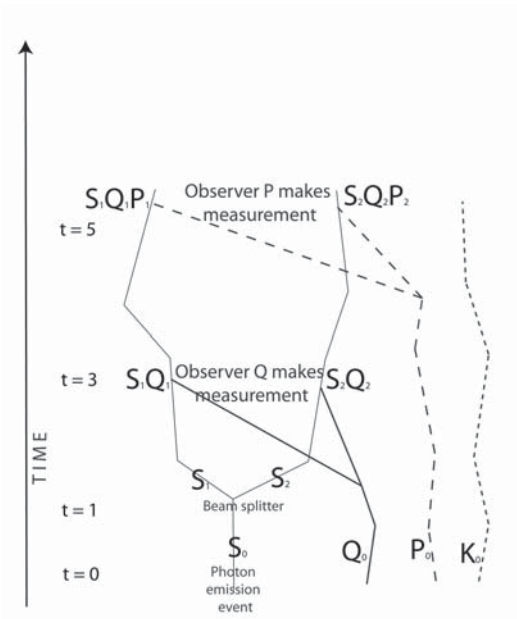


Figure 4. This is an overview of the system’s wave function, from the perspective of an outside observer, K. The states of S, P, and Q all are undetermined before K interacts with the system.

any future measurement by K. A graphical representation (Figure 2, Figure 3, and Figure 4) is shown of the overall scenario from the perspectives of the various observers.

Issues like these show the complementary nature of the Relational and the Consistent Histories approach. CH requires frameworks to be defined which are perspective-dependent. Rovelli proposes the same idea in his Relational model:

A quantum mechanical description of a certain system cannot be taken as an “absolute” (observer-independent) description of reality, but rather as a formalization, or codification, of properties of a system *relative* to a given Observer. (Rovelli, 1996:6)

Macroscopic Quantum Superposition States

So far, our discussion has been limited to uncontroversial microscopic situations. I now turn my attention to the question of MQS states. I will carefully avoid the standard approach to the subject, usually based on building a macroscopic model from the pieces of the microscopic model, because this

approach is doomed to failure from decoherence. Instead, I will remind the reader that macro projectors are a perfectly legitimate aspect of the Hilbert space formulation of quantum mechanics. I will try to uncover the nature of these, and propose that they have emergent properties that do not exist for the individual micro wave functions they are composed of. In the end, I will claim that the macro projectors inherit (via linearity) the “undeterminedness” that I have been describing from the micro states that make them up.

First, I will make the point that a major mark against the existence of MQS states is that they are never observed in the lab. For instance, Zurek (2003:4) says “Given almost any initial condition, the Universe described by $|\Psi\rangle$ evolves into a state containing many alternatives that are never seen to coexist in our world.” Or alternately, Griffiths (2002:367) asks “Is it a defect of quantum mechanics . . . that it allows the physicist [to use a framework which employs MQS states] given that MQS states of this sort are never observed in the laboratory?”¹⁸ But why should one ever expect to “see” or “observe” a macroscopic quantum superposition, even if one is willing to accept that they are real? As in *microscopic* physics, one can only develop equations that point to the existence of these states, and one should be able to measure effects that are the *result of* these states, but one should never expect to see coexisting states (as such), whether in micro or macro physics.¹⁹ So we must do away with the argument that if MQS states existed we would somehow *see* them, simply because it is in the very nature of quantum entities in general to choose a particular state when measured.

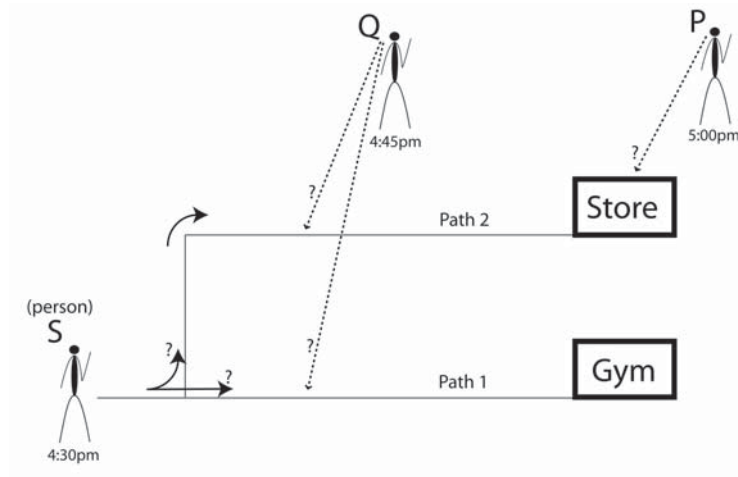


Figure 5. Macroscopic quantum superposition scenario, from P’s perspective.

Let's set the stage with a Gedanken experiment. Imagine going to the grocery store (Figure 5, Figure 6, Figure 7). You arrive at 5:00 p.m., and accidentally run into a good friend (person S). Is it possible that, from your perspective, person S's history was undetermined until you actually observed her at 5:00 p.m.? In other words, from your perspective, her whereabouts were unknown at 4:45 p.m., and so you cannot rightfully say that you know her existence was in a determined state at that time, i.e. that she was on her way to the grocery store. Instead, this theory says that her state was undetermined, and multiple outcomes were possible. The only way to *know* that she was actually on her way to the grocery store would be through a measurement of some kind. One might ask, could you try to prove that this was the case by asking your other friend (person Q) to call person S at 4:45 p.m. and ask what S's plans were, without telling you the result? In this case, person Q would be performing a measurement, and the wave functions of Q and S would become correlated. However, you still would not know what S's plans were, because from your perspective the states of both Q and S are still undetermined. Therefore Q and S are still free to be determined. So if you then saw person S at the store at 5:00 p.m., you would still be surprised because the history of S would be falling into place at that moment. Yet, if you checked in with person Q, you would find that, without fail, Q's information about S would be consistent with your observation of S at the store: Namely, Q would report that S had been on her way to the store at 4:45 p.m.

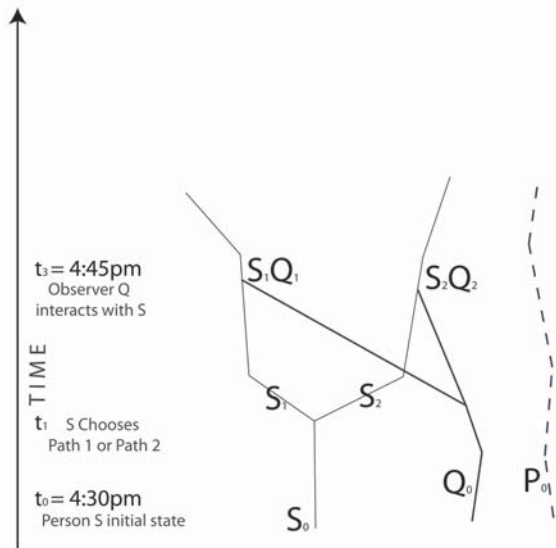


Figure 6. Wave function tree for a macroscopic situation, from P's perspective. Persons Q and S are in undetermined states.

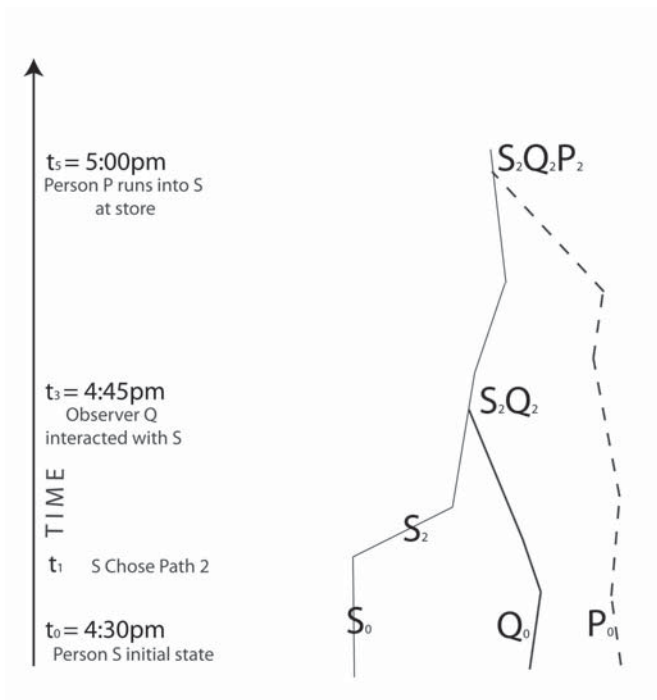


Figure 7. Macroscopic situation from P's perspective after observing person S at the store. The states of P, Q, and S all are retroactively determined from P's perspective.

From your perspective (P), this allows for the possibility that, had you gone to the gym instead of the store, the potential for an event “P accidentally runs into S at the gym” exists as well, because S and Q are not determined until 5:00 p.m. from P's perspective. Depending on the choices of P, the same outcome (“running into S,” whether at the gym or at the store) is possible with different circumstances, through the action of retroactive event determination. In this way, Newtonian causality always remains true when measurements are made, but people are able to make “free will choices” in the moment that could theoretically lead to seemingly “fatalistic” experiences.²⁰

In other words, one is making an unallowable assumption if one assumes that the state of a *macroscopic object* is determined if one has not oneself observed it, for there is no way to prove that it is determined except through observing it. In this case, it is possible and reasonable to wonder if the event called “person S heads to the grocery store” did not really ‘happen’ when it happened (the event at 4:45 p.m. was not determined until 5:00 p.m.).

So how, exactly, does the Hilbert space formulation of quantum mechanics

lead to the existence (at least on paper) of MQS states? This is laid out carefully by Griffiths (2002, see for example Chapter 17) with the conclusion (for one particular example) that “. . . whatever the initial apparatus state, unitary time evolution will inevitably lead to an MQS state in which the (macroscopic) pointer positions have no meaning.” In other words, using a family which has a definite state early in the history often leads to superposition states later in the history, and if those superposition states of *microscopic* systems are correlated to *macroscopic* systems, they will represent an MQS state. Granted, one is free to choose another framework which does not lead to this conclusion, but it will of necessity (due to the consistency conditions) call for undetermined states earlier in the history.

Griffiths points out that

If one supposes that the usual Hilbert space structure of quantum mechanics is the appropriate sort of mathematics for describing the world, then MQS states will be present in the theory, because the Hilbert space is a linear vector space, so that if it contains (two possible states), it must also contain their linear combinations. (Griffiths, 2002:277)

Said another way, if the world can be described by a Hilbert space formulation as quantum mechanics suggests, the linearity of the space will lead to superposition states, at least in a physicist’s notebook. There is no fundamental limit to the linearity of the space.²¹ One might say that MQS states should actually be considered a prediction of quantum theory, rather than an unfortunate byproduct. In CH, it is shown that paradoxes arise through “a process of implicitly . . . choosing families which contain no MQS states, and then inferring from this that the future influences the past, or that there are mysterious non-local influences . . .” (Griffiths, 2002:283). The physicist’s *avoidance of MQS states* in fact causes paradoxes which lead to the violation of such stalwart theories as special relativity!

So let’s define our terms. Following Griffiths’s (2002:236) lead, “it is . . . possible to consider projectors which correspond to macroscopic properties of a piece of apparatus, such as ‘the pointer points upwards’.” A macro projector, then, projects onto an enormous subspace of the system being described, and it “. . . singles out regions of the Hilbert space corresponding to macroscopic properties.” Let’s consider a simple binary macroscopic system, a coin toss. For every possible particle configuration of the atoms in the coin we define a basis vector Ω , and the number of basis vectors necessary to span the Hilbert space Z is enormous. The property “Heads” in a coin toss projects onto a subspace of Z , call it Z^+ , and “Tails” similarly projects onto Z^- . “Such a macro projector is not uniquely defined” says Griffiths, as is clear from the vast number of possible particle configurations that can lead to the same outcome (e.g., Heads).

In this way, the space Z is naturally divided into two macro projectors, $[H]$ and $[T]$. All possible configurations of particles lie in one of these two subspaces (and only one). Due to the linearity of the space, various properties of projectors that apply to each of the constituent micro projectors would also apply to these two macro projectors. For instance, we know that $[H]$ and $[T]$ are orthogonal because every micro state that makes up $[H]$ is orthogonal to every micro state in $[T]$.²² The kets $|H\rangle$ and $|T\rangle$ represent collections of basis vectors for Z , and yet they behave as if they are basis vectors spanning a two-dimensional Hilbert space. The projectors $[H]$ and $[T]$ form a decomposition of the identity in the usual sense that $[H] + [T] = I$. (See Appendix 1 for a complete derivation of this result.)

Here I would like to venture into more controversial territory. This grouping of an enormous Hilbert space of particle configurations into two distinct regions represents the emergence of a new phenomenon in the system: “Headsness” or “Tailsness.” Any flip of the coin will land in one of an enormous number of basis states Ω_i corresponding to a particular configuration of the atoms in the coin, but each possible state will lie (for our purposes) in one of the two groups, H or T . The complete Boolean algebra for this system will include countless states which are superpositions of the form $\Psi = \Omega_i + \Omega_j + \dots$, and similarly countless numbers of these superpositions will include one micro state which falls in $[H]$ superposed with a micro state which falls in $[T]$. So it seems like one must conclude, if one agrees with the conjectures thus far, that there would exist states that are macroscopic superpositions of $[H] + [T]$. Under normal conditions, in macroscopic situations that could be constructed analogous to the interferometer experiment above, these macro projectors would evolve unitarily.²³ Before the experimenter looks at the state of the coin, the state of the *microscopic* configurations of the atoms in the coin will be undetermined (or have no interpretation at all). Does this not apply to the state of the *macroscopic* projectors as defined above as well? I would suggest so.

If the state of a coin after it is tossed can be described by such a macroscopic superposition, I suggest that the same principle should be extendable via the same methods to macroscopic objects of arbitrary size and nature. There has been nothing in the discussion so far of a principle that would expire after some pre-specified duration. Instead, quite the opposite, I have stated that the undetermined nature of system S from the perspective of person P remains so, for as long as P does not make an observation of S . There has likewise been nothing so far to imply that these principles would not hold true once a certain size collection of particles was reached. Rather, the linearity of quantum mechanics implies that systems of arbitrary size will display the properties of macroscopic projectors described above.

So where are we left regarding the existence of macro projectors? Griffiths says

... these examples illustrate the fact that the concept of a quantum history is really quite general, and is by no means limited to processes and events at an atomic scale, even though that is where quantum histories are most useful, precisely because the corresponding classical descriptions are not adequate. (Griffiths, 2002:112)

Macroscopic Quantum States are here to stay, and this leaves for future work understanding their interpretation.

Concerns and Comparisons

Let's begin with a comparison to Everett's theory. One can draw similarities to Many-Worlds interpretations, yet there is a distinction in that the theory proposed here supposes only one present reality for the individual, and there is no philosophical need to propose a plethora of other physical worlds that will never be observed. Not all states are given credence. Rather, correlations between states limit the available states, and furthermore one cannot speak meaningfully in definite physical terms about states which one has not observed. I would suggest that it is generally the subtle assumption of "objective definite reality" that requires the concept of many other real physical worlds, and that is specifically thrown out here.

So in RED I conclude that there is only one version of "me" and of my observed world. But does this not create a paradoxical conflict? From another observer's POV, isn't my state undefined? Indeed it is. In our earlier example (Equations 3–7), I formulated historical descriptions of systems making explicit use of the single-framework rule. From one framework, one can know the outcome of a situation, and yet it may remain meaningless to talk (with certainty) about the path leading up to that outcome. Of course, one can always gain more information about the system and become certain about more aspects of its history, but the assertion remains that until one gains information about the history of the event, it is not meaningful to talk in definite terms about its history. So it is not meaningful to sit in my point of view and ponder what my state looks like from your point of view.²⁴

Ultimately this brings the concern that these postulates seem to be solipsistic. If the world is fully relational in nature, and what is determined or not is totally defined per observer, then it seems that reality is defined by the observer. How is it possible to have any sort of common or objective reality in such a view? We must consider the second postulate carefully: A comparison between viewpoints is forbidden. What is "*in a definite measurable state*" is indeed relative to the observer. It is perfectly possible for multiple undetermined realities to match up without contradiction, as long as one follows the rules stated in this paper. This does not mean that one individual's view is all that matters; quite the opposite! All views are on equal footing in their ability to

describe the real world, but they describe different parts of that world.

Approaching solipsism from another tack, our declaration that correlations are objective means that our individual perspectives on the correlations between events are indeed considered relative. Yet the actual events we experience do not comprise all of objective reality, so we are not being solipsistic because we are not claiming to describe all of objective reality with a simple description of our own experiences. We CAN speak definitively about the *correlations of events*, but this is not solipsistic because everyone will agree on these correlations.

Another concern regards the dimensionality of the wave function. Since I am claiming a form of “realism” to the wave-function, I should address Lewis’ point that according to wave-function realism “. . . the world we live in does not have the three dimensions we take it to have, but in fact has at least 10^{80} dimensions, and perhaps an infinite number of dimensions” (Lewis, 2003:3). The problem is that an N-particle system requires (3N) independent coordinates to parameterize the properties of the system.²⁵ Yet for dynamical laws to be invariant, the 3N degrees of freedom of the wave function configuration space must somehow be reduced to a three-dimensional symmetry. He resolves this in the following way:

Even though the *values* taken by the 3N parameters are independent of each other, the *directions* referred to by the parameters are not all independent; every 3rd parameter refers to the same direction . . . (so) the coordinates of quantum mechanical configuration space range not over 3N-dimensional points, but over three-dimensional *particle configurations*. (Lewis, 2003:10)

It seems that if one selects a given particle configuration, one effectively reduces the space from 3N-dimensional to third-dimensional. This is exactly what happens when one observes an event; one obtains (relative to oneself) a single definite particle configuration space, which has the usual three spatial dimensions.²⁶

Concerning the comparison of the RED model to “collapse theories” such as the Copenhagen Interpretation, there are two main points. First, the theory proposed here is based in part on Relational quantum mechanics, in which the idea of collapse still has meaning but is defined relationally. Therefore, there is no such thing as “objective collapse,” because a wave function that person P is observing is collapsed for person P, but the same object may be in a superposition state for person S. A wave function is a strange beast, taking a definite value when it is measured by one observer and yet remaining in superposition for other observers. Second, in this model, MQS states are purported to exist and there is clearly no fundamental distinction between micro and macro systems, so there is no need to find a boundary between the two, which is usually considered a major limitation of the Copenhagen model. In

RED, the foundation and the house that rests on it are built of the same material.

Next, as suggested earlier, I would like to tackle decoherence. There are several problems with the theory: the motivation for it, the assumption of objective definite states (states that are well-defined for all observers), and the use of the partial trace. As noted earlier, a major motivation for decoherence theory is to explain the complete lack of first-hand experience we have with superposition states in everyday life. Anytime I observe a macro system, I find it in a definite state. Furthermore, if I retroactively observe any system (e.g., either by talking to someone who witnessed the system earlier, or watching a video of the system), I will always find that *it had been* in a definite state. However, I have made the argument above that I cannot assume that the system *is* in a definite state *in this moment* unless I am observing it. The tense of the italicized verbs above is critical in understanding this point. There is no way, other than observation in the present moment, to make a definite statement about the state of a system, and such definiteness is only defined relative to the perspective of that observer. This undermines our assurance that MQS states can be ruled out simply by common sense, since not being able to directly witness MQS states is not evidence that they don't exist.

So decoherence theory makes the assumption of objective definite states (the "environment"), which I regard as unacceptable. According to decoherence theory, ". . . the environment is monitoring the system. Therefore, its state must contain a record of the system" (Zurek, 2000:859). I would correct this to say that the environment is composed of individual macro quantum objects, which will themselves evolve unitarily into superposition states through interaction with the system. Although they do contain a record of the system (i.e. of its superposition state), they do not help us get any clearer on the objective definite state of the system. For instance, if we videotape the results of a quantum experiment, not only is the result of the experiment undetermined for a person who has not read the measurements, but also the details of the recording on the videotape are in a superposition of the possible outcomes from the perspective of a given observer, until the videotape is watched by that observer. The pieces of the environment become part of the system, and objective definite states do not exist.

All of this leads to the central process of decoherence: the step of "ignoring . . . the information in the uncontrolled . . . degrees of freedom" (Zurek, 2003:10), i.e. performing a partial trace over the environment. But if all states are relative to an observer, then this step is not justified. An object in the environment will interact with the quantum system in question and itself evolve unitarily into an MQS state, and the off-diagonal terms cannot be ignored. Taking the partial trace over the environment is only valid if the objects in the environment can be said to be in a definite state, i.e. if "the states of the environment . . . are

(mutually) orthogonal” (Zurek, 2003:10). According to relational quantum mechanics, this would only be true for an observer who had observed that aspect of the environment. Generally, though, the objects in the environment do not have a definite objective state relative to all observers (the possible states of the environment are not orthogonal), so the method of tracing over the environment is invalid in such a view.

I disagree, then, with the following statement: “In the real world, even when we do not know the outcome of a measurement, we do know the possible alternatives, and we can safely act as if only one of those alternatives has occurred” (Zurek, 2003:7). Rather, all we can do is know that if we check retroactively, it will be clear that only one of those alternatives *had* occurred. Furthermore, the interference effects of the superimposed histories of the MQS states should not be considered meaningless; they might become important to consider in the case of synchronicity, a process of meaningful history selection identified by Jung (1972). While synchronicity has not been scientifically proven (or disproven), there is ample circumstantial evidence for it, and in light of the current theory it merits further research.

Finally, I would like to ask how RED impacts our notions of the flow of energy. The Liouville equation (Equation 8) concerns the time evolution of the states of a system.²⁷ One property of this equation is that trajectories of the states never cross or merge. This is also a fundamental result in the consistency conditions of histories in CH, and the reader is referred to Griffiths (2002:137–147, 164). Such crossing of trajectories leads to histories that are not orthogonal, and thereby cannot be considered as part of the same framework. So in this particular way CH automatically ensures the integrity of the Liouville equation:

$$i \frac{\partial \rho}{\partial t} = [H, \rho] . \quad (8)$$

One could also note that the postulates above imply that there is not a definite energy to a system from a given POV unless it is being observed by that POV. Yet one would expect the Liouville equation (and the conservation of energy) to govern the system just as it would in any quantum system. When MQS states naturally evolve in the dynamics of the system, the corresponding density matrices representing those superpositions evolve according to the Liouville equation as expected. The postulates have no affect on the Liouville equation. One could also make note of the fact that Newton’s laws of motion or conservation of energy would hold whenever a measurement or calculation is made. Whenever one interacts with a system, one will find it in a state *as if* it had evolved there continuously. Yet one cannot make claims about the state of the system when one does not interact with it. This should not be considered a violation of these fundamental laws.

Philosophical Grounds

. . . *there must be 'something' . . . that does not depend on us.*
(d'Espagnat, 1998:11)

Here we will briefly analyze the philosophical implications of this paper.²⁸ The basic premises of RED lead to a sort of “middle ground” in the ancient debate over the nature of reality. RED might be considered a form of “wave-function realism,” in that it acknowledges the necessity of an objectively real “something” in the form of the invariant correlations of states of the universal wave function. Yet it is decidedly of the moderately idealistic bent, considering that its fundamental notion is of the relative nature of definite states. In d'Espagnat, this thirst for a middle ground is well-stated:

But their [the laws of quantum mechanics] very existence requires an explanation of some sort, the minimal element of which seems to be the existence of something external to us acting as a support of them. It is this something that should, by definition, be called Mind-Independent reality.²⁹

There is indeed a structure in the theory presented here, namely correlations of events, which “does not just simply boil down to ‘us’” (d'Espagnat, 1998:11).

Let us then look at the theory from the perspective of the moderate or transcendental idealist. Would it not be a Kantian approach to accept that it is impossible to prove that unobserved events are definite, and neither can one prove that they are not, yet one should be able to build his philosophy of the natural world based on the “objects-for-us” (d'Espagnat, 1998:3) that we experience, without concern for the (inherently unattainable) proof? In the RED model, the noumenal descriptions are the correlations between events, while the “world as experienced” is pre-conditioned by the mind (POV) of the observer. Furthermore, the RED model is attractive to the Kantian in that one is not required to question the reality of what one experiences. One is only required to question the *definiteness* of what one *doesn't experience*.

Looking at the terms employed by Whiteheadian philosophers, “. . . an actual entity is a determinate entity that can have many capacities insofar as it exists for (or is objectively given to) *other* actual entities, but *which* capacity will be fulfilled is indeterminate” (Moore, 2010:44). According to this approach, the overall potentiality of an object is complete eternally (“eternal objects”), but *which* quality or *which* event will become manifest (“actual entities”) in a given moment is indeterminate.

This could possibly describe the model put forward here, in which correlations (or relationships between entities) define the eternal objects, and a given determinate state is considered an actual entity. Whitehead's eternal

objects are completely static and permanent, at least in a sense, so in the model proposed here one would need to consider the correlations among objects to be static and permanent. But maybe it is good enough to have the eternal objects represented by an infinite (and therefore unchanging) collection of *possible correlations*, whose *relative weights* nevertheless evolve over time. This leaves us with only a *finite set* of accessible (significant weight) states. According to Moore (2010:48) “. . . the actual entity chooses to spontaneously manifest an anticipated feeling *and in so doing* it ultimately contributes to the form of an eternal object.” Similarly, the events that occur (actual entities) can affect the states available to a system (correlations/eternal objects) by adjusting their relative weights.

The ideas presented herein point to a model that would provide relevant material for further philosophical analysis. I think it is safe to say that this model has a number of similarities to a number of well-known philosophical stances, including the classic positivist stance “Whereof we cannot speak, thereof we must keep silent” (Wittgenstein, 1961), or phrased well by d’Espagnat (1998:6): “Philosophers anxious to keep aloof from unwarranted metaphysics commonly stress . . . the wise observation that we should only speak of what we can possibly know.” In that spirit, I say “We can speak of that which we haven’t observed, but not in definite terms.”

Evidence and Verification

RED makes claims about the retroactive determination of events in the macroscopic domain. In theory, certain types of experiments should be able to be performed retroactively and to get a positive correlation between events in the experimental “timeframe” (i.e. “in the past”) and choices made when the experiment is actually performed, after the fact. Specifically, non-local experiments such as those in Radin (2008) should be amenable to such retroactive event determination. Because the causal relationship in these experiments does not rely on physical cause and effect, any experiment that can get positive results in such a situation should be theoretically possible to perform after the fact. The reader is referred to a number of experiments that have been done (Leibovici, 2001, Dunne & Jahn, 1992, Schmidt, 1976) or could feasibly be done (Nelson, 1998, Smith, Laham, & Moddel, 2010, Radin, 2008). Experiments that rely on physical cause and effect would not show any RED effect, because one can trace physical effects and their causes through linear, forward-in-time processes. RED is not actually *causing* any changes in the past; rather, it is retroactively determining them. Therefore the non-local nature of experimental testing is, I believe, essential.

An interesting parallel of this model with virtual reality programming has been brought to my attention, which may be helpful in understanding

the implications of the two postulates. In massive multiplayer online games (MMOGs), there is a common difficulty with synchronizing the actions of a large number of physically distributed players in a real-time virtual world. One technique for dealing with this is called “optimistic synchronization” (Reiher, n.d., Hsu, Ling, Li, & Kuo, n.d.). Some of the parallels between RED and optimistic synchronization include: The virtual world is only rendered in a definite state from the perspective of each user (relational, Postulate 1); there is no objective definite world, but rather only the collection of worlds as rendered by all of the various users (Postulate 2); events that are observed in common between two players must agree on the specific details (consistency).

Optimistic synchronization is not proof that the world *does* work this way, nor could it be a completely correct analog. Yet it may be a useful model which demonstrates the way in which relationality and consistency of histories work together in actual application to create a virtual world.

Conclusion

I have attempted to present a coherent model for understanding macroscopic quantum superposition states. Beginning with a clear definition of “objective reality,” the fifth dimension was introduced as a means for understanding the invariant nature of the correlations between quantum objects. Two postulates were presented that attempt to provide a solid argument showing that nature is undetermined except when observed. Postulate 1 says that any event (macroscopic or otherwise) unobserved by a specific observer remains in a superposition of possible histories for that observer. Its outcome is undetermined until its state is observed, and then is only determined for that particular observer. Postulate 2 says that there is no definitive global perspective that can see all events in a definite state. One is always limited to speaking about definite events only as described from a particular local perspective. From each local perspective, some events have been observed (and are definite) and other events have not been observed (and are in a superposition of self-consistent histories).

Specifically, I have pointed out that events don’t actually ‘happen’ when they happen—what I have called retroactive event determination. This means a distinction is made between “when an event becomes determined” and “the time coordinate at which that event actually occurred.” A distinction is also made between events that have been “witnessed” and are therefore “facts” from a given observer’s perspective, and events that have not been “witnessed” from that perspective, which still have multiple outcomes available (from that perspective). When a given event is observed by a given observer, the history (or histories) to which that event belongs falls into place for that observer. This must happen in such a way that all of the events in the history can be consistent with each other and with other correlated events observed by other observers.

Through retroactive event determination, the various histories can fall into place in such a way that events are always consistent when compared.

I attempted to justify the application of quantum effects to macroscopic systems by the use of macro projectors. The grouping that defined these projectors was considered an emergent quality that does not exist for the microscopic projectors that compose them.

In attempting to address a number of anticipated difficulties, solipsism in particular is a difficult concept to conquer, because overcoming it requires a reliance on the stated postulates and the overriding of common sense. Yet I tried to convince the reader that this is not a concern because the definite events that make up an individual's relative experience are not fundamentally objective. Rather, the correlations that events have *are* objective, and everyone will agree on these.

In conclusion, the philosophical nature of the argument presented here is somewhere between realism and moderate idealism. I concede that there is an objective reality, but that its nature is indefinite and not to be regarded as physical.

A weakness of this paper is that it questions the nature of how events occur in time and space, thereby challenging our general concepts of energy and information transfer, without providing a comprehensive new model. For instance, if energy is flowing through a system, but the manner in which the energy was flowing at time T is not determined for a certain observer until after time T, what does it say about the absolute existence of energy at time T? All I have stated here is that whenever a measurement is made, the energy will have evolved *as if* it had been smoothly evolving all along.

Another important omission that is outside the scope of this paper but will need to be addressed involves asking what impact the emergent grouping of "heads" or "tails" has on the outcome of a given set of events. I have focused on justifying the existence of MQS states and provided a means for understanding how they could permeate our world without being detected (as yet), but I have not made clear what factors play in to the manner in which a particular macroscopic history falls into place. I have described the "how," but not the "why." Further research should be done into the implications of the macroscopic quantum states (MQS) suggested by the postulates here, specifically with regard to "synchronicity"³⁰ and the role of "meaning" in affecting the outcome of retroactive event determination.

An appealing aspect of this model is that it adds no new assumptions to our understanding of the situation. Instead, it subtracts the assumption that something exists whether or not it is being observed. This idea aligns with the spirit of scientific tradition as perceived by David Hume (Isaacson, 2007), by challenging us to believe only what one can actually observe, and no more, and

making no assumptions about the continuity of reality between observations. This is used here to challenge an implicit assumption of “objectively determined reality” that we all live with on a day-to-day basis.

According to this model, the wave–particle duality is now translated into an “undetermined versus determined” duality. Events that are determined from one reference frame may be undetermined (and still selectable) from another.

Notes

- ¹ The use of the concept “undetermined state” simply refers to a state that can be written as a linear superposition of eigenfunctions of the system. If one has not made a measurement of such a system, the most that can be said about the system is the probability of obtaining each eigenstate, if a measurement were to be performed. I refer to this as an “undetermined state.”
- ² To avoid controversy in this initial step, we could require that the system S is a spin- $1/2$ particle and the “observers” P_i are also microscopic (and therefore quantum) systems that become correlated with S . These could all be observed by a macroscopic observer K , for whom all the states S and P_i are undetermined until a measurement is made.
- ³ We will discuss the definition of framework from the Consistent Histories formalism at a later point. For our purposes here it is roughly equivalent to “point of view.”
- ⁴ This will certainly bring up philosophical questions, which will be acknowledged later, and our justification of our use of the words *objective* and *real* may not be rigorous, at least from a philosopher’s perspective. I will address these concerns later, to the best of my ability, while acknowledging that it may be the case in the future that these terms need to be modified in order to conform to standard uses.
- ⁵ This is intended as a conceptual sketch rather than a formal proof. I hope, though, that any sketchy use of terms will be forgiven and will not detract from the image I am trying to paint.
- ⁶ See, for instance, Rovelli, Griffiths, and any basic treatment of positivism.
- ⁷ The act of “observation,” as used in this paper, refers to the most general definition of observation, the exchange of information in the information theoretic sense. Therefore, it makes no special reference to sentient beings. For instance, an electron interacting with an electric field is an example of the electric field observing the electron (or vice-versa).
- ⁸ For instance, in the vacuum of space, the existence of virtual particle pairs predicts Hawking radiation (Baez, 1994). Because of Hawking radiation, black holes will eventually dissipate themselves into space. Virtual particles are also a key aspect of the Standard Model for forces, in which virtual particle pairs are responsible for inhibiting the range of force-carrying particles (Virtual Particle, n.d.). Zero point fluctuations are another consequence of this principle.
- ⁹ Admittedly, we make use of some very hotly debated philosophical material from over the centuries, regarding the views of positivism, realism, etc. We will attempt to address some of these in the section Philosophical Grounds, given that they are a foundation for the claims in this paper.
- ¹⁰ The nature of the consistency requirements is beyond the scope of this paper, but is based generally on the overall orthogonality of the histories.

- ¹¹ In the notation used by Griffiths, the state is represented by the letter, and its coefficient represents the time step of the history. States c and d represent definite/distinct states in the internal arms of the interferometer, and e and f represent distinct states at the output of the interferometer.
- ¹² The superposition state at time 5 does not commute with the projector onto the state $|e\rangle$ or the projector onto state $|f\rangle$. Therefore it is impossible to make a definite statement as to whether the particle emerges in the e or f channel of the interferometer.
- ¹³ The phase factors in Equation 5 account for differences in the path length of the two paths of the interferometer, and are irrelevant to our current discussion. What is important is that from this framework one can make definite claims about the state $|e\rangle$ or $|f\rangle$ at the end of the experiment.
- ¹⁴ It is taken as common sense that every measurement should obtain a definite result.
- ¹⁵ Here I must change notation slightly to accommodate the various entities. The observers S, P, and Q are clearly shown, the subscripts represent the states, and the time is in front of each term as usual. Some of the time steps are skipped for brevity, but this has no relevance on the problem.
- ¹⁶ It doesn't matter whether K measures S, P, or Q, since S, P, and Q are all correlated.
- ¹⁷ Remember that the use of single quotes around the word 'happen' convey the notion that the outcome of the event remains undetermined *even after the event has taken place*.
- ¹⁸ To be clear, Griffiths' answer to his own question is basically "No."
- ¹⁹ True, quantum physicists measure results in statistical experiments that imply the existence of superpositions of wave functions, but each individual observation is of a particle in a definite state.
- ²⁰ I hope the reader will forgive the undefined use of colloquial terms, simply used to provide a sense of an everyday description of this type of experience.
- ²¹ Decoherence provides a limit to the size at which one can observe entanglement, and this is an issue I take up in the section Concerns and Comparisons.
- ²² Indeed, because the Ω_i form an orthonormal basis, all the micro states are orthogonal with each other, $\langle \Omega_i | \Omega_j \rangle = \delta_{ij}$.
- ²³ For instance, the coin flip results might be arranged to serve as the macro pointer for the results of a light interference experiment, and thereby be correlated to the microscopic results.
- ²⁴ This statement is *not* intended as making an assertion about the role of empathy in the world, or the relevance of "being able to see through another's eyes."
- ²⁵ If one wants to totally describe the state of the system, one needs $6N$ dimensions in order to describe the positions and momenta.
- ²⁶ I want to remind the reader that the earlier assertion in this paper, that the fifth dimension represents the possible states of the wave-function, seems to be a different use of the concept of dimension than that which applies to the dimensionality of a configuration space. In the example above, I began with a fifth-dimensional view, and then by choosing a particular POV we lost the context of the five-dimensional view and saw only the four-dimensional (three space plus time) events of our experience.
- ²⁷ ρ represents a density matrix for the system, and $[,]$ is the commutator relationship for operators.
- ²⁸ Admittedly, philosophy is beyond my area of expertise. But the subject matter of this paper requires a certain analysis of the philosophical stances taken. I will try to do this with as little offense to the serious philosopher as possible.

- ²⁹ I will stop short of calling the concepts in this paper a “Mind-Independent reality,” because I am of the suspicion that Mind may be precisely what is responsible for the objective reality I have described. I opt instead for “observer-independent reality,” or “objective reality.”
- ³⁰ As mentioned earlier, synchronicity can be loosely defined as the occurrence of “meaningful coincidences,” i.e. events that are causally unrelated, but which carry a meaning to the observer that make it seem extremely unlikely for the events to be purely a matter of chance. The term synchronicity was originally coined and analyzed by Jung (1972).

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APPENDIX 1

Derivation of Justification for MQS States in a Coin-Toss Thought Experiment

Assuming a coin made of three atoms in fixed relative position, I will show that these atoms exist in a (macroscopic) superposition of heads and tails after the coin is tossed, before it is observed. This example can be easily extended (using the linearity of the vector space) to consider the vast number of atoms actually in the coin.

I consider the coin as a collection of (quantum) atoms in a fixed spatial relationship. The coin toss is made to happen inside a vertical cylinder with just the right diameter so as to restrict the lateral motion of the coin (see Figure 8). The coin has the ability to rotate around an axis perpendicular to its face, or to flip end over end (heads to tails or vice versa). Ignoring for the moment the end-over-end motion, one can describe the final state of the coin as a point on a one-dimensional line, which is wrapped into a circle such that it represents the degree of rotation of the coin around the axis normal to its face. One can divide up the rotational freedom around this axis into ‘ n ’ possible rotational states (such that the ‘ n ’ possible states span the 360 degrees of full rotation, and each state is different from the next by $360/n$ degrees).

The positions of the atoms will be measured via some interaction that can be represented by a quantum operator which we will not specify (it could be any number of possible physical interactions, such as an interaction with a photon bouncing off the coin). I therefore consider each atom to have n possible eigenstates (of the position operator) available to it. (The system does not have to be considered discrete. Considering the system as a continuous spectrum of states would give an infinite superposition of possible eigenstates of the position operator for the coin, but would not affect our argument here.) I have arranged the system in this manner simply to limit the number of degrees of freedom that must be considered.

I start by considering a consistent family of histories describing one atom in the coin alone, labeled ‘ m ’ (Equation 9). The first ‘time step’ represents the state before the flip, and the second time step is afterward. There are ‘ n ’ possible histories Y_i ,

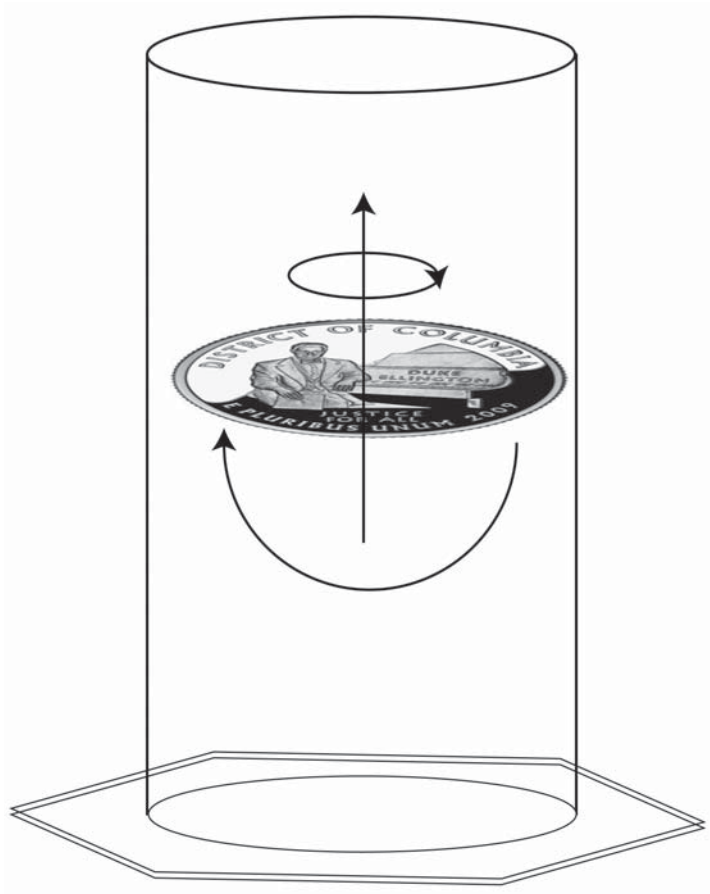


Figure 8. The coin cannot move laterally.

corresponding to the ‘ n ’ possible position eigenstates (“final outcomes”) defined above. I have selected $n = 4$ for this example (see Figure 9), though in macroscopic situations it will be enormous or even infinite.

Equation 9: The coin starts in an initial state and ends in one of four final outcomes.

$$\begin{aligned}
 Y^1 &= [\phi_0^{mv}] \odot [\phi_1^{mv}] \\
 Y^2 &= [\phi_0^{mv}] \odot [\phi_2^{mv}] \\
 Y^3 &= [\phi_0^{mv}] \odot [\phi_3^{mv}] \\
 Y^4 &= [\phi_0^{mv}] \odot [\phi_4^{mv}]
 \end{aligned}
 \tag{9}$$

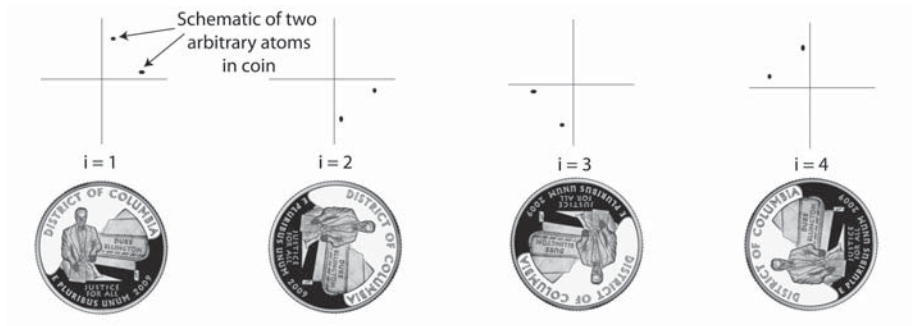


Figure 9. The possible rotational eigenstates for $n = 4$.

This set of histories means that before the toss the atom is described by a projector onto a single state, and after the coin toss it can be described by a superposition of projectors onto the four available states. This is not an unusual description of things. I shall now extend this system to include a second atom in the coin.

Equation 10: Histories for two atoms in the coin considered together.

$$\begin{aligned}
 Y^1 &= [\phi_0^1, \phi_0^2] \odot [\phi_1^1, \phi_1^2] \\
 Y^2 &= [\phi_0^1, \phi_0^2] \odot [\phi_2^1, \phi_2^2] \\
 Y^3 &= [\phi_0^1, \phi_0^2] \odot [\phi_3^1, \phi_3^2] \\
 Y^4 &= [\phi_0^1, \phi_0^2] \odot [\phi_4^1, \phi_4^2] \\
 Y^5 &= [\phi_0^1, \phi_0^2] \odot [\phi_5^1, \phi_5^2] \\
 Y^6 &= [\phi_0^1, \phi_0^2] \odot [\phi_6^1, \phi_6^2] \\
 Y^7 &= [\phi_0^1, \phi_0^2] \odot [\phi_7^1, \phi_7^2] \\
 Y^8 &= [\phi_0^1, \phi_0^2] \odot [\phi_8^1, \phi_8^2]
 \end{aligned}
 \tag{10}$$

The set of histories in Equation 10 starts by describing the two atoms as projectors onto their respective initial states. After the toss (before the measurement) they can be described in $2n$ possible histories. The number of distinct potential outcomes has doubled, simply because two or more atoms are being considered in fixed relationship to each other, so the end-over-end motion of the coin must now

be considered. Each possible rotational outcome of the system also corresponds to another distinct outcome with the coin flipped over. In this case atom 1 and atom 2 are in correlated states after the toss due to their fixed relative positions in the coin, and they represent a composite superposition state, i.e. if I observe one atom in a definite state, the other atom also will be found in a correlated definite state relative to me (or at least its possible states will be severely restricted by its relationship to the atom that was observed by me).

We can consider a third atom in the coin in the same way, as follows in Equation 11.

Equation 11:

$$\begin{aligned}
 Y^1 &= [\phi_0^1, \phi_0^2, \phi_0^3] \odot [\phi_1^1, \phi_1^2, \phi_1^3] \\
 Y^2 &= [\phi_0^1, \phi_0^2, \phi_0^3] \odot [\phi_2^1, \phi_2^2, \phi_2^3] \\
 Y^3 &= [\phi_0^1, \phi_0^2, \phi_0^3] \odot [\phi_3^1, \phi_3^2, \phi_3^3] \\
 Y^4 &= [\phi_0^1, \phi_0^2, \phi_0^3] \odot [\phi_4^1, \phi_4^2, \phi_4^3] \\
 Y^5 &= [\phi_0^1, \phi_0^2, \phi_0^3] \odot [\phi_5^1, \phi_5^2, \phi_5^3] \\
 Y^6 &= [\phi_0^1, \phi_0^2, \phi_0^3] \odot [\phi_6^1, \phi_6^2, \phi_6^3] \\
 Y^7 &= [\phi_0^1, \phi_0^2, \phi_0^3] \odot [\phi_7^1, \phi_7^2, \phi_7^3] \\
 Y^8 &= [\phi_0^1, \phi_0^2, \phi_0^3] \odot [\phi_8^1, \phi_8^2, \phi_8^3]
 \end{aligned} \tag{11}$$

In this situation, all three atoms are in a superposition of the $2n$ possible outcomes. I define a “configuration” as in Equation 12, which represents the i th possible configuration of the three atoms. The sum of all the possible configurations is represented by the identity projector Equation 13.

Equation 12:

$$[\Omega_i] = [\phi_i^1, \phi_i^2, \phi_i^3] \tag{12}$$

Equation 13:

$$[I] = \sum_{i=1}^{2n} [\Omega_i] \tag{13}$$

In any real macroscopic situation, both m and n will be enormous. By symmetry, approximately half of the histories will project onto a final state in which the coin is in heads position, and half with the coin in tails position. These two possible types of configurations are not distinguishable from an atomic perspective; together they simply represent the full sample space of the experiment. However, there is no

reason they can't be arranged together in groups in the sum of configuration states (Equation 14). The first sum (from $i = 1$ to n) represents all states that correspond to a physical configuration of atoms such that the coin is "heads up," and the second sum (from $i = n + 1$ to $2n$) is similarly grouped for "tails up." $[H]$ is a projector onto the subspace including all the "heads up" configuration states, and $[T]$ is similarly defined.

Equation 14:

$$[I] = \sum_{i=1}^n [\Omega_i] + \sum_{i=n+1}^{2n} [\Omega_i] = [H] + [T] \quad (14)$$

The final result is a superposition of macroscopic properties of the coin, inherited directly from the indeterminacy of the atomic states via the linearity of Hilbert spaces. My proposition is that this type of treatment can be done for an arbitrary system, and can therefore apply to any type of macroscopic object, according to the rules laid out in this paper.

COMMENTARY

**Thoughts about Thought Bundles:
A Commentary on Jürgen Keil’s Paper
“Questions of the Reincarnation Type”**

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Abstract—Last year, this *Journal* (*JSE* 24(1), Spring 2010) contained a Commentary in which Jürgen Keil proposed an explanatory model for cases of the reincarnation type (CORTs), suggesting that most and perhaps all CORTs can better be fitted into a framework of psi without the reincarnation or survival hypothesis. We present several features that should be considered in more detail before the pretension to explain all CORTs with the hypothesis outlined by Keil can be regarded as justified. Among others, such features include possible modes of how memories of a previous life might be selected and dramatized into ostensible personal memories of children, departure dreams, CORTs announced via mediumistic communications, cases of the possession type, ostensible memories of intermission periods between the two lives in question, CORTs which involve twins, maternal impressions, crisis apparitions, and the argument of cumulative force. Furthermore, we add comments on possible relations of CORTs with the Lamarckian theory of evolution.

The Spring 2010 issue of this *Journal* contained a Commentary by Jürgen Keil entitled “Questions of the Reincarnation Type” (Keil, 2010). In this paper, Keil has presented a valuable overview on different aspects of his own field studies into cases of the reincarnation type (CORTs). He has also proposed an explanatory model for these cases suggesting that “most and perhaps all CORTs can be better fitted into a framework of psi without the reincarnation or survival hypothesis” (Keil, 2010:81) and maintained that this approach is more parsimonious than the reincarnation hypothesis. The model he proposed is a slightly elaborated version of the model he had already proposed in previous publications in which he had outlined and commented on his first field studies

of CORTs (Keil, 1991, 1994). In these publications, Keil had postulated that thoughts or emotions of a deceased person could continue to exist for some time after death and eventually become transmitted to the relatively unformed personalities of some children, thus resulting in remarkable instances of extrasensory perception (ESP). The present supplements of his hypothesis consist for example in the brief discussions of maternal impressions and birth/death discrepancies, as well as in coining the words “thought bundles” (TBs in the following) and “thought pools” (Keil, 2010:85). In short, Keil proposes that “free floating thought bundles” (Keil, 2010:96) are emitted by a dying person which “may get attached to objects, localities, people, or situations” (p. 98), and might be absorbed by a developing baby by “pre-personality psychic absorption” (p. 84). After this absorption, the growing child will display apparent memories of the life of a previous personality (PP). Whereas this might appear as a restricted or passive form of survival, the important difference from survival proper lies in that these TBs would not possess “the ability to generate new thoughts, which are based on an awareness and interaction with the real world” (Keil, 2010:97). Thus, Keil proposed that the term *survival* is not justified in his model. However, like the concept of reincarnation, Keil’s approach is only conceivable within the framework of interactionist dualism, which in this case would comprise non-material TBs affecting the brain physiology of a fetus or an infant by the suggested mode of pre-personality absorption. A hypothesis almost identical to Keil’s was published a few years earlier by David Ray Griffin in his contribution to evaluating the survival question (Griffin, 1997). Griffin used the term “retroprehensive inclusion” to denote a possible process mediating the re-emergence of memories and skills in CORTs without relying on survival.

We thoroughly appreciate discussions that contribute to elaborating the difficulties inherent to explaining CORTs, and that aim at finding the most appropriate explanatory model accounting for them. However, we believe that any discussion with the pretension to find suitable explanations for most or all CORTs should not rest on short and rather superficial speculations, as is, unfortunately, the case with most of the discussions on the nature of CORTs available today (for exceptions, see Braude, 2003, and Griffin, 1997). In the following, we would like to draw attention to a few of many difficulties that should be addressed in future discussions about the proposed TBs as an alternative explanatory model for reincarnation. In doing so, we hope to stimulate a deepened elaboration of this concept, concurring with Keil that in many instances of CORTs it seems unlikely that relevant information was obtained through normal means of communication and genetic connections. In fact, we maintain that the explanatory power of hypotheses concerning the presumed nature of a given phenomenon can best be evaluated when assuming

the greatest degree of authenticity and evidentiality for documented reports in the sense of Ian Stevenson (1971). These conditions imply that these reports are accurate and generally correspond to how the events had really happened. If the documented CORTs should indeed be authentic and evidential, any satisfactory hypothesis designed to explain all cases must be able to account for them. Thus, for the present purpose, we assume as a working hypothesis that the published accounts of CORTs correspond to how the events had really happened, and therefore contain paranormal features. In our discussion, we also introduce unusual and comparatively rare aspects of CORTs which were hardly mentioned in previous discussions assessing explanatory models for CORTs (e.g., Becker, 1993, Braude, 2003, Gauld, 1982, Griffin, 1997), but which still need to be addressed in models that aim at explaining most or all CORTs. Such rare phenomena include departure dreams, CORTs announced via mediumistic communications, ostensible memories of intermission periods between the two lives in question, and CORTs involving twins. Although they are rare, they might nevertheless be of particular significance because they seem to complicate and weaken explanatory models resting on ESP or TBs. If a given explanatory model faces difficulties in accounting for the most intricate cases of a continuous series of increasingly complex occurrences, it is likely that its explanatory power decreases also with regard to the less intricate cases—whereas only such models which can neatly account also for the most intricate cases are likely to contain the most important element for the correct interpretation of the entire series of occurrences.

In the following sections of this paper, we sketch seven different issues that seem important for evaluating the TB hypothesis, presenting each one in a separate section, and we finish this Commentary by adding a few general concluding remarks.

Establishment of the Link between TBs and the Children

First of all, it remains unclear to what extent both partners, the TBs on the one hand and the fetuses or children on the other hand, are responsible for the selection and the establishment of the link between them. Who selects, who is active, who is passive? Given that TBs are said to be absorbed by fetuses or infants in pre-personality states, we would assume that the child's rudimentary psyche cannot contribute actively to the selection of TBs; they could not even develop a motivation. However, Keil's TBs would also have difficulties in taking the initiative of selecting. Although Keil's characterization of TBs is ambiguous, we assume he intended to express that TBs are not only incapable of generating new thoughts, but are also not aware of physical reality and cannot actively interact with it (the other interpretation of Keil's formulation would be that TBs are aware of this reality and can interact with it, but cannot

generate new thoughts based on these abilities. This, however, is difficult to conceive for us). How then is the link between TBs and the babies established? This problem needs to be explicitly addressed for conventional CRTs, but also for more complex CRTs such as those in which twins claim to remember a previous life in which they had known each other already, and have obviously chosen to become reborn together. Below, we present considerations on six theoretical possibilities of how the link between TBs and embryos, fetuses, or babies could be established.

- (1) The link is established through the initiative on the children's side, the subjects (Ss).
- (2) The link is established by the TBs (being still active after the death of the PP).
- (3) Both sides, babies and TBs, are actively involved in establishing the link.
- (4) Neither fetuses or babies nor the TBs are actively involved. The selection of matching fetuses and TBs works via unspecific if not largely random ways and a successful link or an absorption of TBs is only established if there is a mutual "rapport" of unknown origin on both sides. This type of link formation can be likened to two persons who get to know each other in their daily business by coincidence and without any hidden agenda, but who still find they somehow match together.
- (5) Other persons such as family members of the PPs and the Ss influence the selection and the establishment of the link.
- (6) The link is established by transcendental forces or entities.

Apart from the problems already mentioned above, problems pertaining to possibility (1) include the following: How and according to which motivation would these children select TBs? Why are the selected PPs often represented by individuals with a rather unpleasant life and violent death, instead of individuals with a more pleasurable life history? Or why are sometimes PPs chosen who are problematic for all members of the subject's family, including the Ss themselves? Examples of this are represented by the CRTs in which Burmese infants claim to remember the lives of foreign soldiers who died during the war in Burma, now known as Myanmar (Stevenson, 1983:216, 229, Stevenson, 1997:181, 1301, 1311, 1326, 2025). One might also ask: Why do the children obviously not display other (super-) ESP abilities, such as retrocognition, precognition, clairvoyance, or psi among the living?

Possibility (2) seems not in accordance with Keil's proposed model. Rather, it is close to Stevenson's concept of "psychophores" which was proposed as a working hypothesis for explaining reincarnation. Stevenson regarded the psychophore as the vehicle that carries a person's mental elements between incarnations (Stevenson, 2001:234).

Possibility (3) may be seen as a summation of (1) and (2) with their properties and problems taken together.

Possibility (4) seems closest to Keil's model. However, it remains unclear why and how the children should develop such a strong identification with a passive memory bundle of another person. Moreover, it fails to account for the many meaningful links reported in CORTs, such as announced rebirths of PPs within the same family and many twin CORTs. It seems that adding possibility (5) becomes an indispensable requisite for any resilient hypothesis based on (4).

However, (5) would run into complications when assuming that culturally determined differences of CORTs such as the different rates of sex change cases or the different medians of timespans between the two lives in different cultures represent genuine differences in these CORTs. For example, one would have to attribute a considerable subconscious ESP-ability to the parents who would have to precognitively know or determine the future sex of their babies, and to find a TB of a PP with an appropriate gender who died at a time that would match the timespan of intermission periods assumed in the pertinent cultural belief system. The parents would also have to make sure somehow that *only one* TB is attracted and attached to the child. In any case, determining a motivation of parents or other family members to attract TBs of certain PPs seems difficult in many CORTs regardless of cultural influence (e.g., see the cases of Burmese parents who give birth to children claiming to be reborn Japanese soldiers; see also Braude, 2003:181).

Turning now to possibility (6), it seems likely that any hypothesis based on it will not make CORTs more attractive for the scientific community than the concept of reincarnation. But because this "normalization" of CORTs appears to be one aim of Keil in trying to establish the TB hypothesis, possibility (6) will not be considered further here. In general, it would be valuable to analyze the strengths and weaknesses of all the presented possibilities with regard to CORTs in more detail. But as space is limited in this Commentary, we will only touch briefly on some aspects throughout the rest of this paper.

Birth/Death Discrepancies

The second topic we consider worthy of renewed attention are the cases with *birth/death discrepancies* discussed by Keil. In these cases, the Ss are born before the PPs have died. Keil states that such cases do not agree with the "simple" reincarnation hypothesis, but support his TB hypothesis (Keil, 2010:93). We were surprised that Keil did not mention the possibility that such cases would be in good agreement with the concept of *possession*, which is in close relation and in good agreement with the concept of reincarnation. In fact, it seems only a matter of personal preference whether one classifies the CORTs in which the PPs had died during the subject's gestation as examples

of possession or reincarnation (Stevenson, 1997:1095, 1142). There are even a few published cases of the possession type in which a PP seems to have “taken over” the body of another person, for example when he or she was in a state of apparent death, such as in the cases of Sumitra Singh (Stevenson, Pasricha, & McClean-Rice, 1989) or of the infants Sudhakar Misra (Pasricha, 1990) and Jasbir Singh (Stevenson, 1974). Jasbir has even related memories of the intermission period between the two lives and described how he had entered his new body. Thus, contrary to what Keil seems to assume, cases with birth/death discrepancies pose no difficulty at all for the concepts of reincarnation or of psychophores.

Memories of the Intermission Period between Two Lives

A serious difficulty for the TB hypothesis directly concerns the just-mentioned memories of the *intermission period*. How and why should apparent memories of an intermission period between two lives be attached to the TBs of a dying person? How do these claims fit into the framework of TBs emitted by a dying person? Such TBs should never cover time periods after the death of the PPs. It is especially interesting that descriptions of the intermission period share several features of near-death experiences (NDEs). In particular, the reports of the intermission period contain numerous reports of apparently veridical perceptions of what happened to their body after the cessation of vital body functions or death. Of 69 cases, in which the Ss reported memories of the previous personality’s funeral or the handling of the remains, 25 cases (36 percent) contained details that were verified to be accurate (Tucker, 2006:168f; for published single cases see for example Stevenson, 1975:142, 312, Stevenson, 1977:77, Stevenson, 1983:12, 142ff, Stevenson, 1997:212, 596, 1958). There are even a few cases on account in which the Ss have reported having met deceased individuals in the purported afterlife realm and provided information about them they could not have known by normal means (Tucker, 2006:172, Banerjee, 1979:117).

Departure Dreams and Mediumistic Communications Announcing the Rebirth of a Previous Personality

A fourth set of problems for Keil’s hypothesis we would like to emphasize includes so-called *departure dreams*. These dreams can be regarded as a subcategory of so-called after-death communications or after-death contacts which are not infrequently reported to occur in dreams (Guggenheim & Guggenheim, 1995, Wright, 2002). In these cases, bereaved family members experience a vivid presence of the deceased in their dreams, and the reputed deceased usually also convey a message to the dreamer. In CORTs, reciprocally confirmed variants of

such dreams are reported. For example, the young child may state that he had appeared to his former wife in a dream during the intermission period, explaining to her where he had hidden money (Stevenson, 1997:255); that she had paid visits to her previous son in dreams when he was in difficulties (Stevenson, 1997:594); or that he had pointed in a dream to secret activities of other family members previously unknown to the dreamer, his previous mother (Stevenson, 1975:328). In these cases, the named members of the former families had confirmed having had such dreams. In the category of departure dreams, a deceased individual appears to one or more members of the previous family in dreams and announces his or her rebirth into another family (Stevenson, 2001:100). Also, a deceased individual may occur in a dream of a member of the former family shortly *after* he or she was born as the new subject. At times, the rebirth of a deceased family member was also announced in a dream in which a third person like “an old man in white” described the future family (Stevenson, 1983:245). At present, we are aware of 15 cases that contain one or two departure dreams (e.g., Rawat & Rivas, 2007:160, Stevenson, 1980:44, Stevenson, 1997:727, 750, 1114, 1603, 1700, 1718, Stevenson, 2001:100, Stevenson, 2003:102). Some of the cases that include departure dreams involve additional dreams of corresponding content that members of the future family had, so-called *announcing dreams* (e.g., Stevenson, 1983:281, Stevenson 1997:703).¹ In at least one case, both a departure dream and an announcing dream also corresponded to “very vivid” intermission period memories of the subject (Stevenson, 1983:244f). Whereas the apparently not uncommon announcing dreams might be explained by some kind of precognition on behalf of the members of the future family or as effects of the TBs which might already hover around these persons, the obviously much rarer reciprocally confirmed dreams in CORTs and also the departure dreams are not that easily explained. For example, why and how should a TB of a dying person without the ability to generate new thoughts and without awareness of the physical world announce his or her rebirth into a certain family in a dream, often providing sufficient information to identify this future family? Should we rather interpret these dreams as personified and dramatized acts of precognition or clairvoyance on the part of members of the former family who somehow sensed that TBs of the deceased PP were or will be absorbed and personified by the future subject? There are also three cases in which the PPs communicated their dissatisfaction with the newborn infant’s situation in dreams that members of the previous family had (Stevenson, 2001:100). This would represent a rather unusual form of clairvoyance, given that these nonverbal neonates would only have absorbed passive mental relics of the PPs. Might it not be more rational to assume an at least rudimentary awareness of this reality and an activity on the part of the TBs? If yes, how would that concept differ from the concept of psychophores?

A very similar problem concerns at least 14 CORTs in which the birth of a subject was announced via *mediumistic communications*, usually by personalities speaking through the mediums who claimed to be the PPs (e.g., Hassler, 2011:132, 157, Muller, 1970:190, 192, 229, 235, Playfair, 1975:232, 233, Playfair, 2006:5, 34f, Stevenson, 1974:203, Stevenson, 1997:727, 797, 829, Stevenson, 2003:24, 42). Are we to assume that an unconscious split-personality of the medium simulates the PP with the telepathically mediated subconscious help of the other sitters' minds, attracts the TBs emitted by the PP, and later attaches them to a fetus of the correct mother so that the right baby will be born at the predicted time? Or, in the cases in which the gestation of the child was already in progress: Did the medium sense per ESP that the TBs were already attached to a fetus of a sitter, and simulate the purported communications of the PP? Controversial as these cases might be, they should be addressed when explanatory models with the pretension to explain all CORTs are proposed. The same applies to two other related problems, namely the at least 13 CORTs in which *apparitional figures* of PPs were seen between the death of the PPs and the birth of the Ss, often expressing their wish to become reborn to the perceiver of the apparition (e.g., Muller, 1970:190f, 235, Playfair, 1975:222, Stevenson, 1983:177, 277, Stevenson, 1997:244, 667, 1244, 1458, 2091); and the cases in which the Ss claimed that they had acted in the physical realm and caused *poltergeist-like activities* from the discarnate state of the intermission period (e.g., Stevenson, 1975:312, Stevenson, 1997:183, Stevenson, 2001:112, Stevenson, 2003:24).

Twin CORTs

Memories of intermission periods also play a role in some of the most intriguing examples of CORTs, namely cases that involve twins. These cases also offer a line of inquiry to evaluate the plausibility of the TB hypotheses, if only on speculative grounds. Keil states that "If it can be generally confirmed that some PPs have connections to two or more Ss, this would support the suggestions that relatively disconnected "free floating information" from a PP may persist in time and may be absorbed by more than one S" (Keil, 2010:93). If, in addition, these TBs "get attached to objects, localities, people, or situations" (Keil, 2010:98) which facilitate access to them, and will be absorbed by a developing baby by pre-personality psychic absorption, it is obvious that (monocytotic) twins would be predestined to result in precisely such cases. Given the identical environment in their mother's womb and after birth, the almost identical time of their birth, and, in monocytotic twins, also their identical genome, one might in fact postulate that in such cases the TBs will be absorbed by both twins. Stevenson has analyzed 42 twin pairs and estimated that 18 of them were monozygotic (Stevenson, 1997:1934). Of these 42 pairs, both twins spoke of a

previous life in 22 cases, and in 13 cases only one twin spoke about a previous life. However, in six of these 13 cases the twin who spoke placed the silent twin in his or her previous life (Stevenson, 1997:1936). In no case did twins claim to remember the previous life of the same person, although most of these twin PPs had had some relationship, often family bonds (Stevenson, 1997:1937). Some twins such as the monozygotic Indika and Kakshappa Ishwara even reported previous lives of unrelated PPs (Stevenson, 1997:1970ff). From the perspective of the TB hypothesis (but also from the perspective of any other ESP-based hypothesis), it seems surprising that there is not one “double case” in the 42 twin CORTs analyzed. Should it not be the rule that (monozygotic) twins pick up the same TBs or memories, rather than that only one twin speaks of a previous life, or both speak of two different PPs? Moreover, one might wonder why TBs should develop the motivation to place the silent twin in the context of the previous life—sometimes, as in the case of Maung Kyaw Myint Naing, even claiming that he had invited the silent twin to join him by becoming born as his twin in the discarnate realm, a statement that was apparently also conveyed by the becoming subject earlier in an announcing dream of the future mother (Stevenson, 1997:1936).

Implications of Maternal Impressions

With the sixth issue on our list, we turn to more biological aspects of the TB hypothesis. First, it should be noted that *maternal impressions* are far from being “in good agreement with physiological changes” as Keil (2010:96) assumed. There is no physiologically relevant connection between mother and fetus apart from the umbilical cord. Although we consider the occurrence of maternal impressions as possible and even likely under given circumstances, there is at present no known mechanism by which a physiological instruction to generate a specific birthmark or birth defect could be conveyed through the umbilical cord to the developing child. Consequently, maternal impressions can at present only be interpreted as examples of macro-psychokinesis. Not surprisingly, contemporary medicine strongly rejects the possibility that maternal impressions can occur at all. Thus, it seems doubtful whether attributing the generation of birthmarks and birth defects solely to maternal impressions diminishes the problems—especially in CORTs comprising experimental birthmarks that correspond with the bodily marks of the PPs, but which the mothers were apparently not consciously aware of. Doubts may also rise with regard to cases in which birthmarks on the ears of the Ss matched the positions of holes pierced for earrings of the PPs (Stevenson, 1997:589ff), or to cases in which birthmarks of the Ss matched non-fatal wounds or other marks of PPs, or cases in which internal diseases of the Ss matched those of the PPs, or in which general physical and facial resemblances of the PPs and the Ss were determined

(for examples of such cases see the relevant book chapters in Stevenson, 1997). Such bodily characteristics do not usually elicit strong negative emotions, nor are they very pronounced and visually striking—if the mothers had been aware of such minor, trivial, and sometimes hidden details of the PP’s appearance at all. Yet, as far as can be assumed today, the generation of maternal impressions seems largely restricted to perceiving striking anomalies or wounds that arouse strong negative emotions in the becoming mother. Thus, for us, it seems more reasonable to assume at least for those cases in which the mothers of the Ss were not aware of corresponding characteristics of the PPs that the supposed TBs also possess an ability to affect the re-emergence of the bodily marks of PPs by themselves. In any case, one might wonder if it is possible at all to draw a distinct border between the physiological processes that are associated with recalling memories, governing behavioral patterns, skills, the experience of emotions, or placebo/nocebo-effects on the one hand, and the psychophysiology involved in governing the formation of minor and larger bodily changes on the other hand (Kelly, 2007, Murphy, 1992, Stevenson, 1997, Chapter 2). It is very likely that such a boundary cannot be drawn. Then, there would be no reason why TBs should not also possess the ability to generate physical traits of the Ss such as birthmarks and birth defects. After all, maternal impressions would be caused by respective mental impressions, and we assume that also TBs could be conceived as a kind of “free floating” mental impression. Why should they not be able to affect the bodily development of a fetus after being absorbed? Contrary to the first five issues previously discussed, we do not think that the capacity to cause bodily modifications would pose difficulties for the TB hypothesis. Rather, the endorsement of maternal impressions as explanation of all birthmarks and birth defects suggested by Keil and also Griffin (1997) seems to add unnecessary theoretical complications to their hypotheses.

The Lamarckian Dimension of CORTs

Our seventh comment is closely related to the foregoing topic and concerns *Lamarckian evolution theories*. It builds on Keil’s statement that “Lamarck’s theory suggesting that some information and skills acquired by parents during their lives may be passed on to their children without any genetic or environmental involvement would also be in agreement with psi” (Keil, 2010:81). Here, Keil touched a very important and largely neglected aspect of CORTs, but we’d like to add a minor clarification. Although Lamarck and his early successors did not know about genes and the genome, they assumed that a kind of material factor which would have come close to today’s genes would be indispensable for effecting the “inheritance of acquired characteristics,” the crucial element in all versions of Lamarckian theories of evolution. Yet, the possible mechanisms involved in the transmission of traits were obscure in all

early theories of evolution and hardly formulated. Among the most explicit hypotheses ranks the model of “Pangenesi,” put forward by the most prominent and influential Lamarckist, Charles Darwin (Darwin, 1868(2):Chapter 27). He assumed that little particles, the gemmules, would be distributed in the bodies of organisms and would aggregate in the “sexual elements,” thus transmitting information about the status of the different body parts into the germline and facilitating the re-emergence of characteristics in the offspring which had been acquired by their parents. Later, such hypotheses were refined into the concept of “somatic induction,” postulating that information about certain changes in the body are transmitted into its germ plasm (Detto, 1904, Kammerer, 1924). In fact, even modern trends of epigenetics revive and acknowledge the possibility of the Lamarckian concept of inheritance of acquired characteristics to a certain degree. One way this trait transmission is achieved seems to involve genes and gene products that can be affected by environmental stimuli the organism is exposed to. Accordingly, genes and related biophysiological factors still play a crucial role in presently acknowledged processes mediating examples of the inheritance of acquired characteristics (Jablonka & Lamb, 2006, West-Eberhard, 2003). Hence, traditional Lamarckian theories were not and are not in agreement with psi, but we hold with Keil that psi might yet play a role in mediating examples of inheritance of acquired characteristics in a broader sense. Another point we want to stress is that a central feature of Lamarck’s theory of evolution, even of its modern derivatives, is the transmission of acquired *bodily* modifications from parents to their offspring. Thus, also from the position of a psi-inclusive Lamarckian theory, Keil and Griffin could well include the capacity of TBs to effect bodily changes in organisms into their theories without resorting to any form of survival, thus nearing the outline of possible evolutionary processes proposed earlier by other authors (for a brief review of psi-inclusive theories of evolution, see Nahm, 2007). Apart from these more general considerations, the reference to psi-inclusive Lamarckism in the context of addressing the survival question in CORTs might suggest another possible problem for the TB hypothesis. In all types of Lamarckian evolution theory, the parents are usually still alive when their offspring is born. The parents of many animal species may even raise many subsequent generations before they die. Consequently, one might assume in Keil’s model that persons can emit TBs also during their lifetime, if only “during the last phase of life” (Keil, 2010:96), or even only in near-death states such as prolonged NDEs or comas, but perhaps also during severe accidents and other kinds of emotional shocks and situations arising from fear of death. Hence, although one might expect it in the framework of the TB theory, we are not aware of any published reports of solved CORTs (i.e. CORTs in which the existence of the PP was verified) that involve memories of the lives of still-living individuals, not even

of near-death experiencers or survivors of accidents.² If, alternatively, TBs are only emitted after a time of definitive biological death: Why should that be, and how is this accomplished? In any case, this alternative would not be in agreement with Keil's hypothesis that TBs are emitted during the last phase of life or at death. In this context, it might also be of importance that living persons in acute danger or near-death states as well as persons factually dying do seem able to emit meaningful information, as exemplified by (reciprocally confirmed) crisis apparitions, telepathic impressions, or synchronistic physical phenomena observed around the time somebody undergoes a crisis (e.g., Gurney, Myers, & Podmore, 1886). Given these parallels, it appears recommendable to expound the possible relations between these crisis-related phenomena and the hypothetical TBs which we must assume to be elicited or emitted under largely identical circumstances.

Concluding Remarks

We conclude this commentary on the TB model with some more general remarks. For example, we are not convinced that it is the more "parsimonious" as well as the "simpler" approach (Keil, 2010:82, 96) to replace the single continuous psychophore proposed in the reincarnation concept with three separate agents who need to be connected by convoluted causal chains: (1) TBs emitted by dying persons, (2) fetuses or babies absorbing these TBs, and (3) unconscious ESP plus subsequent psychokinetic maternal impressions by mothers. One might even have to add a fourth, a fifth, or even more separate agents if departure dreams are regarded as dramatized instances of precognition by members of the previous families, if announcing dreams are experienced (first) by other persons than the mother, and if communicators announcing their rebirth through mediums are regarded as split-personalities of the mediums fed with subconscious ESP. However, we would also like to stress that the argument of parsimony or simplicity is by itself loaded with severe intrinsic difficulties and bears far less significance than is often assumed. One of its major drawbacks is that objective and appropriate criteria for simplicity can rarely be established. Thus, the argument of simplicity is often worthless and not more than a tradition-authorized mirror of prejudice which simply reflects the opinions of those who make use of it (Gernert, 2007).

When addressing the survival question, one should also keep in mind the traditional argument of "cumulative force." It was recently also discussed by Braude (2003) with regard to CORTs. This approach implies judging the best CORTs taken together, as well as considering the best examples of other sources that point toward the possibility that consciousness can exist independently of the human brain or toward survival, such as NDEs (van Lommel, 2010), correspondences between NDEs and CORT intermission descriptions (Rawat

& Rivas, 2005, Sharma & Tucker, 2004), cases of the possession type, hypnotic past-life regressions, hauntings and apparitions, mediumistic communications, and so forth (Braude, 2003, Griffin, 1997, Mattiesen, 1936–1939, Roy, 1996).

In sum, we hold that Keil's approach is valuable in highlighting difficulties with the reincarnationist concept associated with CORTs and in offering an alternative explanatory model to reincarnation. But if this approach is to be taken as an alternative that could justify the pretension that "most and perhaps all CORTs can be better fitted into a framework of psi without the reincarnation or survival hypothesis," it needs more elaboration and refinement—for example, by examining in detail some of the best and most intricate CORTs published, by taking into account issues raised in this Commentary, and by tackling the arguments of previous authors who examined explanatory models for CORTs and concluded that some form of survival seems the most likely possibility (e.g., Almeder, 1992, Becker 1993, Braude, 2003, Gauld, 1982, Griffin, 1997). After all, we agree with Keil that there might be more than one explanation for CORTs, and encourage attempts to develop criteria to distinguish between the different possibilities by assessing critical details proposed in this and other publications on CORTs.

Notes

- ¹ Stevenson is not always consistent in his nomenclature. For example, several "announcing dreams" in Stevenson (1983, 1997) are in fact departure dreams because the dreamers belonged to the families of the previous personality, not of the future family of the subjects.
- ² However, one should keep in mind that such cases might be difficult to find because 1) they might be rarer than cases involving PPs who had factually died, and 2) such cases might have slipped the attention of CORT researchers, and/or were never specifically searched or asked for. Yet, discovering such cases would have important consequences. If only one reliable case could be documented, it would serve as a considerable support for the TB hypothesis. Thus, we recommend that CORT researchers should pay close attention to cases that might be indicative of children "remembering" the life of a person who is still alive.

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REPLY

**Reply to the Nahm and Hassler Commentary on
Jürgen Keil’s Paper “Questions of the Reincarnation Type”**

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Is the Psi Interpretation Justified?

Based on reports and publications, I do not find it difficult to agree with Hassler and Nahm that my psi-based interpretations of CORTs may not be justified. However, based on fieldwork investigations of many cases over a number of years, the reincarnation or survival interpretation turned out to be less and less in agreement with the case studies as I experienced them. This is to some extent a subjective assessment, but one which I did not anticipate. I have some general doubts about survival views when they are expressed with a high degree of certainty, but on account of my association with Ian Stevenson—who encouraged me to investigate CORTs—and my high regard for his work, I expected that the results from my fieldwork would generally support the reincarnation or survival hypothesis.

The problem is that cases can generally only be found in countries with some acceptance of reincarnation. Without intentional distortions by the families involved, details are conveyed that are in agreement with particular reincarnation beliefs that differ between communities.

With rare exceptions, families in Turkey do not recognize sex change cases. Different communities have different views about the maximum time during which a rebirth may occur, and Ss outside these limits are not recognized. In a similar way, Ss who are born before the corresponding PPs have died are not generally recognized as rebirth cases. Variations of these and other rules experienced in different countries and communities strongly suggest that the cases that we investigate produce information that is partly based on perhaps somewhat strange traditions and beliefs. In other words, the results are based on information that was filtered and restricted according to local beliefs, traditions, and expectations. This may suggest that some of the information provided

should not be regarded as paranormal at all. However, it is much more likely that in agreement with local expectations additional paranormal information was ignored.

On page 320 of their Commentary in this *Journal*, Hassler and Nahm point out that among 42 twin pairs no S claimed to remember more than one PP. It must be kept in mind though, that the relevant information were obtained from very young children with the help of their parents or other family members. Occasionally other adults were also involved. I did not encounter any Ss who claimed to have information about more than one PP. However, we had not asked any questions that might have suggested that a S could have had a connection with another PP. It must also be kept in mind that the responses were obtained in family settings with no one expecting that a second PP may have been involved.

It is quite possible, in a similar way as sex change cases in Turkey—with one exception I encountered—were not recognized, that no additional PPs were recognized by Ss relatives because of their traditional expectations that an S can only be the reincarnation of one PP.

I do appreciate that many questions remain unanswered particularly with respect to the process by which a particular S is selected who has information about a particular PP and how the information was generated.

I tried to suggest that my assessment of a psi-based information transfer as the simpler alternative is a subjective one. Obviously, I should have expressed this more clearly.

Apparently psi-mediated information transfers (PMITs) occur quite independently of any reincarnation or survival involvement. That means PMITs can provide an adequate and perhaps simpler explanation for any paranormal aspects of most and perhaps all CORTs. More important is perhaps the more subjective assessment that the children who provide paranormal information about a PP do not seem to remember a personal experience. This is difficult to judge because family members often attach emotional importance to such information and this can create emotional responses from the children involved. Nevertheless—and this is again a somewhat subjective assessment—children are often surprisingly unemotional about the information they provide.

I do not suggest that my psi-based interpretation of CORTs can be expressed in terms that would satisfy all the concerns raised by Nahm and Hassler, but based on fieldwork experience I do suggest that paranormal information transfers identified in CORTs can be accommodated in a psi-based model—still in need of further refinements—without reincarnation or survival involvements.

ESSAY

**The Desire for the Development of Flight:
A Recurrent Theme for Advanced Civilizations?**

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Abstract—The desire to fly is a recurrent theme in human civilizations. This fascination has led to the achievement of heavier-than-air flight in modern times and possibly in ancient history as well. Oral traditions and ancient manuscripts from around the world contain many detailed references to flying machines of various types. Many different artifacts, recovered in the course of normal archaeological excavations, also display many mechanical and aerodynamic features. The worldwide distribution of these artifacts, written manuscripts, and traditions suggests that some civilizations perhaps developed, or were about to develop, flying machines. Thus, fascination and attempts with flight seem to be a recurring theme for the human species.

Keywords: aircraft—flight—vimanas—ancient aviation—SETI—advanced technology

Introduction

There is uncertainty whether technologically advanced civilizations, as a general rule, would engage in space travel and visit other planets. A first necessary step toward space is the development of machines capable of achieving heavier-than-air flight. Here, we examine this question by searching ancient documents and artifacts for insights into whether the interest in flight and the development of flying machines in particular, is a recurrent phenomenon of human history or only resulted once in Western civilization, within the last 150 years.

Throughout history, humankind has enjoyed and cultivated a fascination with heavier-than-air flight. Men and women have watched birds, and other winged creatures in flight, and desired to join them in the skies. This yearning has inspired numerous designs throughout the ages depicting flying machines capable of carrying a person through the air. In 1783, two Frenchmen built and

successfully flew a hot air balloon (Heppenheimer, 2000). Leonardo Da Vinci's works include drawings for many unique flying objects (Laurenza, 2004), while George Cayley built and flew a glider, with his servant as its passenger, in 1853 (Ackroyd, 2002). These experiments culminated in the year 1903 near the small town of Kitty Hawk, North Carolina, with Wilber and Orville Wright building and successfully flying the first airplane for a short distance, proving that building machines to carry people through the air was a possibility (Wright, 1986). Less than seventy years later, in 1969, manned space flight became a reality and the first humans walked on the Moon.

The desire to fly, successfully achieved in modern times, is well-documented throughout human history. Many ancient legends, oral traditions, and documents from across the world might speak of flying machines of various types. Ancient sources of this information are distributed worldwide and typically record the earliest period of the particular culture. Many of these legends describe the exploits of gods or hero kings in which the main character moves from place to place in some sort of flying vehicle. The type of vehicle varies from story to story and from culture to culture, but many consistencies are evident among the stories when closely examined.

In addition to cultural legends, some ancient artifacts from around the world appear to closely resemble airplane-like machines and other flying objects. Archaeologists have unearthed artifacts that they classify as birds, insects, or zoomorphic statues, but which appear to have more in common with mechanical objects than any animal known. Other, more controversial artifacts come in the form of hieroglyphs, cave paintings, and murals. Some of these are highly stylized, making it difficult to understand the recorded event, while some are undoubtedly forgeries done in recent times. However, others are definitely legitimate relics that record something special in ancient times. The question remains whether all these documents and artifacts simply record the desire to fly or if they recorded actual events.

Is Technology for Flight a Reasonable Inference for Ancient Civilizations?

Traditionally, the technology necessary for manufacturing flying machines is not attributed to the ancients. It is widely believed that prehistoric cultures had the expertise to manufacture and use flint knives and other stone tools, but are there data to support a culture advanced enough to build and fly a heavier-than-air machine?

Evidence for advanced technology in a variety of disciplines may actually be widespread. For example, many cultures became experts in textile manufacture and made textiles of a quality comparable to that of modern times (Holmes, 1889). An excellent example of such textiles comes from the graves of Nazca,

Peru (Martin, 2006). The engineering skill of some ancients is yet another indication that these cultures possessed far more technological advancement than is generally thought. Megalithic monuments, such as Stonehenge in England, the pyramids of Egypt, Baalbek in Lebanon, and Teotihuacán in Bolivia and Peru show a mastery of architecture and technology that is amazing for modern times. Other evidence of advanced technology comes from the advanced metallurgy technology. Many cultures were able to smelt very hard alloys of copper (Noorbergen, 1977) and very pure iron (Hedge, 1973). Some documentation exists of aluminum alloys being isolated as well (Vintiñi, 2009). These are only a few examples of a higher technological advancement in ancient cultures than is normally considered plausible.

When looking for verification of advanced technology in early societies, it is best to keep in mind how modern devices would fare over time. Perishable objects will decay, and objects that include metals, such as airplanes, would be impossible to find after a few hundred years, especially if exposed to a tropical climate. Plastics eventually break or ultraviolet radiation destroys the material, while animals eat wood and paper. Only a small number of parts from advanced machines would remain for future generations to find, if they in fact existed. In addition, as modern technology has advanced, manufactured parts have become smaller, and this would probably hold true for ancient civilizations as well. Smaller objects are even less likely to survive the ravages of time, and current excavation techniques make recovery more difficult for those that have survived. The most durable evidence for advanced technology would be the art and written traditions that describe certain events, possibly in a dramatized way. Could it be that ancient cultures advanced tremendously in some areas of science and technology and may have developed technology that is difficult to recognize for modern investigators?

Because of composition and environmental factors, artifacts do not last long. As a result, modern researchers looking for evidence of ancient advanced technology can only examine tantalizing remnants that are difficult to interpret. Conquering armies destroyed many ancient documents, and many ancient documents and artifacts were likely intentionally destroyed by the hands of religious zealots, such as the ancient Buddhist statues destroyed by the Taliban in Afghanistan in 2001. It is possible that other texts remain hidden where their guardians placed them generations ago while other scripts are still undeciphered. Translation of many Sanskrit, Chinese, and Russian documents is a very slow process (Müller, 1879), and, in some cases, Western scientists barely know of these documents.

These factors combine to make the discussion of controversial subjects, such as the possibility of ancient flight, extremely difficult. Many people have taken the limited amount of existing data for ancient advanced technology as

evidence for highly speculative theories. For example, many often use evidence of ancient advanced technology as support for the idea of Atlantis (NASCA, 2004) or UFOs. Unfortunately, this tendency to make this data as controversial and sensational as possible causes the scientific world to be apprehensive about pursuing research in these areas. As a result, it is difficult to find published data from peer-reviewed sources and objectively presented information. Here, we attempt an objective and prejudice-free assessment of what evidence for ancient flight exists, and examine whether the desire for developing flight was a universal trait of early societies regardless of the particular culture.

Possible Evidence for Ancient Flight or the Desire To Develop It

Written and Oral Documents

Generally, scholars collectively refer to oral traditions and ancient written documents as mythology since they refer to superhuman feats accomplished by heroes or gods. However, many times Western scientists are too quick to dismiss these legends as completely made up. There are records to show that many, if not a majority, of these legends have their origins in historical facts. Although these traditional stories do contain significant amounts of imaginative license, some of the information presented is likely partially or completely accurate (Müller, 1879). Many archaeologists began to realize the value of oral and written traditions after Herman Schliemann used Homer's *Odyssey* and *Iliad* to confirm the location of the ancient city of Troy (McCarty, 2004). Schliemann's discovery showed that Homer exaggerated and romanticized his retellings of actual events, somewhat similar to the modern ballads and historical novels of today. For this reason, it is logical to scientifically examine legends and oral traditions for information regarding putative ancient flight technology.

Mediterranean

Greek legends contain incidental bits of information within several stories that tell of flight. Much of this folklore speaks of flying sandals or winged animals, possibly remembrances of ancient flying objects as well as a wooden dove-like craft powered by compressed air (Gray, 2004). These references may or may not reflect ancient aviation. However, it is best to keep in mind the way that less-advanced cultures described modern airplanes. Generally, people referred to the airplanes as flying boats, giant birds, or other familiar items. Humans tend to explain unfamiliar experiences and sights in terms with which they are familiar, thus expressing the concept to those around them in an intelligible way. In addition, storytellers may give certain objects different names in order to give the event a religious meaning. The legend of Icarus tells the tale of

a father and son who escape from the island of Crete by flying. The father, Daedalus, was a superior artisan who built wings out of wax and feathers. The legend states that these wings enabled them to fly, but Icarus flew too close to the Sun, which caused the wax to melt, resulting in his fall to the ocean where he drowned (Williams, 2009). According to the National Association for Scientific and Cultural Appreciation (NASCA, 2004), Daedalus, as an expert in his trade, may have made two small aircraft. Daedalus's instructions to his son indicate that he was familiar with the principles of flight even though he was not entirely successful in his endeavors. Although wax and feather wings would not enable someone to fly, this legend may actually record a people's remembrances of an attempted ancient flight over the sea. On the other hand, it might just indicate the ancient desire to achieve the ability to fly, or point out the danger of flight.

Middle East

Several intriguing stories come from the ancient lands of Babylon and Sumer. In the record of Babylonian laws called the *Halkatha*, is a passage stating that the operation of a flying machine is a privilege and that this ancient knowledge was a gift for saving lives (Noorbergen, 1977). This code of laws is one of the earliest found and apparently refers to flight in an even earlier time. Other documents, such as the *Sifr'ala*, which are old and fragmentary, appear to contain detailed instructions on the construction and operation of a flying machine (NASCA, 2004). Unfortunately, the fragmentary text and incomplete translation of these documents make it difficult to reconstruct accurately the information contained in it. However, some sections appear to discuss vibrating spheres, graphite rods, and copper coils (Gray, 2004) which may relate to experimentation in flight. Other sections appear to describe the effects of wind resistance and other important variables of flight (Noorbergen, 1977).

The *Epic of Etana* is another tantalizing piece of information from ancient Babylon. According to Horowitz (1998), this epic dates to at least the Old Babylonian period, or approximately 2003–1595 BCE (Frayne, 1990). This epic describes the journey of the shepherd-king Etana on the wings of an eagle up to heaven. Unfortunately, many portions of the epic are missing, but the journey's destination is apparently Venus, the mythological home of the goddess Ishtar (Jastrow, 1910). The story describes the appearance of Earth at various heights during the flight. For example, after reaching one league (5.6 km) above the Earth, the eagle describes the Earth as a mountain while after three leagues (16.5 km), land is described as a gardener's ditch (Knipe, 1967). These descriptions are obviously somewhat fanciful, but do indicate that the author was aware that water surrounds the land with more water being visible the farther up one went. Unfortunately, the epic is fragmentary and many lines are missing, included more descriptions of the earth from different elevations. No known

version is complete, thus making it impossible to fill in the missing pieces at this time. However, many copies of the epic exist and the descriptions of Earth are somewhat similar to those of modern pilots. Possibly, the original author of the epic had himself been on a trip reaching higher altitudes or was recording the first-hand experience of someone who had. Or, the author was simply very smart in theorizing on the views one might encounter when ascending to high elevations above ground. The eagle might be a later change in the epic to make the aircraft more understandable to later readers or to give the text a religious meaning. In a modern context, official documents or codes frequently refer to aircraft using avian names.

Gray (2004) reported a Hittite story describing the search for a missing person in which the ruler dispatched a “swift eagle” to assist in the hunt. Once again, this may be another reference to an airplane under the guise of an animal. An Iranian text refers to an early king visiting a Caucus Mountain cave while riding a winged horse (Gray, 2004). Still other texts from the Mesopotamia area record people flying on the wings of birds and rising from low horizons to great heights (Gray, 2004). While these texts are highly stylized, and not intended to record technological information, the matter-of-fact way in which the authors mention human flight and the prevalence of these references may indicate some familiarity with aviation. Or, these descriptions may simply reflect a routinely discussed wish to fly.

India, Nepal, and Tibet

The most frequently discussed descriptions of ancient aviation come from the Sanskrit writings of ancient India, Tibet, and Nepal. Vedic texts contain hundreds of references to gods and heroes who knew the secret of flight (Londhe, 2001). Other Sanskrit documents are extremely technical and refer to the operation, construction, and maintenance of vimanas, some type of flying machines (Leonard, 2002). The amount of literature from this area that refers, either directly through physical and mechanical descriptions, or indirectly through references, to flying chariots, people, or animals, is staggering. Many of these descriptions include references to other advanced technology such as sophisticated-sounding weaponry (Childress, 1993).

The *Mahabharata* and *Ramayana* are the two longest and best-known of the Vedic texts. The *Mahabharata* tells the story of the struggle for the throne of India (Buck, 1973) while the *Ramayana* tells of a battle fought to free a kidnapped queen. During these battles, both sides utilized vimanas to attack the enemy (Mazumdar, 1958). According to B. A. van Nooten (in the Introduction to Buck, 1973), the Indian calendar, which begins with the events mentioned in these epics, gives a date of roughly 3102 BCE, but the events more likely occurred in approximately 1400 BCE.

Both the *Mahabharata* and *Ramayana* describe vimanas in incidental ways, as the story is unfolding, while other Sanskrit documents provide detailed information on construction, flight training, and some information on propulsion. One document describes a vimana as circular with four wheels while other texts describe vimanas as having the ability to become invisible (Burrows, 2009)—possibly suggesting that the craft was hidden by clouds at times. Descriptions in these ancient documents also suggest that vimanas were able to go up, down, forward, or backward at will and were very fast (Burrows, 2009). One vimana, in addition to being invisible at times, appeared to multiply, and could move on water, land, or in the air, according to the ancient description. The *Ramayana* and other texts contain many other incidental references to flying machines as well as descriptions of flight and the use of flying machines in warfare. The most common description of a flying machine in the *Ramayana* is one that could hide behind the clouds and become invisible. While the abilities ascribed to the vimanas, such as invisibility, may be imaginative elements added for a good story, the descriptions of flying machines may reflect actual objects used by this culture.

Based on the wide variety of descriptions found in various Sanskrit texts, it is likely that the term *vimanas* was a broad one, possibly similar to the English term *aircraft*. Some texts describe circular flying machines, others were oval, while others seem to have multiple decks. Given the lack of complete technical descriptions, it is difficult to separate the fact from mythology when researching vimanas. In addition, the wide variety of forms which these machines are described as having makes reconstructing an image of them difficult.

Construction of the aircraft is the focus of many of these ancient texts, which provide more details regarding how to fly the machines and how they functioned. Texts are deliberately vague however on certain portions of construction, and are particularly silent concerning propulsion. As the texts state, this is to prevent someone who is not initiated from discovering the secret of flight and using it for war. Another possible explanation for the vagueness is that the technology was not actually developed to the point that these elements could be described in detail. One text, the *Samarangana Sutradhara*, states that construction materials for the body must be lightweight while other construction materials can be iron, copper, and mercury (Ringer, 2007). The *Samarangana Sutradhara* describes how to join the wings to the body as well as some description on the propulsion system. It also describes the gear and training of pilots as well as techniques for flying different kinds of vimanas (Noorbergen, 1977). Many fragmentary references to propulsion and guidance systems seem to imply that native mercury, a yellowish white liquid, and “antigravity technology” are integral parts of the aircraft (Childress, 1993), while some texts refer to possible laser technology as part of the engine (*Samarangana Sutradhara*, in Leonard,

2002). Descriptions that appear to describe things such as antigravity or high-quality lasers may more likely represent the imagination of the storyteller, additions added to improve the power of the hero or god, or biases on the part of the translator. However, the technical descriptions that are available are very detailed. The mercury appears in connection with an iron framework, and the method for use is currently unknown (Childress, 1993). We do not know of any construction of the type spoken of in these texts. Unfortunately, the fragmentary nature of these manuscripts prevents reconstruction of the described propulsion system, thus limiting our understanding of the possible mechanism.

The numerous writings from India, Nepal, and Tibet indicate a familiarity with the principles of flight that is surprising. The construction materials and propulsion systems are sometimes different from those used in modern times, but appear highly advanced and are certainly detailed. Some texts appear to describe aircraft similar to modern hovercraft or helicopters. The described vimanas came in many different types, all of which were different in shape, use, and construction. Some descriptions of these ancient craft are so technical and detailed that it is impossible simply to dismiss them as wholly fantasy. Additionally, many of the texts, independently found and translated, describe a craft with the same features. These texts appear authentic, suggesting that flight or the possibility of flight preoccupied the minds of many people during ancient history. Whether this preoccupation went as far as actually developing the technology for flight is uncertain, however.

Asia

China also has numerous stories detailing flight. Not only do the texts describe flying machines similar to airplanes and helicopters, but also references include the testing of a parachute (Noorbergen, 1977). Chinese chroniclers from the reign of Emperor Shun (2258–2208 BCE) to as late as 400 AD described flying machines of various types and accurately described the regions over which they flew. Ko-Hung, writing in approximately 400 CE, tells of a flying machine made out of wood with rotating blades that caused the machine to rise off the earth (Noorbergen, 1977). Moreover, the Chinese language already had a word for an airplane meaning “flying chariot” when modern airplanes came into use (Gray, 2004).

The Chinese placed great importance on chronicling their history accurately (Chan, 2009). In addition, the Chinese have always had one of the most advanced civilizations of the ancient world. In fact, many of our inventions, such as gunpowder, stem directly from Chinese science. Because the Chinese were so careful to record accurately what they observed, these reports of flying machines in China deserve serious consideration.

Other Regions of the World

There is a rich tradition of flying found in Celtic legends and in Druid traditions. Druid legends speak of machines that could travel on land, in water, and in the air (Gray, 2004). Other Celtic traditions speak of flying ironclad animals without bones that did not need food and of flying machines that did not touch the water and could travel from Ireland to England in one night, or tell of air travel from Britain to Greece (Gray, 2004). One legend surrounding Stonehenge suggests that the transport and placement of the stones used aircraft (Noorbergen, 1977). These stories are fanciful descriptions of Celtic history, and likely indicate a period in their early history which document the strong desire of these cultures for achieving flight. Or, possibly they are a description of the various attempts that they made to achieve flight.

Ethiopia has an ancient tradition dating to the fourteenth century, called the *Kebra Nagast*. In this document, there is an account of King Solomon presenting the Queen of Sheba (Ethiopia) with a flying machine (*Kebra Nagast*, cited in Gray, 2004). Egypt also has its stories of ancient flying vehicles. One tells of a king who was inside of a white bird that came down with a trail of fire (Gray, 2004). These stories may not be as noteworthy as some others mentioned in other cultural manuscripts simply because they are less realistic in their descriptions. However, they do fit in the general trend of documentation of the desire for flight in a wide variety of cultures.

The Polynesians and Aborigines of Australia both have oral traditions of visitors from the West who came in flying boats above the ocean. On Mangareva in the Gambier Islands, the native inhabitants describe a flying canoe with wings that could fly long distances (NASCA, 2004). From Easter Island comes the tradition of flying men in hats (Gray, 2004). Could this be the inspiration for the enigmatic statues found here? In New Zealand, legends describe the north island of New Zealand as shaped like a ray-fish (Gray, 2004), although this feature of the island is only visible from high above ground level.

The Hopi of North America tell a story of nations that had aircraft and used them for warfare, while Piute Indians tell of peoples who had large, quiet airplanes with weapons (Gray, 2004). In addition, documents from Mexico record the arrival of flying ships and an Aztec king who designed an airplane (Gray, 2004). The stories originating in North America are quite similar to the Indian epics in their description of aircraft associated with war technology. They are recently recorded oral traditions, written down before aviation became a common technology. In addition, these stories depict flight as an incidental part of the story instead of a central feature. This makes it more likely that the flight was an actual event that had occurred or was anticipated rather than embellishment by the storyteller. Clearly, many ancient cultures were intrigued by the possibility of achieving heavier-than-air flight.

Artifacts Possibly Depicting Flight

Certain artifacts that may represent flying or gliding technology from ancient times, or that indicate some steps toward the development of that technology, are known from around the world. The most intriguing of these examples are discussed below in detail.

Columbian Artifacts

These artifacts come from Central and South American and date to the Sinu culture between 500 and 800 CE (Janku, 1996). All of the artifacts recovered so far have wings and most accurately represent known flying creatures, such as birds, insects, or bats, generally identifiable to the species represented. However, there are fourteen of these zoomorphic models displaying features of a more mechanical nature, which do not fit the features of any known flying animal (Janku, 1996). These out-of-place models resemble model aircraft in many of their features with one such artifact that is approximately five centimeters long, possibly originally a pendant or amulet. The deltoid-shaped wings have very straight edges and are located too far back on the body to accurately represent any known flying animal. From an aeronautical viewpoint, it appears that the object may have had an engine (Noorbergen, 1977) and is well-designed for flight. These models have spirals on both wings and the nose, and spirals, in Native American cultures, may represent ascent if right-oriented and descent if left-oriented (Janku, 1996). If this is so, then the artist may have placed the spirals on the wings and nose to show that these parts were most intimately involved with the flight of the craft. Regardless of the type of plane that the object may represent, the objects have definite mechanical features and resemble manmade flying objects. Major archaeological expeditions unearthed the Columbian artifacts, which do not appear to be forgeries. World-renowned museums authenticated these artifacts, some of which are currently housed at the Smithsonian Museum.

Nazca Lines

The Nazca lines are geoglyphs drawn into the soil of the Nazca Desert in southern Peru. These glyphs remained undiscovered until the 1930s when commercial airlines began flying over the region. The Nazca lines are difficult to see from the ground, but are easily discernible from the air. Many of these glyphs depict animals, while others are straight lines that run for kilometers (Nazca Lines, 2009). The purpose of these drawings remains an open question, as does the method of construction. Because it is difficult to see the glyphs from the ground, it has been suggested that the construction of the lines utilized

directions from someone who was in the air (Nickell, 1983). In the 1970s, Jim Woodman and colleagues from the International Explorers Society conducted a test flight with a hot air balloon built entirely of and heated with materials available to the Nazcan people. The balloon construction used cloth replicated from surrounding tombs and the basket from reeds found on Lake Titicaca (Nickell, 1983). While the flight was not smooth, it was successful and showed that the technology was available to the Nazcans, whether they utilized it or not. Many local stories and historical reports from this region of the Nazca Desert appear to discuss hot air balloons as well (*Time Magazine*, 1975). More research is necessary to either confirm or disprove the theory that aerial technology was critical to the construction of the Nazca lines.

Saqqara Bird

In 1891, excavators discovered a unique artifact among the contents of a tomb located in the Saqqara Necropolis, Egypt. The tomb dated to 200 BCE (Jochmans, 2008). At the time of discovery, the researchers classified the artifact as a bird, and along with other bird objects taken from this tomb stored it in the Egyptian Museum. The artifact remained in storage until 1969 when the late Dr. Kahlil Messiha came across it (Noorbergen, 1977). Messiha was a model plane enthusiast and immediately recognized the Saqqara Bird as being very similar to a model aircraft. Further detailed examination revealed that the Saqqara Bird had eighteen-centimeter wings of a reverse dihedral nature, smooth, pointed nose, and a vertical tail (Messiha et al., 1991, Jochmans, 2008). The smoothed body shows no evidence of carved or painted feathers or feet (Messiha et al., 1991). The vertical tail is flattened on top and possibly broken on the bottom, indicated that something else might have been part of the tail that has since disappeared (Jochmans, 2008). Due to Messiha's findings, the Cairo Museum asked a panel of Egyptian aeronautic engineers to examine the craft. They concluded that the Saqqara Bird showed advanced features indicative of low-speed flights with large loads of freight (Noorbergen, 1977). An external engine attached to the tail may have powered the Saqqara Bird, or it may have had an internal engine not depicted on the model. To us, the model most likely represented a glider (Figures 1 and 2).

The model glided very well in tests done by Messiha as reported by Jochmans (2008). The development of a glider would be reasonable given the other technological achievements of the Egyptian society and also indicate not only the desire to fly but also experimentation. In order to understand what the Saqqara Bird is portraying, reexamination of the artifact in light of today's technology is necessary.

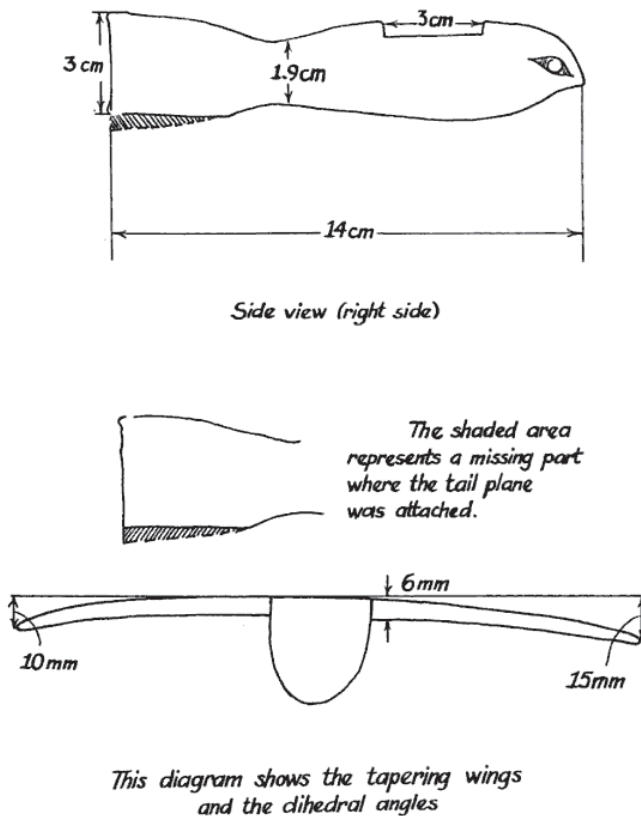


Figure 1. Drawings showing the side and front view of the Saqqara Bird (from Messiha et al., 1991).

Mission To Find Conclusive Evidence for Ancient Cultures' Developed Flight

Finding undisputable evidence for ancient aviation is unlikely even if it has existed, due to the poor preservation of likely construction materials. However, there are several ways to further analyze current documents and artifacts and several places to look for additional physical evidence. Archaeologists have excavated an extremely small portion of known ancient sites, and analysis by experts is even more limited due to time and funding constraints. Western scientists do not have access to many Asian documents, and many oral traditions are lost before recording is possible. In order to continue the search for evidence pointing to the development of ancient aviation, we need to take measures to remedy these obstacles.



Figure 2. Side view of the Saqqara Bird, clearly showing the vertical tail and bird-like head (photograph from Dawoud K).

First, existing artifacts need in-depth analysis by competent scientists. For example, the claim that the Saqqara Bird and Columbian artifacts portray actual airplanes is quite common. In order to determine the validity of this claim, a panel of aeronautic engineers and other aviation experts needs to examine carefully all the supposed aerodynamic features of the models. Building larger replicas or computer-generated models is a possible method of testing airworthiness. As scientists, we need to accept the possibility that our current theories of human development may be in need of revision and then, with open minds, consider the evidence. After testing existing artifacts, results may indicate that the models are not aerodynamically sound and simply represent highly stylized winged zoomorphic figures. If that is the case, then it will be unlikely that ancient legends record anything more than humanity's fascination with flight.

Second, the recording of oral traditions is critical. As these traditions are lost, so is a vital part of our heritage that tells us about human history. These stories are important sources of information for locations in which to search for artifacts relating to primitive aviation and other evidence. These traditions are being lost at an alarming speed as the rush to develop modern technology and to stay up to date with the modern culture reduces the number of people learning

the old tales. Recording and studying these traditions can pinpoint locations where advanced civilizations existed in the past. This information can then guide researchers toward useful areas of excavation.

Third, current documents need in-depth study by scientists and some, such as the Indian epics, by aviation experts. Completing the translation of many documents quickly before the ravages of time destroy the delicate palm leaf paper is important also. Thousands of ancient manuscripts were lost as conquering armies burned libraries, including the Alexandrian library in Egypt and the Mayan Codices in Central America. As we have very limited numbers of these ancient documents left, we should make every effort to preserve those that remain and the knowledge they contain.

Fourth, examining all zoomorphic figures and models currently housed in the museums of the world is necessary. Through a thorough examination of museum collections, searchers may find additional misclassified artifacts showing possible evidence toward the development of ancient flight. Many of these zoomorphic figures may represent stylized remembrances of a more advanced period.

As the above discussion indicates, very little conclusive evidence is available for the existence of ancient aviation. Each piece of information when taken alone is weak, but when examining the data as a whole, a picture more strongly in favor of the development of ancient aviation, at least to the glider stage, emerges. However, these separate threads of research may simply indicate that ancient cultures were advanced enough to understand the technical requirements of flight, without actually being able to fly. An example of this situation is found in our own time with the story of George Cayley, mentioned earlier, who developed rudimentary flying machines but was hindered in his research by the limited technology available to him at that time.

The prevalence of oral traditions and ancient documents is puzzling if the ancients did not achieve some type of flight. However, if one or several ancient cultures were able to achieve some sort of flight or came close enough to leave technically accurate mythology behind, then the worldwide distribution of these myths becomes understandable. The highly technical nature of these sources also indicates a basis in fact, as it is unlikely that a writer could invent accurate technological data without some background technology on which to base it. Documents from such diverse places as India and Australia agree on details such as the shape of the aircraft, which very likely indicates a common event or history behind the stories. Thus, these stories are unlikely to be ancient science fiction with no basis in reality.

Artifacts worldwide share many features with modern aerial craft. Just as is found in ancient oral and written traditions, it appears unconvincing that artists in so many places concocted all of these artifacts without some sort of technical

background. The streamlined shapes remain recognizable today and are similar to all others around the world. This similarity between artifacts from various parts of the world is unique to those appearing to describe some sort of air flight and does not translate to other types of ancient relics. For example, new world and old world metallurgy is extremely different in technology and appearance (Lechtman, 1977), thus not showing the same similarity as might be seen in ancient aviation-type objects.

This trend toward similarity reaching beyond cultural boundaries extends into the realm of anthropology as well. Technology, science, religion, and all other aspects of society diverge and change when in isolation from other groups of people. As a result, artifacts and stories tend to be dissimilar if the stories are entirely fiction. That they are similar, argues for some basis in reality. Based on current data, it is possible that one or more ancient cultures possessed enough technical ability either to achieve heavier-than-air flight or to author relatively detailed and accurate stories and did so routinely in the distant past. Open-minded researchers, who are willing to reevaluate current theories about cultural development if necessary, are needed before we will be able to decide the issue conclusively.

Discussion

An important consideration when evaluating evidence for and against ancient flight is the possibility of technology being lost. Any technology, especially advanced technology, requires specialized knowledge. Maintaining this pool of knowledge is vital for retaining the technology, and if the people with this knowledge do not pass it on to a younger generation then the knowledge will be lost completely. A familiar modern example, according to DeLong (2004), is found in the NASA space program. Due to budget cuts, the engineers responsible for building the equipment to successfully launch the lunar missions were encouraged to retire. Unfortunately, the knowledge and experience of these engineers was not passed on, making a return mission to the Moon much more difficult (DeLong, 2004). This is an example of how quickly knowledge can be lost if it is not shared. An ancient example can be found in Old Kingdom Egypt. The earliest pyramids, such as the Step Pyramid and Bent Pyramid, show increasing technological skills and knowledge, which culminates with the construction of the pyramids of Giza. However, later pyramids, such as those built by Pepi II near the end of the Old Kingdom, due to their shoddy construction indicate that the ability to build great monuments like the Great Pyramid was disappearing (Malek, 1986). Regarding the possible development of ancient flight, this is an important principle because in many societies, such as India, documents state that the knowledge of how to build and fly airplanes was accessible only to members of certain secret societies and that even within

those societies the knowledge was carefully guarded. When these societies died out or leadership was handed to younger members, the ability to build and fly airplanes may have easily been lost. The ease with which technical knowledge can be lost may explain why so many artifacts and documents seem to refer to the development of flight in ancient times, and that this knowledge had to be rediscovered in modern times.

There is fascinating, but highly controversial evidence for the development toward flight in the ancient past. Unfortunately, very little scholarly research is available for the documents and artifacts mentioned above. In order to determine whether ancient humans took to the air, and if they did how often and with what technology, will require very detailed analysis of the evidence from artifacts and ancient texts. Ultimately, if enough information is present in the texts, testing ancient designs in the field becomes important to determine whether they do work. Building working models based on ancient descriptions is the only way to truly understand how advanced the described technology really is. Overall, though, our research points to the fact that flight is a feat that several ancient civilizations attempted several times, and in some of the cases probably successfully, at least in the form of lightweight gliders. Regardless, the fascination and attempts with flight seems to be a recurring theme for the one species on Earth that is able to do so, and implies that at least some intelligent species that may have developed elsewhere in our universe may follow this same path.

Conclusions

There is no conclusive evidence that ancient societies ever developed heavier-than-air flight. However, many oral traditions, written documents, and even artifacts clearly indicate that the fascination with flight was a broad theme in many advanced societies of the ancient past. It also appears that at least in some cases steps were undertaken toward the actual technological development of flight, at least to the stage of a lightweight glider. Thus, for many cultures, the development of flight is a recurrent theme.

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LETTER TO THE EDITOR

The Uses and Misuses of Quantum Jargon

This letter has been simultaneously published in *EdgeScience* magazine (7, April–June 2011), also published by the Society for Scientific Exploration.

Many people involved in frontier areas of scientific study display a tendency to invoke the nomenclature of quantum mechanics to bolster their scholarly credibility with both the public and mainstream academia. While such strategies can be effective for clarification of subtle concepts, and may be useful ways of emphasizing the need for alternative perspectives of reality, carried to excess they can easily become counterproductive and should be deployed cautiously. First of all, there is an understandable, if not totally legitimate, recalcitrance of the “exact science” communities to surrender their proprietary quantum conceptualizations and classifications to what they regard as less precise and rigorous sectors, especially when such appropriations are blatantly shallow, if not totally incorrect. In our ongoing struggle for development of a broader conceptual framework capable of accommodating the subjective dimensions of reality, such naïve representations tend to be more offensive than persuasive. But beyond this, they also tend to obscure the important fact that quantum mechanics, like any theoretical structure, is itself an essentially metaphorical technique for formalizing and communicating objective representations of subjective observations and interpretations of experimental data. As Albert Einstein so aptly put it:

Concepts which have proved to be useful in ordering things easily acquire such an authority over us that we forget their human origin and accept them as invariable. (Einstein, 1949:175–176)

. . . The system of concepts is a creation of man together with the rules of syntax, which constitute the structure of the conceptual systems. . . All concepts, even those which are closest to experience, are, from the point of view of logic, freely chosen conventions . . . (Einstein, 1949:13)

Early in the course of our PEAR (Princeton Engineering Anomalies Research) program, we too were struck by certain common features appearing both in our empirical observations of consciousness-correlated anomalous physical phenomena and in various theoretical aspects of quantum science, that lent themselves to useful associations. Subsequently we attempted to verbal-

ize these analogies in a sequence of such metaphorical propositions as “consciousness atoms,” “consciousness molecules,” and “consciousness resonant bonds,” along with “consciousness uncertainty, complementarity, exclusion, and indistinguishability principles” that we had unabashedly appropriated from their Bohr/Schrödinger/Heisenberg physical counterparts. Wave/particle complementarities likewise were invoked to help conceptualize certain wave-like features of consciousness experience and behavior that had appeared in our empirical observations. Unfortunately, some readers misconstrued these metaphorical representations as literal descriptions of the activity of consciousness being derived from physical quantum processes, rather than as a set of “concepts which have proved to be useful in ordering things.”

Over prior and ensuing years, scholars of various other backgrounds and insights also have proposed quantum mechanical treatments of consciousness mechanics, using an assortment of mathematical formalisms and figurative illustrations that have reflected their personal theoretical backgrounds and skills. In fact, many of the patriarchs of early quantum theory themselves had, individually and collectively, pondered the relevance to mind/matter issues, but largely deferred any attempts at resolution thereof pending the acquisition of more comprehensive and reliable empirical data (Heisenberg, 1971, 1962).

More recently, however, the popularity of quantum analogies for modeling all manner of anomalous phenomena has been penetrating much further into the communities currently addressing the assessment, comprehension, and utilization of a much broader range of consciousness-related topics. Not only does this trend further alienate quantum physicists, but it adds the unfortunate effect of promulgating implicit assumptions that limit the effects under study to strictly physical interpretations, thereby precluding options for more profound ways of thinking. In our view, this proliferation of quantum logic and jargon is now becoming intellectually and pragmatically unproductive, and should be utilized more astutely lest it deteriorate into simplistic mantras and slogans that obfuscate attempts to develop more seaworthy models of the fundamental processes underlying the consciousness dynamics in play.

Fascinating as our consciousness-correlated anomalies may be in their own right, their higher intellectual value lies in the hints they provide regarding the broader experiences of consciousness, per se, and of the inadequacies and outright errors that persist in our prevailing attempts to construct incisive models thereof. Titillating coffee-table conversations invoking “quantum leaps” or “collapsing wave functions” do not greatly advance our comprehension of the full sweep of the capabilities of the human mind. To pursue that epistemological challenge, rather than resorting to some metaphorical re-fry of sexy quantum concepts and language, we need rather to develop a fresh lexicon of scientific conceptualization that can capture and advance the deeper essence of our most

precious and powerful capacities for information acquisition, processing, and utilization. Most notably, we need to extend the sweep of scientific methodology to embrace the subjective as well as the objective dimensions of human experience. This caution by no means needs to exclude the use of aptly selected metaphors, but it does enjoin us to recognize them as such and to realize that even they cannot convey the deeper ontological aspects of reality. Rather, like all other theoretical tools, they are used to attempt merely to share useful representations of how human consciousness perceives reality, and indeed in some sense participates in its very creation and organization. This is no playground for naïve or sloppy language or thought; it is very sacred scientific terrain.

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ESSAY REVIEW

Medicine To Make You Mad

Anatomy of an Epidemic: Magic Bullets, Psychiatric Drugs, and the Astonishing Rise of Mental Illness in America by Robert Whitaker. Crown Publishers, 2010. 404 pp. \$26 (hardcover). ISBN 9780307452412.

If you want to make someone cry, have them read Chapter 12 of this book: A doctor decided that a child's bed-wetting warranted treatment with a tricyclic antidepressant. That drug's "side" effects were then "treated" with further neurologically targeted (psychotropic) "medications," and 20 years later the formerly bed-wetting child is a permanently "mentally disabled" adult (p. 248 ff.).

Anecdotes, individual cases, prove nothing, of course, at least not scientifically. But this story comes in Chapter 12, which has been preceded by fully documented accounts of the widespread damage done to tens of thousands of adults and children during the last half century, as psychiatry came to assert that all behavioral, emotional, or mental "problems" stem from drug-reversible biological dysfunctions of the brain.

The mainstream research literature is cited by Whitaker on the following points:

— The terminology of "anti-psychotic," "anti-depressant," "mood stabilizer," and the like is fundamentally misleading, because the drugs do not have such specific, targeted effects.

— Instead, these drugs "muck things up" by interfering in a blunderbuss way with various neurotransmitters: They convert normal brain functioning into non-normal functioning. When given to emotionally or mentally disturbed people, they do effect a change of some sort—which can easily be misinterpreted as ameliorating the perceived problem. All too often, however, the drugs transform into chronic illness what might otherwise have been only singular or rare episodes.

— It has never been shown that "anti-psychotics" actually ameliorate, let alone cure, psychoses or schizophrenia. It has never been shown that "anti-depressants" ameliorate, let alone cure, depression. It has never been shown that "mood stabilizers" ameliorate, let alone cure, manic-depressive or bipolar behavior. Indeed, it has never been shown that those conditions even have a biological cause, a "chemical imbalance," let alone specifically among the neurotransmitters targeted by those drugs.

— The same points apply to “attention deficit disorder” (ADD) or “attention deficit hyperactivity disorder” (ADHD). It has never been shown to be a biological dysfunction, and the drugs administered to those diagnosed with the condition doom many children to a life of impaired cognition and dependence.

— Long-term outcomes for people treated with psychotropic drugs are distinctly worse than in the pre-drug era. In clinical trials of psychotropic drugs, long-term outcomes have been better for the placebo-receiving controls.

The Epidemic

The epidemic of the book’s title is the explosion of mental illness in the United States since the introduction and then widespread use of drugs for treatment of mental illness: The numbers of Americans now supported by Social Security Disability payments are far greater than the numbers who were in mental hospitals 50 years ago. It was coming upon these unexpected, surprising numbers that led Whitaker to the further research reported in this book. Among the features that make the discussion so convincing is that the author began his investigations as a believer in the official story about the benefits of drugs against mental illness, until he was astonished at the paradox that the numbers of disabled Americans had risen so dramatically during the era in which treatments had supposedly become increasingly effective. Then he searched the literature for data about outcomes of drug treatment. What he found was an almost complete lack of evidence for the benefits claimed by the drugs and much evidence for the damage caused by taking them for more than brief periods.

By 1987, the rate of “mental disability” in the United States was 2.5 times greater than in 1955. After the introduction of “second-generation” drugs beginning with Prozac in 1987, by 2007 the rate of mental disability had increased by another factor of 2.5. In 1955, 1 in about 620 Americans had been hospitalized for schizophrenia; half a century later, 1 in 125 Americans receives disability support on account of schizophrenia or psychosis (p. 120).

Furthermore, fifty years ago most of the hospitalized mentally ill had suffered from psychoses, which can be genuinely disabling; nowadays, more than half of those on disability are afflicted not by psychoses but by neuroses, affective disorders, emotional disturbances such as depression or bipolar illness, which were not permanently or seriously disabling before psychotropic drugs came into use.

The explosion of mental illness has been particularly dramatic among children. Fifty years ago, bipolarity or depression had been exceedingly rare among children—by 1987, only 5% of children on disability insurance were there because of mental illness. By 2007, the proportion was 50%. Between 1987 and 2007, the number of children said to be disabled by mental illness had

increased by a factor of 35, from about 16,000 to more than 560,000. Nowadays 1 of every 15 Americans enters adulthood with a “serious mental illness” (p. 246).

Attention-deficit disorder (ADHD) and Ritalin yield a story that parallels those of schizophrenia and depression and bipolar disorder (p. 218 ff.). Like bipolar, ADHD was defined for the first time in 1980 in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III). By 2007, more than 4% of all American children aged between 4 and 17 were being “treated” with Ritalin or some other stimulant—on average 1 in every teacher’s class; 3 times the rate in any other country (p. 220). Yet no biological basis for ADHD has ever been demonstrated. Most diagnoses are made by teachers. Ritalin’s physiological effect is the same as that of cocaine, but longer lasting; children are quieted down, to the superficial benefit of their teachers and parents and to the distinct underlying harm to the child. As with the other psychotropic drugs, longer-term clinical trials or follow-ups show that the drugs make things worse rather than better (p. 226 ff.).

A Military Surge in the Offing?

Whitaker covers in great detail the outcomes of drug-centered treatment of schizophrenia, depression, bipolar disorder, anxiety, and ADHD. I asked him by email about obsessive-compulsive disorder (OCD), and his response underscores how carefully he hews to the evidence: Though OCD is treated with anti-depressants (SSRIs, selective serotonin reuptake inhibitors), mood stabilizers, and antipsychotics, which have poor long-term outcomes with all the disorders discussed in the book, he ventured no opinion about the outcome of treatment of OCD because he has not researched that specific literature.

I asked Whitaker also about post-traumatic stress disorder (PTSD). It had occurred to me that the high prevalence of this condition reported among soldiers who have served in Iraq and Afghanistan might presage a surge in the epidemic of chronically mentally disabled Americans, if PTSD is “treated” with the same psychotropic drugs used for other conditions. He agreed.

The Psychiatric Guild

How this epidemic came about does not redound to the credit of the psychiatric profession (Chapter 13). Fifty years ago, clinical psychologists were competing with medical psychiatrists. By the 1970s, the psychologists outnumbered the psychiatrists. Psychiatry had declined into a minor specialty: Psychiatrists earned less than most other medical specialists, and only 4% of medical graduates were choosing that specialty, down from 11% in the 1950s when psychiatry had been the fastest-growing medical specialty. *Quite consciously and overtly*, leaders

of the psychiatric profession set out to vanquish the competition from clinical psychologists by insisting that mental illnesses are *medical* illnesses, which means having a biological basis and being treatable potentially by drugs that could only be prescribed by physicians, not by psychologists. The crowning achievement of this approach was the DSM-III published in 1980. Whereas the earlier DSM-II (1967) had reflected Freudian concepts of mental illness as neurosis, to be treated by psychotherapy, DSM-III identified 265 disorders asserted to be distinct and detectable via symptoms; for instance, if 5 symptoms are present of the 9 common to “major depressive episodes,” a diagnosis of depression can be made. Yet common sense, if nothing else, testifies that “[a]ll psychiatric diagnoses . . . ‘are subjective in adults and children’”; as was admitted even by Joseph Biederman, full professor at Harvard Medical School and himself a leading proponent of the drugs-for-mental-illness approach (pp. 318–319).

However, the official view is that enshrined by DSM-III and continued by DSM-IV (1994), which lists 297 disorders, thus an additional 32. How this diagnostic authority is (mis)used may be illustrated by the nurse practitioner who relied on it to declare a 4-year-old to be bipolar and prescribed a cocktail of lithium (“mood stabilizer”), Depakote (for “seizure disorders”), and Risperdal (anti-psychotic) (p. 33).

Diagnostic criteria have been enormously loosened as well as expanded: Diagnosis of manic–depression half a century ago was based on at least one episode of actual hospitalization for mania and also for depression; nowadays, a few days of “moodiness” suffice (pp. 181–182).

Conventional Wisdom Is Wrong

The popular myth is ill-founded, that the introduction of anti-psychotic drugs allowed mental hospitals to be closed and mental patients to be released into the community. It was federal actions that led to this change, namely, subsidies to states for nursing homes but not for mental hospitals (p. 93). The consequences have been a much larger number of chronically mentally disabled Americans whose individual outcomes are on average worse than in the pre-drug era, together with an escalating cost of medications that is affecting all health insurance programs including Medicare and Medicaid. Closing the mental hospitals has not decreased costs, it has increased the overall cost of the national burden of mental illness.

Evidence-Based Medicine

“Evidence-based medicine” has become something of a slogan and a shibboleth. The term is used as propaganda to proclaim the reliability of modern medicine,

just as the terms “scientific” and “the scientific method” are used as propaganda to claim that anything emanating from any putatively scientific source should be taken on trust as true. But in reality, “evidence-based medicine” is an ideal to be aimed at, a venture announced publicly in the 1990s to transform medical practice toward *becoming* evidence-based because *so much medical practice was not and is not now based on good evidence* (Centre for Evidence Based Medicine).

The lack of evidentiary basis for the drug-centered treatment of mental illness is illustrated by the fact that the very first trial of the first neuroleptic (anti-psychotic) drugs, Thorazine and other phenothiazines, lasted only six weeks, and the criteria of efficacy were weak and subjective (pp. 96–97). A retrospective follow-up decades later revealed that relapses were more common among the drug-treated patients than among those on placebo (pp. 98–99). Even contemporaneously, it was often acknowledged that the “side” effects of these first-generation drugs are so severe and debilitating that the cure could be experienced as worse than the disease (pp. 104–105).

How had these first-generation drugs to “treat” mental illness been discovered? Not through finding the causes of schizophrenia, depression, manic–depressive behavior, or “attention deficits” or “hyperactivity” and then seeking some way to counter those causes. Rather, studies in animals had revealed that certain substances stimulate activity whereas others dampen activity. On hunches like those that had led earlier to insulin-shock and electric-shock treatments and prefrontal lobotomy, these chemicals were tried out on human beings; and indeed they did change behavior. But there never was any indication that these chemicals, which produce abnormal behavior in animals, manage by marvelous serendipity to produce normal brain functioning in disturbed people (p. 65).

The best evidence seems to speak against the use of any of the currently prescribed anti-psychotic drugs. They have produced an epidemic instead of decreasing the number of mentally ill, and countries relying on traditional treatment rather than these drugs have far better long-term outcomes and fewer relapses (pp. 110–111). A long American trial reached the same conclusion (p. 115 ff.). Anti-depressants, routinely prescribed for “bipolar” patients, convert those patients into “rapid cyclers” with longer periods of depression (p. 175 ff.) and far worse long-term outcomes than in pre-drug days (p. 188 ff.).

Whitaker cites many studies that directly disproved the serotonin theory of depression (e.g., p. 72 ff.) and the dopamine theory of schizophrenia (e.g., p. 74 ff.). But one ought to have been highly skeptical of such ultra-reductionist theories in the first place. There are billions of neurons, and multiple connections among them. There are only a handful of neurotransmitters. If there really are the several hundred distinct DSM-defined mental illnesses, it

is inconceivable that increasing or decreasing the availability of one or other of those neurotransmitters could be anything like a specific treatment for any of those disorders. More telling still would be to recall that animal bodies are highly intricate systems of interlocking biochemical reactions and signals seeking homeostasis: When something is disturbed, other things change in order to counteract the disturbance. When the availability of a neurotransmitter is artificially decreased, the body seeks to compensate, and one way of doing that is to increase the number of receptors specific to that neurotransmitter (p. 76). Drugs acting on brain function have an immediate effect—though that is not the conversion of a pathogenic to a “normal” state, any more than an electric shock is. But if the drug continues to be consumed, the body adjusts and the drugs tend to lose their efficacy, and “mental patients” often find themselves perpetually prescribed changes in medications. However, when any given drug is suddenly withdrawn, the enlarged array of its neuroreceptors is suddenly and desperately deprived, and some sort of crisis ensues, so withdrawal from any of these medications must be done excruciatingly slowly (p. 105 ff.). At the same time, such withdrawal crises offer spurious support for the orthodox view: The crisis is misinterpreted as a recurrence of the initially diagnosed illness.

All the evidence, though, points against long-term use of brain-function-altering drugs. The clinical trials that provided support for introduction of these drugs began with that trial running for only six weeks and using a very weak criterion of efficacy, and a later meta-analysis of all pertinent trials by the Cochrane Collaboration—an independent organization that takes no money from drug companies—found that “reliable evidence for [even!] short-term efficacy is surprisingly weak” (pp. 96–97).

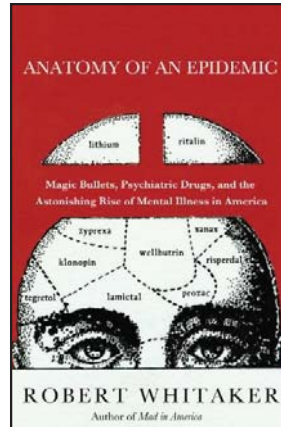
Official reviews had also declared that benzodiazepines should not be prescribed long-term, yet they continue to be widely prescribed against anxiety and in cocktails of drugs given to “bipolar” patients (p. 147). Eli Lilly’s best-selling Zyprexa has done untold damage to countless children as well as adults (p. 207 ff.). “[A]gitation, abnormally increased or decreased muscle tone, tremor, sleepiness, severe difficulty breathing, and difficulty in feeding” can occur in babies when pregnant women take psychotropic drugs including such widely used ones as Abilify, Risperdal, Seroquel, or Zyprexa (FDA, 2011).

Life expectancy is reduced by between 12 and 20 years for people on any psychotropic medication (p. 176). This assertion is so startling that I felt the need to check some of the primary sources cited by Whitaker, and I found them to be accurate (except for the occasional omission of “et al.” in the lists of authors): “risk for death in schizophrenia was doubled on a background of enduring engagement in psychiatric care with increasing provision of community-based services and introduction of second-generation antipsychotics” (Morgan et al., 2003); “With respect to mortality, a substantial gap exists between the health

of people with schizophrenia and the general community. This differential mortality gap has worsened in recent decades. In light of the potential for second-generation antipsychotic medications to further adversely influence mortality rates in the decades to come” (Saha et al., 2007). The risk of sudden death among schizophrenics increased by factors of 1.7–1.8 with benzodiazepines (e.g., Librium, Valium, Xanax), by 2.1 with clozapine, by 2.4 with antipsychotics, and by 4 with promazine (Windfuhr et al., 2010). Anti-psychotic drugs “disturb normal cardiac electrophysiology”; sertindole was implicated in sudden deaths and withdrawn; thioridazine, tricyclic anti-depressants, and lithium carry similar risk (Appleby et al., 2000). Risk of death among schizophrenics increases by a factor of 2.5 with each additional neuroleptic drug (Joukamaa et al., 2006).

The scandalous fact is that “The industry is not interested, the NIMH is not interested, and the FDA is not interested. . . . Nobody is interested” in ascertaining whether psychotropic drugs actually do more harm than good, according to an editorial in *Psychiatric News* as far back as 1994 (p. 161). Instead, the easy superficial way is taken that rocks no boats: Any ill effects shown by patients on medication are ascribed without further ado to the underlying disease, not to the drugs. Yet the evidence seems quite compelling that psychotropic drugs are severely harmful; for example, in the pre-drug era, schizophrenia tended to lead in the longer term to dementia while manic–depression did not; in the drug-treatment era, both conditions show progressive cognitive deterioration, ultimately into dementia (p. 192).

The central problem is that evidence does not speak for itself. Facts do not speak for themselves. Truth does not speak for itself. Science and medicine by the 21st century had become knowledge monopolies that suppress minority views very effectively, so that official pronouncements about matters of science and medicine may reflect anything but the best available evidence (Bauer, 2004, 2009a, 2009b, 2011). Neither medical students nor practicing psychiatrists read the critical literature (p. 263). It was 2009 before an editorial in the *Lancet* asked how practitioners had been beguiled into believing that second-generation psychotropic drugs were better than the first, or that either of them actually do what is claimed for them (p. 303). Whitaker answers that question with a timeline of a few pages recalling the main points documented in earlier parts of the book (pp. 303–312).



Conspiracy Theory?

No matter how often it is pointed out, for example at a meeting of the American Psychiatric Association, that “there are many examples of situations where the vast majority of physicians did something that turned out to be wrong” (p. 172), the inertia of the system is enormous, helped along by the liberal distribution of goodies by drug companies to prominent “knowledge leaders” among psychiatrists—just so long as they put their names on articles praising what the drugs do and playing down the “side” effects (pp. 278, 300). The drug companies also support and thereby co-opt groups such as the National Alliance for the Mentally Ill, which make it seem that consumer advocates independently favor the conventional wisdom about the benefits of drug treatment (pp. 279–280).

In 1985, outpatient sales of drugs to treat depressions and psychoses totaled \$503 million. By 2008, that figure was \$24.2 billion. I have long resisted joining those who describe associated conflicts of interest as out-and-out deliberate corruption, but my resolve was thoroughly shaken by Whitaker’s documented account of how clinical trials for Prozac were fudged, for instance by pre-selecting subjects and dishonestly reporting trial results (pp. 230–231, 284 ff.). The consequent harm done to many children (p. 231 ff.) ought to be regarded as criminal. Childhood mania was “recognized” only after Ritalin use had become common (p. 234).

Yet willful evil-doing need be no more damaging than cognitive dissonance, the inability to take in evidence contrary to one’s belief: to explain the occurrence of mania in children treated with Ritalin or with anti-depressants, it was suggested that the drugs served to make manifest an underlying, formerly hidden disorder, and that the drugs could therefore be used to detect such hidden disorders (pp. 234–235)—and this possible explanation served to evade any consideration of whether it is the drugs that cause the manic behavior, a probability indicated by Occam’s Razor if not by plain common sense.

The Soteria House project had been started in 1971 by Loren Mosher, director of the Center for Schizophrenia Studies at the National Institute of Mental Health (NIMH), to study non-drug treatment of schizophrenia. It delivered better outcomes than drug-based treatments. Nevertheless, funding for Soteria was cut off—by a committee comprising representatives of the orthodoxy (pp. 271–272). Instead, NIMH launched the Depression Awareness, Recognition, and Treatment (DART) program which served as a marketing vehicle for anti-depressants, Prozac in particular (p. 289 ff.).

That’s how knowledge monopolies work, as an interlocking network of public agencies and private companies and purportedly consumer-advocacy groups. George Bernard Shaw pointed out long ago that all professions are conspiracies against the public. Nowadays the medical profession, and science

or research as professions, are constituents of an academic–government–industrial complex that governs individual careers through control of research funding and publication—mainstream professional associations, national and international agencies, book and journal publishers, academic institutions, all take their advice from the same mainstream experts (Bauer, 2011).

Guilt By Association

Whitaker impresses with the range of his historical research, and he uncovered this interesting tidbit: In 1969 there had been established the Citizens Committee on Human Rights to campaign against electroshock treatment, lobotomy, and psychiatric drugs (p. 280 ff.). The founders were the maverick psychiatrist Thomas Szasz (“mental illness is not a medical condition”) and the Church of Scientology, a creation of science-fiction writer L. Ron Hubbard who had earlier invented a bowdlerized version of psychotherapy, Dianetics. There are excellent reasons for dismissing Dianetics and Scientology as quackery. By easily discrediting them, the orthodoxy could make it appear that all the critics of psychotropic drugs were of the same ilk.

How To Restore Sanity?

The pity of it is that more successful as well as patient-palatable treatments than drug-centered ones are available, and they are and have been known to anyone who cared to read the specialist literature. Successful treatments not relying primarily on drugs have been demonstrated over the years in Wales specifically and in the United Kingdom in general, in Lapland (Finland), and in the USA at Duke University, the Seneca Center in California, the earlier Soteria House project also in California, and in Alaska (Chapter 16). Moreover these programs turn out to be less expensive—win–win, one might think. But the grip of the interests-vested orthodoxy does not yield to evidence or logic.

Medicine To Make You Mad

Anatomy of an Epidemic tells of the “medicines” that create rather than cure “madness.” At the same time, this is a story that should make us mad, enraged, furious enough to want to change the circumstances that spawned and continue to nurture “medicine” that harms instead of helping.

Shocking as the circumstances of drug treatment of emotional and mental illnesses may be in themselves, it is even more disturbing as merely one aspect of the wide-ranging damage done by drug-centered medicine in the last half-century or so. Prescribing drugs had become an important part of standard medical practice by the middle of the 20th century, helped along by mutually beneficial relations of long standing between the American Medical Association

and pharmaceutical companies (p. 54 ff.). Illnesses were invented (Moynihan & Cassels, 2000). Correlation was and is perpetually confused with causation, symptoms becoming surrogate markers for illness and laboratory tests relied on to discern illness in perfectly healthy people (Greene, 2007). The flaws in medicine's current approach to mental illness are symptoms of a deeper and wider malaise that also spawned and continues to nurture the mistaken belief that HIV causes AIDS (Bauer, 2007), that natural accompaniments of aging are illnesses (Moynihan & Cassels, 2000), and that consuming substances to lower cholesterol, blood pressure, PSA numbers, etc., can prolong healthy life and prevent what comes naturally with age (Greene, 2007). Once those surrogate markers became accepted as indicating to-be-treated-disease, the numbers of people consuming drugs have expanded steadily as the "desirable" figures for blood pressure, cholesterol, blood sugar, were progressively shifted; similarly, by redefining bipolar from episodes requiring hospitalization to episodes of moodiness, the consumption of psychotropic drugs has exploded. Plain common sense ought to reject the perpetual scare warnings that some large and always increasing percentage of people suffer from hypertension, social anxiety disorder, high cholesterol, bipolar disorder, etc.—conditions that, by coincidence, can be rectified by talking to one's doctor about a certain medication, whose manufacturers will even assist those who cannot afford to pay for it.

A remarkable and discouraging feature of this mad story is that the specialist technical literature has been replete from the very beginning with evidence and argument revealing the flaws in what nevertheless became mainstream consensus, conventional wisdom, and "standard of care." A whole host of books, many of them by insiders, has exposed how the mainstream approach is dysfunctional and corrupted by conflicts of interest in medicine (for example, Angell, 2004, Kassirer, 2004, Kauffman, 2006, Abramson, 2004, Avorn, 2004, Goozner, 2004) and in academe (for example, Yoxen, 1983, Kenney, 1986, Porter & Malone, 1992, Rodwin, 1993, 2011, Soley, 1995, Slaughter & Leslie, 1997, Weisbrod, 1998, White & Hauck, 2000, Greenberg, 2001, 2007, Bok, 2003, Krinsky, 2003, Washburn, 2005, Giroux, 2007). Several volumes, some cited by Whitaker and others as well, have exposed the logical and evidential errors of regarding behavioral abnormalities as reflecting diseased physiology. Psychiatrist David Healy has written a number of books describing the history of psychopharmacology and advocating a balanced view of the utility of drugs for treatment of psychoses but not neuroses (for example, Healy, 1990, 2004, 2006), and quite a few other authors have expressed similar views (for example, Ross & Pam, 1994, Breggin, 1994, 1995, 2008, and other books by Breggin, Hobson & Leonard, 2001, Lane, 2007, Moncrieff, 2009).

The hold that the drug-centered mainstream dogma has on current practice may be illustrated by the fact that even when official bodies issue warnings about the ill effects of psychotropic drugs, they leaven and weaken the warning with reminders of how beneficial the drugs are supposed to be; for example, warning that all psychotropic drugs are dangerous for newborns if taken by their mothers, it is also said that the drugs “have been shown to improve daily functioning in individuals with these disorders [schizophrenia and bipolar disorder]” (FDA, 2011)—which is simply untrue; and “Patients should not stop taking these medications if they become pregnant without talking to their healthcare professional, as abruptly stopping antipsychotic medications can cause significant complications for treatment” (FDA, 2011) where “significant complications for treatment” is quite misleading—indeed, another lie—since sudden withdrawal is dangerous only because of what the drugs have perpetrated, not because it complicates treatment.

The attempts from various quarters to make mainstream representatives respond substantively to substantive questions about psychotropic drugs has met the same stonewalling and evading that is familiar to people who have asked, for example, for proof that HIV causes AIDS: “The answers to your questions are widely available in the scientific literature, and have been for years”—without giving any specific citations to the primary literature (pp. 330–331). Formerly lauded insiders such as David Healy are excommunicated when they point out that the evidence goes against accepted practices (p. 334), just as Peter Duesberg was excommunicated when he questioned HIV/AIDS theory.

The dysfunctional circumstances go even beyond medicine and medical science. Dogmatic orthodoxies suppress evidence and persecute dissenters over a host of fields: in archeology, climatology, cosmology, geology, paleontology, physics In open societies and in the absence of official censorship, the mainstream viewpoint on matters of medicine and science has become able to suppress competent dissenting views so effectively that the public and policy makers remain unaware that the appearance of consensus is misleading (Bauer, 2011). That is really dangerous at a time when society has come to regard official pronouncements on matters of science as trustworthy.

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ESSAY REVIEW

Apparitions of the Living: The Views of William H. Harrison and Gabriel Delanne

Spirits Before Our Eyes by William H. Harrison. London: W. H. Harrison, 1879. 220 pp. Available at <http://www.archive.org/details/spiritsbeforeou00harrgoog>. Reprinted by Nabu Press, 2010.

Les Apparitions Matérialisées des Vivants & des Morts. Vol. 1: Les Fantômes de Vivants [Materialized Apparitions of the Living and of the Dead. Vol. 1: Phantoms of the Living] by Gabriel Delanne. Paris: Librairie Spirite, 1909. 527 pp. Free at <http://gallica.bnf.fr/ark:/12148/bpt6k57746213>

The phantasm of a man . . . may, when the man's senses are laid asleep or overpowered, be presented to the senses of others in a corporeal form, in some indescribable way unknown to me . . .

— St. Augustine, *The City of God*, 1871(2):236–237

The phenomenon of apparitions has a long history coming from antiquity. Historical studies on the topic—among them those of Felton (1999), Maxwell-Stuart (2006), and McCorristine (2010)—have provided us with much information about the social and cultural history of these phenomena, particularly apparitions of the dead. In addition, there is a long history of accounts of apparitions of the living. Roman historian Cornelius Tacitus recorded the following experience Emperor Vespasian had when he visited the temple of Serapis:

He gave orders that all persons should be excluded from the temple. He had entered, and was absorbed in worship, when he saw behind him one of the chief men of Egypt, named Basilides, whom he knew at the time to be detained by sickness at a considerable distance, as much as several days' journey, from Alexandria. He enquired of the priests, whether Basilides had on this day entered the temple. He enquired of others whom he met, whether he had been seen in the city. At length, sending some horsemen, he ascertained that at that very instant the man had been eighty miles distant. He then concluded that it was a divine apparition . . . (Tacitus, 1873:189)

Many other accounts can be found in later years, among them the apparitions of bilocated mystics and saints (Thurston, 1952). There were also cases such as

the appearances of a man to his wife during an accident (Defoe, 1727:263–264) and of a dying woman to her children (Baxter, 1691:147–151). Accounts of this sort led a drama critic in 1826 to refer to fetches and doubles as “the apparitions of living persons, which, without their permission, or even knowledge, kindly fly off . . . , we suppose, to inform interested persons and others, that the party who thus appears by visionary proxy is about to visit the world of shadows” (Theatrical Examiner, 1826:487).

Discussions of the topic can be found in several 19th-century writings of psychic phenomena whose authors argued for the existence of nonphysical aspects of humankind. Among them I may mention J. H. Jung-Stilling’s *Theory of Pneumatology* (1808/1834), Catherine Crowe’s *The Night-Side of Nature* (1848), and Robert Dale Owen’s *Footfalls on the Boundary of Another World* (1860).

American minister and spiritualist Samuel B. Brittan devoted Chapter 32 of his *Man and His Relations* (1864) to apparitions of the living. He wrote:

There may be numerous exceptions . . . but many persons, whose magneto-spiritual effigies appear at a distance from all corporeal restraints, will be found to have been at the time in some other than a normal, waking state. In profound mental abstraction, or introversion of the faculties—when the soul looks within; when present objects disappear and temporal interests are forgotten; when the mind is centered on things remote—on absent friends, the events of the past and the realities of the future; “in visions of the night when deep sleep falleth on men”; in the palsy of catalepsy; in magnetic coma and other trances; in periods of protracted sickness, which jar and weaken the soul’s material connections; when disaster and death are impending and the shadows of the immortal world fall on the soul—in all these imperfectly defined physical and psychical conditions, it would seem that the spirit, in some potential sense, leaves the body while it wanders in distant places, or is possibly intromitted to other worlds. (Brittan, 1864:462–463)

Cases were also discussed in magazine articles, as seen in publications such as *Spiritual Magazine* (Cuppy, 1862), *Human Nature* (Nehrer, 1874), and *Borderland* (Stead, 1896). In the latter William T. Stead referred to apparitions of the living as the double and stated:

Ghosts of the dead are important, no doubt, but they are from the Other Side, and often seem to experience great difficulty in translating their thoughts into the language of earth, and not less difficulty in adjusting their fitful apparitions to the necessities of the psychical researcher. But with the Double it is different, for there is no chasm to be bridged in its case between the living and the dead (Stead, 1896:24)

Apparitions of the living always bring to mind Edmund Gurney, Frederic

W. H. Myers, and Frank Podmore's *Phantasms of the Living* (Gurney, Myers, & Podmore, 1886). This was one of the 19th-century classics of psychical research and the first major work of the Society for Psychical Research. The main theoretical idea presented in the book was that apparitions of the living were hallucinations triggered by a telepathic message, although Myers (1886) authored a section in the book with a different interpretation for some apparitions. Gurney, Myers, and Podmore were influential during the late 19th century in developing the already-old belief of a connection between death—or closeness to death due to accidents or illness—and apparitions. As Myers wrote in the introduction: “On reviewing the evidence thus obtained we were struck with the great predominance of alleged apparitions at or near the moment of death. And a new light seemed to be thrown on these phenomena by the unexpected frequency of accounts of apparitions of living persons, coincident with moments of danger or crisis” (Gurney, Myers, & Podmore, 1886, 1:lxix). But these “crisis” apparitions were not the only apparitions of the living discussed in the book. There were also apparitions of persons who were sleeping, of persons before the appearer died, of persons trying to appear to others, of persons perceived at a place where they were going to before they arrived, and of recurrent apparitions of persons who were not necessarily in any special state or condition.

Later collections of cases included those of Camille Flammarion (1921/1922) and Eleanor Sidgwick (1922). Flammarion (1921/1922) believed that there were some apparitions of the living “due to projections of thought acting upon the brains of percipients who are more or less in harmony with these projections” (p. 79). But he also believed some of these apparitions were objective: “The human being may have a duplicate form analogous to the ordinary one; this form may detach itself from the body, take on a certain consistency, become visible, even tangible, may speak, may produce mechanical effects” (p. 79). To this day many writers discussing apparitions of the living depend almost solely on *Phantasms of the Living* to discuss and evaluate the topic. This is understandable because these writers have been concerned with the evidentiality of the cases and *Phantasms of the Living* is still unrivalled for its attention to both first-hand accounts and corroborating testimony. But such dependence on this work and on its evidential aspects may have contributed to the neglect of other writings that form part of the history of the subject, such as the two books reviewed here.

Spirits Before Our Eyes (1879)

William Henry Harrison was an English journalist and a publisher of works on spiritualism. He was the editor of *The Spiritualist* (an influential publication later called *The Spiritualist Newspaper*) and the author of several works. This included his anthology *Psychic Facts* (1880) in which he collected accounts of

psychic phenomena, particularly mediumship, from various writers.

In the book reviewed here, *Spirits Before Our Eyes*, Harrison presented an examination of apparitions, mainly apparitions of the dying. His purpose, he wrote, was

to classify some of the authenticated apparitions of our own and past times, to examine the conditions under which the spirits of human beings are seen, to show that the spirit of man can sometimes temporarily leave the earthly body, and to seek to draw only those conclusions which well-proved facts warrant. Thus may laws and principles be deduced, to guide future explorers of the realm between the known and the unknown, in relation to spirit existence. (p. 14)

Harrison believed that, unlike mediumship, which critics tried to attribute to non-spiritual processes, apparitions could be explained “only by the presence of the spirit, the whole spirit, and nothing but the spirit” (p. 21). He started discussing what he referred to as deathbed apparitions. Not to be confused with what we refer to today as deathbed visions, or those visions experienced by a dying person, Harrison defined deathbed apparitions as the “occasional appearance of the spirit of a person in one place, at about the time that his body is dying in another place,” cases he believed were “so common as to indicate some connection beyond that of accidental coincidence between the two occurrences” (p. 24).

Such deathbed apparitions, the author believed, were caused by the spirit leaving the body. In his view the dying body provided the spirit “enough materiality to make itself visible” (p. 62). Such speculation was similar to those presented by others at the time to account for materialization phenomena observed with mediums, something that was part of a rich history of ideas of vital forces to explain psychic phenomena (Alvarado, 2006). One of these individuals speculated that spirits “through the exercise of their united will-power attract and gather certain magnetic and material elements from the medium, the persons present, and the atmosphere” (Crowell, 1879:181–182). Related to this idea, Harrison stated that some apparitions produced physical effects, being “objectively and palpably temporarily materialised” (p. 55). He further wrote about materialization to illustrate the point:

Spiritualists who have seen much of materialisation seances know that spirits have a remarkable power of duplicating, not only the forms of their mediums, but their clothes. . . . Still there is no creation of new matter. The law of the conservation of energy is not broken. Recent experiments . . . have shown by means of self-recording weighing apparatus that, while the duplicate form of the medium and his clothes is being materialised in one place, the weight of his normal body and clothes is diminishing in another, and vice versa. There is

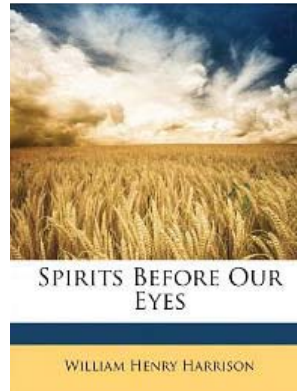
a play of forces between the two, underlying the vulgarly known phenomena of molecular physics. . . . (pp. 60–61)

But Harrison also entertained some cases being explained differently. He believed some apparitions were perceived through normal vision and others were seen psychically, in response to the thoughts of spirits. As he wrote, “when apparitions are psychically recognised, what the spirit thinks the medium sees, and . . . the unearthly visitor becomes visible in consequence of his mesmeric influence over the spectator” (p. 83). The thoughts of distant living persons were also believed by Harrison to be a cause for some apparitions of the living, an idea that had been discussed by others before. One such example was Herbert Mayo’s (1851) assumption that there could be mental connections between people at a distance, particularly at the moment of someone’s death. As he wrote about this idea:

Suppose our new principle brought into play; the soul of the dying person is to be supposed to have come into direct communication with the mind of his friend, with the effect of suggesting his present condition. If the seer be dreaming, the suggestion shapes a corresponding dream; if he be awake, it originates a sensorial illusion. To speak figuratively . . . I will suppose that the death of a human being throws a sort of gleam through the spiritual world, which may now and then touch with light some fittingly disposed object; or even two simultaneously, if chance have placed them in the right relation;—as the twin-spires of a cathedral may be momentarily illuminated by some far-off flash, which does not break the gloom upon the roofs below. (Mayo, 1851:71)

Harrison also argued that some cases of veridical dreams in which the dreamer visited a distant location were not necessarily the projection of the spirit. They “might be instances of natural clairvoyance, or of a dreamer seeing that which a spirit or mortal in rapport with him thought” (p. 146).

Like other writers before him (e.g., Crowe, 1848), Harrison cited a variety of cases to illustrate the existence of the spirit and its powers manifesting during life. He discussed apparition cases in which the appearer was not dying, cases in which the content of dreams was affected, and cases of mediumistic communications from living persons. As stated in the first chapter of the book, Harrison’s intent was an attempt to validate the movement of spiritualism by showing how the human spirit could act at a distance producing mental and physical effects, an idea that was in direct contradiction to the materialistic assumptions of the times.



Furthermore, Harrison made the observation that both apparitions of the living and of the dead were similar. He wrote that “there is no break of continuity in the phenomena of apparitions in consequence of the death of the body. So impossible is it to find any indication in the phenomena, of a natural dividing line coinciding with the death moment, that in this volume several cases of after-death apparitions are included, differing in no way from the apparitions of living persons whose mortal bodies are in a sleeping or quiescent state” (p. vii). Others, such as Owen (1860:360–361), assumed the identity of apparitions of the living and what was later called out-of-body experiences with apparitions of the dead. But it took till the study of Hornell Hart (Hart & Collaborators, 1956) for the issue to be studied via actual comparisons of the features of apparitions of the living and the dead.

Les Apparitions Matérialisées des Vivants & des Morts:
Vol. 1: Les Fantômes des Vivants (1909)

French spiritist leader Gabriel Delanne was known during his time for writings such as *Le Phénomène Spirite* (1897b) and *L’Ame Est Immortelle* (1899). The book reviewed here, *Les Apparitions Matérialisées des Vivants & des Morts: Vol. 1: Les Fantômes des Vivants* is one of the most comprehensive treatises on the topic. The book consisted of two volumes. The first one, and the one reviewed here, was mainly about apparitions of the living. The second was about apparitions of the dead (Delanne, 1911).

The author stated in the first volume of his book that he was trying to empirically show “that the human soul exists during life and after death” (p. 1, this, and other translations, are mine). To accomplish this he presented a detailed review of apparitions of the living based on cases published in *Phantasms of the Living* and in other sources. In addition to presenting many veridical cases, Delanne discussed recurrent apparitions, voluntarily produced apparitions, out-of-body experiences, apparitions producing physical effects, and materialization phenomena. The latter was connected to the idea of a human double, a topic related by some writers to physical mediumship in the past. Some of this involved discussions about the possibility that some materializations did not represent the presence of spirits of the dead but the manifestation of the medium’s double (e.g., Coleman, 1865).

Delanne accepted that some apparitions of the living could be telepathic, but he felt that telepathy could not explain collectively perceived apparitions. In his view some cases showed an “absence of a telepathic action caused by a vivid emotion of the agent” (p. 180), cases that were best explained by “doubling” or the separation of the spirit from the body. He felt that cases of recurrent apparitions of the same living person suggested to him a “physiological

idiosyncrasy” in the agent as opposed to a psychological factor. While superficially similar to Frederic W. H. Myers’ (1903, Vol. 1:264) idea of “psychorrhagic diathesis,” as we will see below Delanne’s idea was more physically oriented than Myers’. Interestingly, Harrison had speculated in his book: “Some individuals are so physiologically constituted, that their spirits are not unfrequently seen in the place to which their thoughts are directed” (p. 161).

Delanne argued that the soul “possesses an ethereal body by which it affirms its presence through the phenomenon of apparitions” (p. 16). Such mention of an “ethereal body” was a reference to the concept of the perispirit discussed by Kardec (1857) and by others such as Delanne (1897a) himself (see also Alvarado, 2008), a concept that has similar versions coming from antiquity (Mead, 1919, Poortman, 1954/1978). This concept of a “fluidic” body was used by Delanne in the book, and by spiritists in general, to account for some apparitions, and physical phenomena such as mediumistic materializations, and photographs of “doubles” and spirits of the dead.

According to Kardec (1857), who based his ideas on statements dictated by supposed spirits through mediums: “The perispirit is of a semi-material nature, that is to say intermediary between the spirit and matter. It takes forms determined by the will of the spirits and under some conditions it can affect our senses” (Kardec, 1857:44). Furthermore, Kardec believed the “substance” of the perispirit came from the “universal fluid” (p. 44). This envelope of the spirit, Kardec (1862) wrote in a different work, was a “fluidic body, vaporous . . . invisible to us during our normal state” (p. 5), and had only a few of the characteristics of physical matter. According to Kardec (or rather to the “spirits”), the perispirit provided the physical conditions necessary for the immaterial spirit to cause physical phenomena such as the movements of tables and apparitions. As he wrote about the latter:

By nature and in its normal state the perispirit is invisible . . . but it may . . . undergo modifications that render it perceptible to sight, by a kind of condensation, by a change in molecular arrangement. . . . The perispirit acquires the properties of a solid and tangible body; but it can instantaneously recapture its ethereal and invisible state. (Kardec, 1862:132)



FIG. 18. — Un faux dédoublement.
EXAMPLE OF A FALSE DOUBLE,
A DOUBLE EXPOSURE.

Delanne was sympathetic to Frederic W. H. Myers' (1903) concept of a phantasmogenetic center. But he did not follow Myers completely. Delanne believed that there was a projection of a "fluidic image without interior organization, without intelligence . . ." (p. 495), something that Myers did not postulate. He was also critical of Myers' idea that apparitions could consist of "some elements of the personality . . . perceived at a distance from the organism" (Myers, 1903, Vol. 1:263). Delanne considered Myers' emphasis on "elements of the personality" an unnecessary assumption and saw the soul as an unitary concept that could not be fragmented in any way.

The author also postulated that there were cases that were intermediate between the production of a double with physical properties and the projection of consciousness from the physical body. He believed that these cases "show the continuity of this genre of phenomena and the great difficulty that exists in clearly separating one from the other" (p. 496).

Delanne presented a table at the end of his book summarizing the causes of false (hallucinatory) and real apparitions. The latter consisted of the odic phantom (a physical and involuntary emanation that could be seen and photographed and was not conscious), the clairvoyant apparition (a clairvoyant vision seen by some but not by others), semi-materialized apparitions (cases presenting veridical details in the appearance of the apparition, cases in which the agent and percipient could see each other, and those perceived collectively), and materialized apparitions (as seen in physical and photographic effects). Like Harrison and others before him, Delanne argued that apparitions of the living showed the existence of a nonphysical element in human beings, the "existence of the soul during life" (p. 519). Thought, he asserted, was not a function of the brain. He wrote:

We have first established . . . that thought is exteriorized, that it acts at a distance on other human beings, and we have concluded from the analyses of the phenomena that it is not comparable to the known physical phenomena, that it is not material, which confers a special characteristic to the extra-corporeal action of thought, without parallels with the physical, chemical or physiological properties of the brain (p. 514).

Similarly, the evidence for veridical aspects in the apparition cases indicated to Delanne that the brain was not involved in the process. He believed that these phenomena showed that the soul was independent of the physical body.

Final Thoughts

The books by Harrison and Delanne are part of a literature forgotten by many today that represents attempts to understand apparitions of the living in previous eras. As I have argued elsewhere (Alvarado, 2009), these works are

part of the conceptual history of out-of-body experiences and of the idea that apparitions of the living represent the action of a nonphysical aspect of human beings. But as representatives of particular periods, these books also remind us of differences between the past and the present. An example is the rarity of current ideas about the materiality of apparitions as discussed by Harrison and Delanne, at least outside the small contemporary literature in which concepts such as the perispirit are defended.

In addition, such works may inform contemporary writers and researchers interested in apparitions of a variety of interesting cases and ideas relevant to current concerns such as speculations about the independence of the mind and the body. The books are also a reminder that a phenomenon such as apparitions of the living may be conceptualized as different types of experiences explained in various ways. Finally, the books by Harrison and Delanne serve as a reminder of the existence and complexity of apparitions of the living, a phenomenon neglected in recent times.

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BOOK REVIEWS

Phantasms of the Living (2 volumes) by Edmund Gurney, Frederic W. H. Myers, and Frank Podmore. London: Trübner and Company, 1886. Both volumes free at <http://www.esalenctr.org/display/books/phantasms/>

Reports of experiencing ostensible psychic (psi) phenomena go back far in human history, with some of the earliest experiences apparently dating from the ancient Greek and Roman periods (Dodds, 1971). Serious attempts to systematically study psi experiences formally began in 1882 when the Society for Psychical Research (SPR) was founded by a distinguished group of scholars associated with Cambridge University in England. Among this group were Edmund Gurney, a man with broad-ranging interests who served as the SPR's first honorary secretary (Beloff, 1977:12), and Frederic Myers, a classical scholar who also became a pioneer in the study of dissociation and subliminal consciousness (Kelly, 2001, Kelly & Alvarado, 2005). In addition to conducting field investigations and simple experiments, the early members of the SPR began amassing, examining, and appraising personal accounts of spontaneous psi experiences. A painstaking effort at the latter activity by Gurney and Myers, along with SPR researcher Frank Podmore, resulted in *Phantasms of the Living*, which may be considered one of the essential classics in parapsychology and psychical research.

This hefty two-volume collection contains just over 700 individually documented cases of spontaneous psi within its 1,306 pages. Each case is taken from personal accounts sent to various members of the SPR by correspondents from the general public, and many seem to depict an instance of extrasensory perception (ESP) involving two or more individuals, one of whom was often the correspondent. To help ensure that the cases were based on actual experiences that had been accurately and honestly reported, strict criteria were set by Gurney et al. for including a case in *Phantasms*. For example, a case had to have been a first-hand eyewitness account by the correspondent, and the ESP experience it described had to have been told to a third party before the details of the distant individual's situation were learned. As evidence of the latter, each numbered case in *Phantasms* is accompanied by corroborative statements from one or more individuals who either had been present with the experient when the experience occurred, or were told about the experience by the experient very soon afterward. It was also necessary to ascertain that none of the important details in the correspondent's account had been altered or embellished by

comparing it against the account of the third party and/or documented records. It is clear from the accounts that Gurney et al. went to great lengths to verify the details contained within each case. As eminent psychologist William James (1887) commented in his review of *Phantasms* in the pages of *Science*:

Nothing, in fact, is more striking than the zeal with which [Gurney et al.] cross-examine the witnesses; nothing is more admirable than the labor they spend in testing the accuracy of the stories, so far as can be done by ransacking old newspapers for obituaries and the like. If a story contains a fire burning in a grate—*presto* the Greenwich records are searched to see whether the thermometer warranted a fire on that day; if it contains a medical practitioner, the medical register is consulted to make sure *he* is correct; etc. (James, 1887:19, italics in original)

It also had to be determined that the ESP experience between the individuals involved in the cases could not have arisen merely by chance coincidence. In Chapter 13 of Volume 2, Gurney et al. describe their efforts to estimate the odds ratios of chance occurrence for the various kinds of experiences published in *Phantasms*, based on estimates of the frequency of experiences among a random sample of people, the size of the adult population of England at the time, the death rate among adults in the country within a 12-year period, and similar demographic data. Most of their odds come up in the range of trillions to one against chance.

The experiences described in the cases range from simple sensory-like impressions to detailed veridical hallucinations. The latter experiences differ from other types of hallucinations, in that the content of the hallucination seems to actually correspond to verifiable events taking place at a distance, rather than merely being an abnormal product of the experient's imagination (a common psychiatric interpretation of the term *phantasm*). An example of a veridical hallucination case is Case #20, in which a woman, Mrs. Bettany, recounts an experience from her childhood:

On one occasion (I am unable to fix the date, but I must have been about 10 years old) I was walking in a country lane at A., the place where my parents then resided. I was reading geometry as I walked along, a subject little likely to produce fancies or morbid phenomena of any kind, when, in a moment, I saw a bedroom known as the White Room in my home, and upon the floor lay my mother, to all appearance dead. The vision must have remained some minutes, during which time my real surroundings appeared to pale and die out; but as the vision faded, actual surroundings came back, at first dimly, then clearly. I could not doubt that what I had seen was real, so, instead of going home, I went at once to the house of our medical man and found him at home. He at once set out with me for my home, on the way putting questions I could not

answer, as my mother was to all appearance well when I left home.

I led the doctor straight to the White Room, where we found my mother actually lying as in my vision. This was true even to minute details. She had been seized suddenly by an attack of the heart, and would soon have breathed her last but for the doctor's timely advent . . . (Vol. 1, p. 194)

This account was later verified by both of Mrs. Bettany's parents, and in his corroborating statement (p. 195), her father added that neither he nor the family servants had any indication of his wife being ill prior to the crisis, a situation that argues against prior knowledge of the mother's situation through logical inference.

The cases in *Phantasms* are collectively interpreted by the authors in two ways. Since many describe an instance in which one person (the percipient) seems to respond to the situation being experienced by another person (the supposed agent) at a distance, they tend to be regarded by Gurney as cases of *telepathy* (or "thought-transference," in the terminology often used by the authors). In such an interpretation, it is assumed that the agent had somehow mentally "transferred" information or impressions pertaining to his or her situation to the percipient. However, in a note added to Volume 2 (pp. 277–316), Myers recognized the alternate possibility that the percipient could have become aware of the agent's situation through *clairvoyance* (which he initially called *telaesthesia*, or "distant sensing"; Myers, 1903). In this alternate interpretation, the percipient perceives or otherwise becomes aware of the agent's situation without the agent having necessarily transferred something, as in telepathy.

Although telepathy is offered by Gurney as the prime interpretation for the cases (apart from Myers' note) based on the results of early experiments in telepathy (reviewed in Chapter 2 of Vol. 1), the possibility that clairvoyance could be involved is raised by a point made by C. Lloyd Morgan (1887) in his review of *Phantasms* that, ". . . there are great difficulties in applying the thought-transference hypothesis to a great number of cases" (p. 281). Morgan cites the above case involving Mrs. Bettany and her mother as an example, which can be subject to either interpretation when examined closely. Although the mother is still conscious and could have served as a telepathic agent, there is no clear indication that she attempted to intentionally convey a thought, impression, or idea to another person at the time of experience (in contrast to the experimental and spontaneous cases in Chapter 2 and Chapter 3 of Vol. 1, which involved such attempts). While this does not explicitly rule out the possibility of telepathy (since it may be the case that telepathy can operate unconsciously as well as consciously), it does seem to argue against it. Furthermore, it is notable that Mrs. Bettany's description of her vision seems akin to the scenic image of a bystander, which appears more suggestive of clairvoyance than

telepathy. Another case which seems suggestive of a scenic image, and thus of clairvoyance, is Case #66, the account of which is partly reproduced below. According to Gurney et al., the account was given to the SPR by a Fellow of the College of Physicians in 1884:

Twenty years ago [abroad] I had a patient, wife of a parson. She had a peculiar kind of delirium which did not belong to her disease, and perplexed me. The house in which she lived was closed at midnight, that is, the outer door had no bell. One night I saw her at 9. When I came home I said to my wife, 'I don't understand that case; I wish I could get into the house late.' We went to bed rather early. At about 1 o'clock I got up. She said, 'What are you about; are you not well?' I said, 'Perfectly so.' 'Then why get up?' 'Because I can get into that house.' 'How, if it is shut up?' 'I see the proprietor standing under the lamp-post this side of the bridge, with another man.' 'You have been dreaming.' 'No, I have been wide awake; but dreaming or waking, I mean to try.' I started with the firm conviction that I should find the individual in question. Sure enough there he was under the lamp-post, talking to a friend. I asked if he was going home. (I knew him very well.) He said he was, so I told him I was going to see a patient, and would accompany him. . . . (Vol. 1, p. 267)

Upon arriving at the house, the physician was able to enter and found his patient being served strong liquor by her maid, which had apparently contributed to her delirium. At the end of the account, Gurney added that:

In conversation with the present writer [Gurney], the narrator explained that the vision—though giving an impression of externality and seen, as he believes, with open eyes—was not definitely located in space. He had never encountered the proprietor on the spot where he saw him, and it was not a likely thing that he should be standing talking in the streets at so late an hour. (p. 267)

Apart from the scenic nature of the experience, accounting for this case in terms of telepathy is again complicated by the fact that there does not seem to be any clear indication of an attempt to intentionally convey a thought, impression, or idea from agent to percipient. In order to fit the case into the telepathy hypothesis, Gurney suggests that the physician's intention of getting into the house may have had an effect on the proprietor's mind, a suggestion that seems to stretch the hypothesis in such a way that the physician can be viewed as both agent and percipient. Whether this suggestion can be considered a more plausible alternative to the clairvoyance hypothesis, is an example of the possible dilemma faced by readers when attempting to interpret the cases for themselves.

It is cases such as these that seem to illustrate the inherent ambiguity

in attempting to distinguish telepathy from clairvoyance. Although not always recognized, this issue of telepathy vs. clairvoyance is one that persists into the present time, mainly due to the difficulty in designing an unambiguous experimental test for telepathy (Rhine, 1974). The issue is again raised by Gurney et al. in their attempts to interpret cases involving apparitions that were collectively perceived by more than one person (discussed below).

Regardless of their interpretation, the cases in *Phantasms* seem to collectively show patterns that have been found in other collections of spontaneous cases. For example, Gurney et al. note that the agents and percipients are biologically related in nearly half (47%) of the cases, although they add that, “. . . since in many cases the relatives of the percipient will have naturally belonged also to the circle of his intimate friends, it seems reasonable to conclude that consanguinity, as such, has little if any predisposing influence in the transmission of telepathic impressions” (Vol. 2, p. 723). Table 1 compares Gurney et al.’s findings on the relation between the percipient and the supposed agent in the *Phantasms* cases to those obtained in analyses of four separate case collections. The details of these four collections are as follows:



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1) Stevenson (1970, Chapter 2) analyzed 160 cases published in the *Journal and Proceedings* of the American and British SPR from the 1880s up to 1967. (It should be noted that 34 of these cases were included in *Phantasms*, making this the only collection shown in Table 1 that is not entirely independent of Gurney et al.) For convenience, these 160 cases were combined here with the analysis of 35 cases of ostensible telepathy received by Stevenson from correspondents (one case that lacked an identifiable agent was excluded; Chapter 6).

2) L. E. Rhine (1981, Chapter 17) analyzed 2,878 cases of veridical dreams, which had been compiled from a larger collection of more than 10,000 cases sent by correspondents to the Duke University Parapsychology Laboratory between the late 1940s and the mid-1960s.

3) Schouten (1981) analyzed 789 ESP cases sampled from a collection of about 1,000 cases gathered in a 1950 German newspaper survey conducted by G. Sannwald.

4) Persinger (1974, Chapter 3) analyzed 164 telepathy–clairvoyance cases published in *Fate* magazine between 1965 and 1969, which were personal accounts sent in to the magazine by its readers.

In Table 1, “Immediate Family” refers to parent–child, spousal, and sibling relations, while “Extended Family” refers to all other family relations outside the immediate (e.g., grandparents, aunts/uncles, cousins, in-laws, etc.).

Table 1 seems to show a fairly consistent trend across case collections concerning the relation between the agent and percipient, in line with the relation observed by Gurney et al. But contrary to their initial conclusion, median and mean percentages taken across collections seem to indicate that consanguinity, as inferred by immediate family relation, may be a relevant factor in ESP experiences. In addition, these values are consistent with those obtained in a separate analysis by Schouten (1979:420) of 562 cases extracted from the *Phantasms* collection.

In examining the themes of the *Phantasms* cases (i.e. the circumstances which may have precipitated the ESP experience between the agent and percipient), Gurney et al. observed that:

It is the very large proportion of cases in which the distant event is *death*. It is in this profoundest shock which human life encounters that these phenomena seem to be oftenest engendered; and, where not in death itself, at least in one of those special moments, whether of strong mental excitement or of bodily collapse, which of all living experiences comes nearest to the great crisis of dissolution. Thus among the 668 cases of spontaneous telepathy in this book [not including the 34 cases added as a supplement to Vol. 2], 399 . . . are death cases, in the sense that the percipient’s experience either coincided with or very shortly followed the agent’s death; while in 25 more cases the agent’s condition, at the time of the percipient’s experience, was one of serious illness which in a few hours or a few days terminated in death. (Vol. 2, p. 26, italics in original)

This suggests that just over half (59.7%) of the cases in *Phantasms*, as analyzed by Gurney et al., contain a death-related theme. Table 2 compares the themes of the *Phantasms* cases (represented by Schouten’s 1979 analysis, which involved a more in-depth examination of themes) with those of the cases contained in the four other collections.

Median and mean percentages taken across all five collections seem to indicate that, in a manner fairly consistent with Gurney et al.’s initial observation, nearly half of the cases involve a death-related theme. Also of interest is that in nearly three-fourths ($45.8 + 28.4 = 74.2\%$) of all the cases, the supposed agent is facing a death or crisis situation (e.g., serious illness, accident). In contrast, only 19% were about trivial (i.e. non-crisis) situations.

Some research suggests that ESP, both in spontaneous and experimental situations, may be negatively correlated with geomagnetic activity (e.g., Persinger, 1989, Spottiswoode, 1990). A study by Persinger (1987) found this

TABLE 1
Relation Between Agent and Percipient in Spontaneous ESP (% Cases)

Analysis	N Cases	Immediate Family	Extended Family	Friends	Strangers
Gurney et al. (1886)	702	44.2	9.0	31.7	4.3
Stevenson (1970)	194	63.9	7.2	26.3	2.6
Rhine (1981)	2878	39.0	14.2*	14.2*	13.4
Schouten (1981)	789	55.9	11.0	28.0	5.1
Persinger (1974)	164	53.0	16.0	14.0	9.0
Median Percentage	-	53.0	11.0	26.3	5.1
Mean Percentage	-	51.2	11.5	22.8	6.9

* In her analysis, Rhine placed extended family and friends in the same category, which she labeled "Remote Relationships" (pp. 218–219, 222).

same correlation between 109 cases in the *Phantasms* collection and early geomagnetic indices recorded between 1868 and 1886. This negative correlation compares favorably with the one obtained using another SPR collection of spontaneous cases from roughly the same period (Arango & Persinger, 1988).

In addition to veridical hallucination cases, *Phantasms* contains cases in which the percipient perceives an apparition of the supposed agent. As in veridical hallucinations, the agent is often facing a death or crisis situation at the time that his/her apparition is perceived by the percipient, and thus the experience is referred to as a *crisis apparition* case. In order to be considered a crisis apparition case and thus be included in *Phantasms*, Gurney et al. specified that the apparitional experience had to occur within the 24-hour time period surrounding the agent's situation (i.e. 12 hours before to 12 hours after). An example of a crisis apparition case is Case #28, in which N. J. S., a man "... [o]ccupying a position of considerable responsibility," gives an account of his experience of the apparition of F. L., a close friend and co-worker who had fallen ill several days before. An excerpt of the account is reproduced below, which was written by N. J. S. from a third-person perspective:

On Saturday evening, March 24th, N. J. S., who had a headache, was sitting at home. He said to his wife that he was what he had not been for months, rather too warm; after making the remark he leaned back on the couch, and the next minute saw his friend, F. L., standing before him, dressed in his usual manner. N. J. S. noticed the details of his dress, that is, his hat with a black band, his overcoat unbuttoned, and a stick in his hand; he looked with a fixed regard at N. J. S., and then passed away. N. J. S. quoted to himself from Job,

TABLE 2
Themes of Spontaneous ESP Experiences (% Cases)

ANALYSIS	N CASES	THEME		
		Death	Crisis	Trivial
Schouten (1979)*	562	66.7	21.2	12.1
Stevenson (1970)	195	36.9	44.6	18.5
Rhine (1981)	2878	22.7	28.2	14.6
Schouten (1981)*	789	48.7	22.9	28.4
Persinger (1974)	164	54.0	25.0	21.0
Median Percentage	-	48.7	25.0	18.5
Mean Percentage	-	45.8	28.4	18.9

*The values for Schouten (1979, 1981) were calculated based on values given in Table 16 (1979, p. 432) and Table 10 (1981, p. 29), respectively.

‘And lo, a spirit passed before me, and the hair of my flesh stood up.’ At that moment an icy chill passed through him, and his hair bristled. He then turned to his wife and asked her the time; she said, ‘12 minutes to 9.’ He then said, ‘The reason I ask you is that F. L. is dead. I have just seen him.’ She tried to persuade him it was fancy, but he most positively assured her that no argument was of avail to alter his opinion.

The next day, Sunday, about 3 p.m., A. L., the brother of F. L., came to the house of N. J. S., who let him in. A. L. said, ‘I suppose you know what I have come to tell you?’ N. J. S. replied, ‘Yes, your brother is dead.’ A. L. said, ‘I thought you would know it.’ N. J. S. replied, ‘Why?’ A. L. said, ‘Because you were in such sympathy with one another.’ N. J. S. afterwards ascertained that A. L. called on Saturday to see his brother, and on leaving him noticed the clock on the stairs was 25 minutes to 9 p.m. F. L.’s sister, on going to him at 9 p.m., found him dead from rupture of the aorta.

This is a plain statement of facts, and the only theory N. J. S. has on the subject is that at the supreme moment of death, F. L. must have felt a great wish to communicate with him, and in some way by force of will impressed his image on N. J. S.’s senses. (Vol. 1, pp. 210–211)

Apart from visual apparitions such as this one, some cases involve auditory apparitions in which the percipient seems to hear the agent's voice (e.g., Case #33, Vol. 1, p. 221), and at least a few cases have involved visual or auditory apparitions coupled with tactile sensations (e.g., Cases 293–295, Vol. 2, pp. 135–139). Some of the apparitional experiences are collective, in which the apparition is perceived by more than one percipient (e.g., see the cases in Vol. 2, Chapter 18).

Like the veridical hallucination cases, the crisis apparition cases can be interpreted in more than one way. In the last paragraph of his account, N. J. S. offered a personal theory that his encounter with the apparition of F. L. may have been due to some form of telepathic connection between F. L. and himself. Gurney et al. similarly offer telepathy as the prime interpretation for such cases, suggesting that during a moment of crisis, the supposed agent impresses an image of him or her self upon the mind of the percipient, which is then experienced by the percipient as an apparition. This telepathic approach to apparitions was apparently influenced not only by early experimental and anecdotal accounts of telepathy (Chapter 2 and Chapter 3 of Vol. 1), but also by quasi-experimental attempts by some correspondents to intentionally appear as an apparitional figure before an unsuspecting relative or friend at a distance (Cases 13–16, Vol. 1, pp. 103–109; Cases 685 & 686, Vol. 2, pp. 671–676). Case #13 is partly reproduced below as an example of such an attempt, with the account given by the Rev. W. Stainton Moses:

One evening early last year, I resolved to try to appear to Z, at some miles distance. I did not inform him beforehand of the intended experiment; but retired to rest shortly before midnight with thoughts intently fixed on Z, with whose room and surroundings, however, I was quite unacquainted. I soon fell asleep, and awoke next morning unconscious of anything having taken place. On seeing Z a few days afterwards, I inquired, 'Did anything happen at your rooms on Saturday night?' 'Yes,' replied he, 'a great deal happened. I had been sitting over the fire with M, smoking and chatting. About 12.30 he rose to leave, and I let him out myself. I returned to the fire to finish my pipe, when I saw you sitting in the chair just vacated by him. I looked intently at you, and then took up a newspaper to assure myself I was not dreaming, but on laying it down I saw you still there. While I gazed without speaking, you faded away. Though I imagined you must be fast asleep in bed at that hour, yet you appeared dressed in your ordinary garments, such as you usually wear every day.' 'Then my experiment seems to have succeeded,' said I. (Vol. 1, pp. 103–104)

Cases such as these, which were also mentioned by Myers (1903:689–690) in his book *Human Personality and Its Survival of Bodily Death*, seem to suggest an intention on the part of the agent to precipitate the experience in the intended percipient, and thus seem, on the surface, to be in line with

the telepathy hypothesis. However, there are other factors that do not seem to conform very well to the hypothesis.

One of these factors is that, in many cases, apart from the intentionally generated cases, there often seems to be no clear indication that the agent held an intention to appear before the percipient, and in some cases, the agent may not have been aware that the percipient had seen the figure of him or her. L. E. Rhine (1957:42–43) noticed this same factor in veridical hallucination and crisis apparition cases from her own collection. Since the possibility that telepathy can operate on the unconscious level has not been explicitly ruled out, this factor may not clearly preclude telepathy, but seems to minimally argue in favor of clairvoyance.

Another factor, also noticed by L. E. Rhine (1957:43), is the manner in which the percipient often perceives the apparition. In Case #13 above, it is indicated by Z. that he had witnessed Moses' apparition in the garments that he was accustomed to seeing Moses wear every day. The same goes for the apparition of F. L. in N. J. S.'s account (Case #28 above). Similarly, in the accounts of people who have experienced veridical apparitions of deceased individuals, Broughton (2006) has noted that: "Often the clothing that the ghost appeared in was what the deceased customarily wore, not necessarily those in which the person died" (p. 150). This seems to suggest that the agent is not the only one who has a role in precipitating the apparitional experience; rather, it suggests that the percipient has a role, as well. In this case, the percipient seems to contribute to the details of the apparition (the clothes it is wearing) based on his or her own personal memories of the individual who is perceived. As Broughton (2006) suggests, some veridical apparitions of deceased individuals may be ". . . essentially a product of the mind of the percipient—an [*sic*] hallucination composed of images taken or constructed from the experiencer's memory" (p. 150). Offering preliminary support to this possibility is the experimental and anecdotal evidence suggesting that (long-term) memory has a role in ESP (Broughton, 2006, Irwin, 1979, Palmer, 2006, Roll, 1966, Stanford, 2006).

If this can be extended in any way to apparitions of the living (as in crisis apparitions), then it may suggest a slightly greater contribution to the experience by the percipient, and might begin to tip the scales a bit toward clairvoyance. On the other hand, it should be recognized that the apparent inconsistency between the clothing of the agent and his/her apparitional counterpart is somewhat in line with the percipient's subjective experience in at least some ostensible telepathic experiences. For instance, in ganzfeld telepathy experiments, rarely does it seem that the percipient's subjective experience represents an exact mental picture of the target that the agent is looking at. Instead, the percipient's experience seems more to comprise sensory details from his or her own memory that can

be associated in some way with the target, whether directly or indirectly. This suggests that correspondence in the experiences of the agent and percipient in telepathy may not always be exact. Examples of this can be seen in verbal transcripts of the percipient's subjective impressions from the first ganzfeld experiment by Honorton and Harper (1974:163–164), who also acknowledged the possibility that memory could have a role in ESP (pp. 164–165). If this point has merit, then it could leave some margin for the possibility of telepathy.

A third factor is that, in some cases, the experience is not limited solely to the intended percipient, and seems to require a stretching of the telepathy hypothesis in order for it to “fit the mold,” so to speak. There are two types of crisis apparition cases that seem to require a stretching. One type is a case where the apparition is perceived not by the intended percipient, but by another person, who witnesses the apparition in close proximity to the percipient. When this other person describes the apparitional figure, the percipient may recognize it as resembling a person who he or she knows (Case #355, Vol. 2, p. 256). An illustrative example is Case #242, reported to the SPR by a Mrs. Clarke in October of 1885:

In the month of August, 1864, about 3 or 4 o'clock in the afternoon, I was sitting reading in the verandah of our house in Barbadoes [*sic*]. My black nurse was driving my little girl, about 18 months or so old, in her perambulator in the garden. I got up after some time to go into the house, not having noticed anything at all—when this black woman said to me, “Missis, who was that gentleman that was talking to you just now?” “There was no one talking to me,” I said. “Oh yes, dere [*sic*] was, Missis—a very pale gentleman, very tall, and he talked to you, and you was very rude, for you never answered him.” I repeated there was no one, and got rather cross with the woman, and she begged me to write down the day, for she knew she had seen someone. I did, and in a few days I heard of the death of my brother in Tobago. Now the curious part is this, that *I* did not see him, but she—a stranger to him—did; and she said that he seemed very anxious for me to notice him. (Vol. 2, p. 61, italics in original)

A very similar kind of case exists for apparitions of deceased individuals, where another person perceives the apparition in close proximity to someone who had known that individual in life. L. E. Rhine (1957) had coined the term *bystander-type case* as a label for them, noting that “. . . these cases are suggestive of the haunting cases, the main difference, however, being that in these the link is a person rather than a geographical location” (p. 39). In being so similar, the analogous cases for apparitions of the living, like Case #242, seem to represent a “crisis bystander-type case,” if such a label can be used.

To account for cases like 242 in terms of telepathy, Gurney et al. suggest an extension of the telepathic link by the intended percipient to the third person

bystander who witnesses the apparition. In a sense, the intended percipient now becomes a second agent, who in turn conveys the impression regarding the original agent to the bystander, who now becomes a second percipient. It is suggested that the reason the bystander is able to perceive the apparition, and the intended percipient is not, may be due to a greater psychic sensitivity on the part of the bystander. Again, the reader is faced with the dilemma of whether or not this hypothesis can be considered more plausible than the alternative hypothesis of clairvoyance on the part of the bystander.

In other cases, the apparition is collectively perceived by several persons, and it seems that the more witnesses there are in addition to the percipient, the more severely the telepathy hypothesis must be stretched. Gurney attempts to stretch the hypothesis by proposing a form of “telepathy by infection” among the witnesses. As Tyrrell (1953/1961) succinctly describes it,

. . . an agent, A, telepathically influences, in the first place, the primary percipient B, in whom he is interested, and that B, while creating his own sensory image, acts as an agent, in turn transmitting the apparition on to C, who repeats the process, retransmitting the apparition to D, and so on. (Tyrrell, 1953/1961:43)

Myers seemed to recognize the conceptual difficulty that arises with the complexity of stretching the telepathy hypothesis in this manner to account for collectively perceived apparitions, and in his added note to Volume 2 (pp. 277–316), he offers the alternative hypothesis of clairvoyance, along with what he calls a “phantasmogenetic” effect on the part of the agent. Myers (1903, Vol. 1) somewhat expounds upon this idea in his book *Human Personality and Its Survival of Bodily Death*, in which he seems to suggest that the agent acts as more of a direct agent in creating the apparition through “. . . a psychical element probably of very varying character, and definable mainly by its power of producing a phantasm, perceptible by one or more persons, in some portion or other of space” (p. 264). However, he does not seem to regard this effect as one on physical space *per se*, for he states that,

. . . when the phantasm is discerned by more than one person at once . . . it is actually effecting a change in that portion of space where it is perceived, although not, as a rule, in the matter which occupies that place. It is, therefore, not optically or acoustically perceived; perhaps no rays of light are reflected nor waves of air set in motion; but an unknown form of supernormal perception, not necessarily acting through sensory end-organs, comes into play. (Myers, 1903(2):75)

Instead, Myers posits that the changes may occur in what he calls “the metetherial,” which seems to be an aspect of space parallel to, but also separate from, that occupied by matter. He does not seem to clearly outline its properties

or any other of its aspects, suggesting that it may have represented a working concept in progress.

In general, Myers' view seems to lie somewhere in between the telepathy and clairvoyance hypotheses:

I hold that this phantasmogenetic effect may be produced either on the mind, and consequently on the brain of another person—in which case he may discern the phantasm somewhere in his vicinity, according to his own mental habit or prepossession—or else directly on a portion of space, “out in the open,” in which case several persons may simultaneously discern the phantasm in that actual spot. (Myers, 1903(1):215–216)

This statement seems to acknowledge the possibility of telepathy in the case of one percipient (through an effect upon the percipient's brain), while also indirectly acknowledging the possibility of clairvoyance in the case of multiple percipients, who perceive the apparition in open space. In some respects, this phantasmogenetic effect by the agent sounds very much like a psychokinetic effect on the part of the agent.

A slightly similar interpretation is the one offered by Tyrrell (1953/1961) in his book on apparitions, which, through the metaphorical analogy of a stage production, seems to acknowledge possible contributions by both agent and percipient to the apparitional experience. This possibility is suggested by a quasi-experiment described by German Councillor H. M. Wesermann in 1819, in which he (as the agent) made several attempts to willfully appear to unsuspecting percipients in their dreams. In one instance where he assumed that the male percipient, Lieutenant N., would be asleep at a certain hour, Wesermann attempted to make the image of a deceased woman appear to him in a dream. However, Lieutenant N. was not asleep at the time, and the image instead appeared before him as an apparition, which was also perceived by another witness. Gurney et al. cite the account of this instance, as personally given by Wesermann:

The intention was that Lieutenant N. should see in a dream, at 11 o'clock p.m., a lady who had been five years dead, who was to incite to him a good action. Herr N., however, contrary to expectation, had not gone to sleep by 11 o'clock, but was conversing with his friend S. on the French campaign. Suddenly the door of the chamber opens; the lady, dressed in white, with black kerchief and bare head, walks in, salutes S. thrice with her hand in a friendly way, turns to N., nods to him, and then returns through the door. Both follow quickly, and call the sentinel at the entrance; but all had vanished, and nothing was to be found. Some months afterwards, Herr S. informed me by letter that the chamber door used to creak when opened, but did not do so when the lady opened it—whence it is to be inferred that the opening of the door was only a dream-picture, like all the rest of the apparition. (Vol. 1, p. 102)

Although the apparition witnessed by the two men seemed to largely conform to Wesermann's stated intention as the agent, there are a few aspects of the experience that seem to deviate from his intentions. As mentioned, Wesermann apparently assumed that Lieutenant N. would be asleep in his bedroom when he made his effort. Thus, one might expect that the apparition should have appeared in N.'s bedroom, but it did not; it appeared in the room where he was talking with S. And instead of appearing in a dream as intended by Wesermann, the figure appeared before N. as a waking apparition. The apparition also acknowledged the presence of S. with N., even though it does not seem that Wesermann was aware that S. would be present with N. at the time of his effort. Assuming that the effect of suggestion was not involved in this case, these deviations would seem to suggest a possible contribution of the percipients. As Roll (1974) commented of this case:

The Wesermann ghost also supports Tyrrell's theory that an apparition is usually the product not only of its creator but also of the perceiver. The lady ghost would have performed in an empty room had something not brought her to the anteroom—that something presumably being the unconscious minds of the officers reacting to Wesermann's attempts. In [psychical researcher Hornell] Hart's terminology, the three men had together produced a persona. This all sounds rather strange, but in fact, it is typical of ESP. Even in card tests, the result is rarely an exactly copy of the target but an interaction between the target, the mind of the subject, and often of the experimenter's mind too. (Roll, 1974:403)

Such an interpretation would seem applicable to crisis apparition cases, although for postmortem apparition cases, it confounds the possibility of ESP with that of survival after death. As Tyrrell (1953/1961) stated: "If an apparition represents a dead person . . . this is not sufficient proof that the dead person is the agent. A living agent *can* produce it" (p. 133). However, he goes on to note that: "On the other hand, the consensus of evidence goes to show that this kind of apparition must be produced by *some* agent; and in the majority of cases it is hard to find a plausible candidate other than the person the apparition represents" (p. 133). This raises another difficult issue apart from that of telepathy vs. clairvoyance, but given the limit of this review to Gurney et al.'s cases of apparitions of the living, it will not be addressed here, although the interested reader should perhaps consult the articles by Roll (1977; 1982, Sect. 2) and by Stevenson (1977, 1982) for broader discussions of the issue.

Somewhat similar to the veridical hallucination cases, the crisis apparition cases in *Phantasms* seem to show at least a few suggestive patterns found in other case collections. For example, many of the apparitions seem to represent a close relative of the percipient. The relation of the percipient to the supposed agent (whose apparition is seen) is shown in Table 3 for five other case collections of

TABLE 3
Relation Between Percipient and Agent in Apparition Cases (% Cases)

Analysis	N Cases	Immediate Family	Extended Family	Friends	Strangers
Persinger (1974)	193	47.0	22.0	18.0	13.0
Osis & Haraldsson (1977)	418	60.3	12.2	6.9	20.6
Haraldsson (1988–1989)	100	53.0	-	10.0	11.0
Haraldsson (2009)	337	46.0	-	8.0	29.7
Arcangel (2005)	590	58.2	11.3	-	12.7
Median Percentage		53.0	12.2	9.0	13.0
Mean Percentage		52.9	15.2	10.7	17.4

The values for Osis and Haraldsson (1977) are calculated from their Appendix Table 2 (p. 218). The values for Arcangel (2005) are calculated from her Appendix survey (pp. 284, 291). Values not cited are marked with a dash (-).

apparitional experiences. The details of the collections are as follows:

1) Persinger (1974, Chapter 6) analyzed 193 crisis and postmortem apparition cases published in *Fate* magazine between 1965 and 1969, which consisted of personal accounts sent in by readers.

2) Osis and Haraldsson (1977) analyzed 418 apparition cases received from physicians and nurses in the United States and India between 1961 and 1973. These cases consisted of deathbed visions, in which the apparition of a living or a deceased person was perceived by a terminally ill or dying patient shortly before death.

3) Haraldsson (1988–1989) analyzed 100 cases of crisis and postmortem apparitions obtained through interviews with people who responded to a national survey in Iceland in 1974.

4) Haraldsson (2009) analyzed 337 additional crisis and postmortem cases obtained through interviews with people who responded to a questionnaire placed in five popular magazines circulated in Iceland in 1980–1981.

5) Arcangel (2005) analyzed 590 cases received through a multi-phase, worldwide survey of people who attended grief workshops and media events, responded to radio interviews, or participated in an online survey.

As in Table 1, “Immediate Family” refers to parent–child, spousal, and sibling relations, while “Extended Family” refers to all other family relations outside the immediate (e.g., grandparents, aunts/uncles, cousins, in-laws, etc.).

Gurney et al. did not perform a separate analysis of their crisis apparition cases. However, they noted (Vol. 2, p. 723) that the agent and percipient were biologically related in 47% of the *Phantasms* cases, which includes the crisis apparition cases. If this value can be taken as a rough estimate of the relation between agent and percipient in the latter (while recognizing that it may be an overestimate), then a comparison of this value with the median and mean percentages for “Immediate Family” in Table 3 indicates that the values are in fairly close range. Of course, because of the possible overestimate, this should only be taken as a tentative pattern.

In analyzing 314 apparition cases from the *Phantasms* collection, Stevenson (1982:346) found that 28% of the agents in the cases had suffered a violent death. Similarly, Haraldsson (1988–1989, 2009) found that, in his 1974 and 1980–1981 surveys, the number of agents suffering a violent death was 23% and 30%, respectively.

As it may be clear from this review, *Phantasms of the Living* is a book containing spontaneous case reports that, when read closely, can potentially raise complex issues, ones that still remain largely unresolved within parapsychology even in the present time. However, this should not take away from the knowledge of the greater importance, as well as the enjoyment, that a reader can gain from reading these classic cases. As mentioned, Gurney et al. went to great lengths to verify the details in these cases, which make them difficult to dismiss as mere fabrication, suggestion, or misperception. Instead, the cases collectively offer evidence to suggest that ESP and apparitional experiences can and do manifest in the lives of people from all walks of life, a suggestion that is still echoed in the spontaneous cases being reported many years later (e.g., Feather & Schmicker, 2005, Stevenson, 1995). The anecdotal evidence available from spontaneous cases across time, coupled with the experimental evidence in parapsychology, seems to form the best case for serious consideration of the existence of psi phenomena.

The potential value of spontaneous cases in parapsychology has been addressed before by several researchers in the field, who have argued that such cases can: 1) illustrate the various ways in which psi can manifest in nature, 2) reveal more about the content and depth of the subjective experiences of agents and percipients, 3) highlight rare and interesting forms of psi phenomena that have been neglected by researchers in the past, and 4) be useful for uncovering general patterns across cases that can possibly be developed into testable hypotheses, among many other values (Alvarado, 1996a, 1996b, 2002, Irwin, 1994, Rhine, 1977, Watt, 1994, White, 1992). *Phantasms of the Living* remains

a source useful for demonstrating all of these values, and for that reason should continue to be brought to the attention of psi researchers of the current and future generations.

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Nonsense on Stilts: How To Tell Science from Bunk by Massimo Pigliucci. The University of Chicago Press, 2010. 336 pp. \$20 (paperback). ISBN 9780226667867.

While its declared goal is to “allow us to tell the difference between it [science] and bunk, *Nonsense on Stilts* contains, unfortunately, its own bunk which makes the (borrowed) title apply to the book itself in addition to what is described in it. Here are some examples of “nonsense on stilts”:

—p. 63: *The earth . . . has an axis of rotation (which causes the alternation of day and night) and an axis of revolution (around the sun). These two axes are not parallel, but diverge by a little more than 23° . . .*

Each of those two sentences is bunk:

1) There is no such a thing as an *axis of revolution around the sun*. The Earth is revolving around the sun on an *elliptical path that has two axes*.

2) Following the error in the first sentence, here comes the error about the angle of *a little more than 23°*. In reality, Pigliucci seems to describe the Earth’s obliquity or tilt angle. The tilt angle can be defined not as he defined it, but by one of the following statements:

- a. The angle the Earth’s axis of rotation makes with a line perpendicular to the plane of the ecliptic, or
- b. The angle that a plane passing through the Earth’s equator makes with the plane of the ecliptic

—p. 93: *This is simply false, as the idea of a temporary cooling of the earth’s temperature was advanced in the popular press (not in academic, peer-reviewed journals) . . .*

At least a dozen papers, discussing the idea of a temporary global cooling were published, in the mid-1970s, in academic, peer-reviewed journals, such as *Nature*, *Science*, and the *Journal of Atmospheric Research* (see below).

Barrett, E. W. (1971). Depletion of short-wave irradiance at the ground by particles suspended in the atmosphere. *Sol. Energy*, 13, 323–337.

Bryson, R. A. (1974). A perspective on climatic change. *Science*, 184, 753–760.

Bryson, R. A., & Dittberner, G. J. (1977). Reply. *J. Atmos. Sci.*, 34, 1821–1824.

Bryson, R. A., & Dittberner, G. J. (1976). A non-equilibrium model of hemispheric mean surface temperature. *J. Atmos. Sci.*, 33, 2094–2106.

Bryson, R. A., & Murray, T. J. (1977). *Climates of Hunger: Mankind and the World’s Changing Weather*. American University Publishers Group, 171 pp.

Bryson, R. A., & Wendland, W. M. (1970). Climatic effects of atmospheric

- pollution. In S. F. Singer (Ed.), *Global Effects of Environmental Pollution*, Springer-Verlag/D. Reidel, pp. 130–138.
- Chýlek, P., & Coakley, J. A., Jr. (1974). Aerosols and climate. *Science*, *183*, 75–77.
- Hamilton, W. L., & Seliga, T. A. (1972). Atmospheric turbidity and surface temperature on the polar ice sheets. *Nature*, *235*, 320–322.
- Kukla, G. J., & Kukla, H. J. (1974). Increased surface albedo in the Northern Hemisphere. *Science*, *183*, 709–714.
- McCormick, R. A., & Ludwig, J. H. (1967). Climate modification by atmospheric aerosols. *Science*, *156*, 1358–1359.
- Rasool, S. I., & Schneider, S. H. (1971). Atmospheric carbon dioxide and aerosols: Effects of large increases on global climate. *Science*, *173*, 138–141.
- Twomey, S. (1977). The influence of pollution on the shortwave albedo of clouds. *J. Atmos. Sci.*, *34*, 1149–1152.

—p. 136: . . . *we do have an atmosphere, and carbon dioxide (CO₂) is a major component of it.*

This is a huge “nonsense on stilts”: **CO₂ represents only 0.039% of the entire atmosphere.** Even if Pigliucci meant to say that CO₂ is a major greenhouse gas, he would be wrong by two orders of magnitude, because the most important greenhouse gas is water vapors (1%–4% concentration).

The next comments refer to Pigliucci’s criticism of Bjorn Lomborg’s book *The Skeptical Environmentalist*.

—On p. 137, Pigliucci writes: *We will go into a bit of detail analyzing **one chapter** [emphasis added] of Lomborg’s book . . . because it represents a good example of how science can be used to oversimplify complex topics and how hundreds of pages and thousands of notes do not necessarily make good scholarship.*

In other words, by analyzing one chapter out of twenty-five or 66 pages out of 515 pages, Pigliucci hopes to show that the remaining hundreds of pages and thousands of notes do not necessarily make good scholarship because of one bad chapter. This is a logical fallacy called *hasty generalization*, and it is weird when it comes from a philosopher of science who wrote a book about “nonsense on stilts” trying to debunk such kinds of misconceptions.

—On p. 138, Pigliucci tells us that *Lomborg is not a climate scientist . . . Why, then, attempt to write a scholarly book about the “true” state of the environment?*

HINT: read p. xx of Lomborg’s Preface. Another hint: Pigliucci himself

is not a climate scientist, but he expresses opinions like a climate scientist. Unfortunately, many of them are deadly wrong.

—On p. 139, Pigliucci writes: . . . *Lomborg's own book—though published by the prestigious Cambridge University Press—has not been reviewed by a single natural scientist . . .*

Nor do we know if a single philosopher of science has reviewed *Nonsense on Stilts!* But if we read Lomborg's Acknowledgements, we will find no fewer than five scientists who can qualify as "natural scientist" (professor of geology Henning Sørensen, Ed Dlugokencky and P. Tans from the Climate Monitoring and Diagnostics Laboratory of the US National Oceanic and Atmospheric Administration, John H. Dyck from the US Department of Agriculture, and Dr. Johann Glodammer at the Max Plank Chemistry Institute). These scientists as well as many others listed in the Acknowledgements "commented on large parts of the book."

—On p. 139, Pigliucci writes: "*The claim that the temperature is higher now than at any time throughout the past 1,000 years seems less well substantiated.*" *He is technically correct, as we are in fact coming out of a so-called Little Ice Age, but his own graph of the data shows remarkable convergence of estimates from various studies showing not only a steady increase in temperatures over time, but a recent steep rise that seems compatible only with an anthropogenic explanation.*

Is Lomborg contradicting himself? According to Pigliucci, the answer is yes. But, if we go back to Lomborg's book (pages 260–263, Figure 134) we will notice that Pigliucci did not pay attention to criticism made by Lomborg with regard to one set of temperature data (Mann, M. E., Bradley, R. S., & Hughes, M. K. (1999). Northern hemisphere temperatures during the past millennium: Inferences, uncertainties, and limitations. *Geophysical Research Letters* 26(6), 759). That set of data illustrates the infamous "hockey stick," where the Little Ice Age was completely obliterated to make "the recent steep rise" in temperature more obvious. Probably, Pigliucci does not know (remember, he is not a climate scientist by his own recognition) that the "hockey stick" model was discredited a long time ago, that its author himself, Michael Mann, dropped it, and that the latest IPCC report in 2007 no longer includes it. What is remarkable, however, is that Lomborg, in 2001, advances plenty of reasons for which Mann's temperature data should be regarded with skepticism. And the recent "Climategate" scandal clouded Mann's work even more. But Pigliucci seems to ignore what happened between 2001 and 2010 in order to win the point against Lomborg.

—Referring to Figure 146 of the first book, Pigliucci writes on p. 142: *Let us set aside for the moment the non-negligible detail that there is very little understanding of the causal link between sunspots and global temperatures (and without a well-established causal link, a correlation is just an interesting but potentially misleading statistic).*

Apparently, Pigliucci never heard about Maunder and Sporer sunspot minima and their links to the Little Ice Age in the Northern hemisphere. He does not know either that some scientists suggested that changes in solar irradiance accounted for 50%–75% of the 0.6°C increase in temperature during the 1900s and that other scientists (such as the famous P. D. Jones and M. E. Mann from the infamous “Climategate”) place the solar irradiance changes since 1880 at about 10% of the amount of 0.7°C warming during the last century.

—On p. 142, Pigliucci writes: *Lomborg adds: “however, these are global figures over the next 63 years [this is an odd number to pick; your baloney detector should go yellow alert]. . .*

In fact, my baloney detector went again straight to red alert because he (voluntarily or not, who knows?) misrepresented that number. It’s not odd at all if he noticed that Lomborg refers to a Canadian report published in 1997 dealing with overall cost until 2060 of the implementation of the CFC protocols. You do not have to have a PhD to realize that 2060 – 1997 = 63 years. “It’s elementary, my dear Watson . . .”

—Regarding again Lomborg’s Figure 146, Pigliucci writes (p. 142) that *Lomborg glosses over the fact that the otherwise very good match between the two curves he shows (. . .) completely breaks down during the last few decades, with temperatures continuing to increase regardless of the solar cycle.*

But on p. 278 of his book, Lomborg writes that *the connection between temperature and the sunspot cycle seems to have deteriorated during the last 10–30 years, with temperatures outpacing sunspot activity in Figure 146.* Is this “glossing”? I would argue that Lomborg is aware of the disconnection between the two curves, and indeed he in fact “draws readers’ attention to this annoying detail.”

—Continuing the critique of the same Figure 146, Pigliucci writes (p. 143): *He [Lomborg] attributes this to an “emerging greenhouse gas signal,” that is to human-caused global warming!*

Going back to Lomborg’s book on page 278 (Pigliucci’s endnote #11 gives the wrong page for the above-quoted words), one can read the following: . . . *the fact that the emerging greenhouse gas signal only appears now seems to indicate once again that the estimated CO₂ warming effect needs*

to be lowered. One such IPCC-loyal study finds that the solar hypothesis explains about 57 percent of the temperature variations and that the data suggest a climate sensitivity of 1.7°C, a 33 percent reduction of the IPCC best estimate. It seems to me that Lomborg says quite the opposite of what Pigliucci is claiming.

—On p. 142, Pigliucci pokes fun at Lomborg: . . . *His example [of a better technology]? At the beginning of the twentieth century icebergs were considered “a major climatic threat impeding travel between North America and Europe.” But all it took was for us to invent jet liners and, voilà, no more Titanics. Hardly the sort of argument that belongs in a scholarly book.*

I would argue that this is a cheap shot. Because Lomborg, citing the *Titanic* example from the literature, explains in the next paragraph why he chose that metaphor (p. 278): *To remain with the metaphor above, it seems that the scenarios are more concerned about plotting a better course for the Titanic than investigating the likelihood of alternative means to travel.* It is Pigliucci’s right to not include this sort of argument in one his scholarly books, but, personally, I appreciate the power of a well-chosen metaphor.

—On p. 144, Pigliucci writes: *I guess that was why in 2003 . . . thirty-five thousand people died in Europe (not in central Africa) during a heat wave . . .*

While this is a gruesome number when talking about victims of a heat wave and, by extension, of possible consequences of global warming, I am wondering why Pigliucci is not quoting the following: *In Europe as a whole, about two hundred thousand people die from excess heat each year. However, about 1.5 million Europeans die annually from excess cold. That is more than seven times the total number of heat deaths. Just in the past decade, Europe has lost about fifteen million people to the cold, more than four hundred times the iconic heat deaths from 2003. That we so easily neglect these deaths and so easily embrace those caused by global warming tell us of a breakdown in our sense of proportion* (Bjorn Lomborg, *Cool It*, 2007:17).

—On p. 146, Pigliucci writes: *Lomborg quotes **with disdain** [emphasis added] University of California Berkeley’s physicist John Holdren (later director of the White House Office of Science and Technology Policy under President Obama), who pointed out that the major problem we have for the future isn’t a lack of energy, but how we use it.*

Going back to Lomborg’s book on p. 321, we read: *UC Berkeley physicist John Holdren pointed out that “clean-burning, non polluting, hydrogen-using bulldozers still could knock down trees or build housing developments on farmland.”* Now, could somebody tell me, where is the disdain here?

I declare I stopped reading *Nonsense on Stilts* after Chapter 6 because of a quote used by Pigliucci himself when discussing Lomborg's book. According to Thomas Henry Huxley, "many a beautiful theory was killed by an ugly fact." I cannot think of a more appropriate quote for Pigliucci's book.

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Nonsense on Stilts: How To Tell Science from Bunk by Massimo Pigliucci. The University of Chicago Press, 2010. 336 pp. \$20 (paperback). ISBN 9780226667867.

Nonsense on Stilts, by Massimo Pigliucci, takes its name from a quote by Jeremy Bentham, the English utilitarian philosopher. The book aims to provide the average person with the tools required to differentiate science from non-science—a classic problem in philosophy of science. Massimo Pigliucci is both a scientist and a philosopher as, according to his bio at platofootnote.org, he holds a doctorate and two Ph.D.s—in genetics, evolutionary biology, and philosophy. He is currently a professor at the City University of New York and "noted skeptic."

The writing style of *Nonsense on Stilts* is readable and accessible to those who don't have a philosophy or scientific background, and some sections are bound to be informative even if you do, as the scope of the book is huge. It contains information about basic philosophy of science to the representation of science in the media as well as discussions about controversial scientific topics in politics and the courtroom (global warming and intelligent design, respectively). It also contains a quick rundown on the history of the development of science as a break-away discipline from the grips of theology and philosophy (from the pre-Socratics to the founding of modern science). And he also manages to cover more current developments in philosophy of science with two chapters dedicated to the "science wars" and finally a chapter where he discusses the role of the expert.

He skillfully manages to cover this extensive ground while making the book an enjoyable, easy read. His apparently affable personality shines through which is refreshing in comparison with many books on philosophy of science/science, and he slips in an appropriate level of personal information about his own history, opinions, and experiences. It is remarkable what he manages to

cover in the book (which runs to 300 or so pages), and it is replete with many great quotes, examples, and backstories which make the ideas discussed come alive.

But perhaps because the scope is large we don't see the analysis put to work as it should be. Massimo Pigliucci obviously has a great love of science and what it can do to help us understand the world and universe we live in. I fully support the idea that drives the book: the need to provide people with the tools to make a judgment about scientific knowledge for themselves. He acknowledges that science is complex and that it is not easy for the average person to come to grips with how to make an assessment about what constitutes good science and what bad or even what to make of the information that science presents us with. His knowledge of what is currently accepted as "good science" is well-founded and thoughtful.

The troubles start when you begin to see he uses the same rhetoric he set out to dispel to promote his own skeptical agenda, which he wears on his sleeve. This is a shame, because if you take his basic message and apply it you will be able to do as he wishes—make an informed assessment of science, controversial or not, based on the notion that:

What all scientific inquiry has in common, however, are the fundamental aspects of being an investigation of nature, based on the construction of empirically verifiable theories and hypotheses. These three elements, naturalism, theory, and empiricism, are what make science different from any other human activity. (p. 303)

He lets the reader down because he doesn't apply his own analysis to the all of the topics he is examining in the book.

For instance, even early in the book, before a definition of pseudoscience has been given, we are informed that "The disciplines in the middle land may one day be recognized as full members of the scientific enterprise, as is happening to areas of psychology that are turning into cognitive science; *or they may slide into pseudoscience, as happened in the past to astrology and parapsychology*" (p. 25, my italics). This is an early indication that once you get to the section on psi research it is going to be a teeth-grinding exercise if you are more familiar with the actual evidential status of parapsychology. And sure enough it is.

He has clearly already made up his mind about what areas of human enquiry are to be categorized as pseudoscientific. This goes against the grain of the book which is otherwise a rational, thoughtful exploration of science. It would have been much more helpful and, I think, led him to a different analysis of parapsychology had he first of all set out the benchmarks he would use to delineate a pseudoscientific enterprise (which he outlines on p. 42) and then

applied them to an analysis of the best available contemporary evidence for the areas that are controversial such as parapsychology (the aspect of the book on which I've been asked to focus for this review).

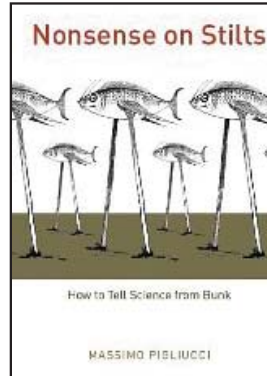
When Massimo Pigliucci does come to reveal why parapsychology is pseudoscientific he admits that he can grant it only a short space in this book. He says so much has already been written in this area, which presumably is a reason not to give it much space. He refers the reader to the other books using a footnote; these are: *Flimflam!* by James Randi, *Skeptical Odysseys: Personal Accounts by the World's Leading Paranormal Inquires* by Paul Kurtz (Ed.), *Pseudoscience and the Paranormal* by Terence Hines, *The Skeptic's Guide to the Paranormal* by Lynne Kelly, among others, also noted skeptics. Need I go on?! It would be refreshing to see a skeptic reference other than their own, but alas we are let down here. As we are with the analysis.

The two examples selected for scrutiny in this section are the PEAR laboratory PK experiments and the J. B. Rhine Zener card experiments. Pigliucci acknowledges that "what the PEAR group did surely qualifies as science" (p. 78), but he criticizes them for using statistical significance to measure the results of a long-run experiment, as well as failing to maintain adequate baseline readings. The first is a problem which any scientific endeavor using statistical significance for large amounts of data will encounter (something he acknowledges does occur in other areas of science). But he ends with the point that when the measurement is small and indicative of something which "violates the laws of physics!" (p. 80), you would be better to dismiss the evidence. This contradicts something earlier in the book where he acknowledges "indeed, physicists themselves are beginning to question whether the so-called laws of the universe are truly universal or instead apply locally, in either time or space" (p. 53). In contemporary philosophy of science the idea that there are universal, unbreakable laws is certainly debated. If you are going to critique parapsychology for its use of statistics in these instances, you will need to apply the same analysis across the board to every other area of scientific endeavor.

On the second count, the lack of a baseline, he references a skeptic's account of the criticism but fails to mention that a member of the PEAR group of researchers, York Dobyms, had responded to this critique and that currently there is no unanimous agreement among scientists who have weighed in on the issue as to whether or not the problem invalidates the research (Broderick, 2007:33–38). The lack of discussion is alarming.

Massimo Pigliucci then goes on to introduce the work of J. B. Rhine. But here the little snippets of information that make the book interesting in many other sections are used to produce the notion that Rhine was motivated by crazy beliefs in things such as talking horses as well as a dated interest in Lamarckian theory. Whether consciously or not, Pigliucci is priming the reader to think that it is unlikely good science could come out of the lab of someone like this. It is also a strange selection. J. B. Rhine's research was first undertaken in the 1920s,

so it is representative of research from nearly a century ago. The study of psi has progressed significantly since then and though Rhine was an important “founding father” of parapsychology, he is in no way representative of what is going on in contemporary parapsychology. For instance, the long runs of the same boring material are not carried out anymore. Pigliucci criticizes the research on the same account as the PEAR experiments: problems with randomness and statistical significance. But rather than take the point into a broader discussion about the use of statistics in science he instead infers Rhine’s experimental methodology was flawed and open to fraud. Thus leaving the uninitiated reader in doubt as to the validity of psi research unfairly. (No wonder the myth perpetuates!)



He fails to mention that parapsychology as a scientific discipline has learned from these early experiments and continued to produce positive results at the same time as taking into consideration some of the methodological problems apparent in the early experiments. Look at the development of the ganzfeld and autoganzfeld experiments to see where these early Zener card experiments eventually led—to the point where even some skeptics acknowledge there is something going on (for example the Honorton/Hyman joint communiqué in Bem & Honorton, 1994:9). If more thinkers approaching the evidence from the skeptical perspective acknowledge there is something to explain, then we might see further theoretical development leading, eventually, to a satisfying explanation for all concerned.

It is on this area of scientific explanation that the book is noticeably silent. Psi does pose a challenge to science because the mechanisms are not able to be explained. This doesn’t mean it is impossible nor that it will never be explained. The idea that theories compete to account for the same dataset is explored briefly (p. 74). But how to judge between the theories is only glanced at. There is the recommendation that one should employ Occam’s Razor, but contemporary discussions in philosophy of science involve much more sophisticated analyses when confronted with competing explanations.

With regard to scientific explanation, philosophy of science has been in a state of debate since the demise of the covering law theory in the early 1970s. Although one wouldn’t expect a detailed analysis of this complex area of philosophy in a book already covering so much ground, there should be some acknowledgement of how philosophers (and some scientists) are attempting to develop thought in this regard. (For example, the competing explanation theories of Bas Van Fraassen, Philip Kitcher, and Wesley Salmon.) Some ideas put forward in the discussions that do take place in philosophy are that the “best” explanation is the most comprehensive explanation vs. the “best” explanation is

the most useful explanation. These all impact on areas of science in which there are data but competing explanations, such as in parapsychology.

At one stage in the book Massimo Pigliucci himself admonishes skeptics for leaping to conclusions without first becoming acquainted with the facts (in the section on UFOs, p. 75). And yet he does the same thing in his brief discussion of parapsychology. It is possible for both sides to acknowledge the evidence and agree to disagree about the explanation and see what eventuates. It would be good to see a book like this, which already covers the territory so well in other areas, acknowledge that the problem is not the doing of the science, it is the explanation of the data which is at issue. And discussions about explanation can lead to discussion (rather than debates), which is expected and helpful when there is a scientific problem to solve.

There is one chapter in the book which is equally relevant to both groups: the representation of science in the media. Much of what Pigliucci has experienced as he takes his message to the mainstream press will be familiar to those who have also tried to get a fair hearing on controversial topics such as psi research. His experiences show how difficult it is for anyone making public comment about complex issues in science. It is in this chapter that you feel you get to know the author and can identify with some of the problems he faces.

I can recommend this book as an excellent source of readable information about science—its history and controversies. But not as a book which applies the analysis fairly to all areas of scientific enquiry. It also provides insight into the sophisticated rhetoric and views of a “noted skeptic” where topics such as parapsychology are covered. It left me feeling sad that so much work in psi research is still dismissed by those who should clearly be able to apply their own calls for intelligent, thoughtful analysis to bear on the subject.

So, if you do read this book, it is wise to heed the advice Massimo Pigliucci leaves us with: “Never, ever, forget to turn on your baloney detector” (p. 305).

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The Logical Leap: Induction in Physics by David Harriman. New York: New American Library, 2010. 275 pp., including Index. \$16. (paperback). ISBN 9780451230058.

The so-called problem of induction has been with us since David Hume first drew attention to it in the mid-18th century. The problem is that we infer from a number of similar events laws of nature that are universal. We infer the idea of a cue “causing” a billiard ball to move, by observation of many similar events of cues striking billiard balls. Therefore we suppose that the next time we strike a billiard ball with a cue that the ball will move in a similar way. But, says Hume, there is no valid chain of reasoning that can lead to that conclusion (there is no valid Aristotelian syllogism that leads from “some” to “all”). We can introduce an axiom “the future resembles the past” or “nature is uniform in certain regards,” but by so doing we are arguing in a circle:

all inferences from experience suppose . . . that the future will resemble the past, and that similar powers will be conjoined with similar sensible qualities. If there be any suspicion that the course of nature may change, and that the past may be no rule for the future, all experience becomes useless, and can give rise to no inference or conclusion. It is impossible therefore that any arguments from experience can prove this resemblance of the past to the future; since all these arguments are founded on the supposition of that resemblance. (Hume, 1748)

This problem of being unable to get from past observations to some necessarily *true* general principle is known as the “problem of induction.”

Induction is contrasted with deduction, which is moving from some true premises inevitably to true conclusions. Aristotle formulated the laws of logic which showed which kind of deductions (syllogisms) lead to correct conclusions, regardless of the actual objects to which the various premises refer. The ubiquitous example is “All As are B; C is A; therefore C is B.” Thus “All men are mortal; Socrates is a Man; Therefore Socrates is mortal.” The point is that the deduction is *valid* whatever is substituted for A, B, and C. The deduction is not necessarily *true* if the premises are not true: “All men are women; Socrates is a man; therefore Socrates is a woman.” There is thus a distinction in Aristotelian logic between the validity of an argument and the truth of the conclusion. Aristotle came to his universal laws of logic by a process of induction. First he examined a great many arguments and arranged them into 192 possible forms, removing the particulars to which the arguments referred. Aristotle then isolated 14 valid syllogisms out of the 192 (later expanded to 19 out of 256) which give true conclusions if the premises are true. Although a syllogism may be valid and true, it does not necessarily get you very far. Take

for example the valid syllogism “no women are immortal; some people are women; therefore some people are mortal.” All the valid syllogisms have “all” or “no” in one or the other of the premises. But the only way such premises can be arrived at is by induction or by definition (as in mathematics).

Yet science proceeds from individual experiments and observations to general principles. It is to the problem of when and why the inference from “some” to “all” is legitimate—“in short, how can man determine which generalizations are true (correspond to reality) and which ones false (contradict reality)” (p. 7)—that Harriman sets his mind in *The Logical Leap*, subtitled *Induction in Physics*.

To answer the question, Harriman relies on the Objectivist philosophy of Ayn Rand (1905–1982, author of the novel *Atlas Shrugged* where she describes her philosophy in detail, of other works of fiction, and of numerous philosophical essays). Objectivism takes for granted the validity of sense perception and causality (p. 9). Sense perception is our only contact with reality. From sense perception we find out what exists in the world: tables, chairs, etc. “We form concepts by grasping similarities that make a group of existents stand out against a background of different existents” (p. 10). The concepts formed in this way do not imply that all existents grouped into a concept are the same: Their differences are quantitative. For instance, tables have different surface areas, different heights, and different numbers of legs. “When we form a concept, our mental process consists in retaining the characteristics but omitting their differing measurements”(p. 10).

Concepts are hierarchical. “The meaning of first-level concepts can be made clear simply by pointing to instances” (p. 12). For higher-level concepts we need definitions which must be empirical statements that specify the distinguishing characteristics and condense our knowledge of them. A concept however cannot be equated with its definition:

The concept ‘temperature’ had the same meaning for Galileo and Einstein, i.e. both men referred to the same physical property. The difference is only that Einstein knew much more about this property; he understood its relation to heat, to motion, and to the fundamental nature of matter. (p. 13)

Generalizations are also hierarchical, and all generalizations ultimately depend on first-level generalizations: “all generalizations—first level and higher—are statements of causal connection. . . . there is nothing to make any generalization true except some form of causal relationship” (p. 21). Thus, contrary to Hume, we perceive causation directly in the case of the cue and the billiard ball, and in the case of high-level generalizations we discover causes by experiment. We do not discover causes by simply counting regularities or finding correlations.

The above is a (condensed) version of Rand's theory of concepts. The so-called problem of induction relies on prior concepts. "Deduction takes for granted the process of conceptualization. Induction is the conceptualizing process itself in action" (p. 35). The process of making higher-level concepts requires thought and is therefore not infallible. In fact it is quite difficult.

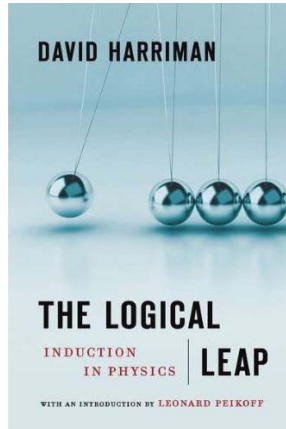
As an example of correct induction, Harriman cites Benjamin Franklin's famous experiment with a kite in a thunderstorm which showed that lightning is essentially electricity. Franklin drew on a number of concepts:

'electricity', 'discharge', 'conductor', 'insulator', 'Leyden jar'. These concepts were made possible by and represent a wealth of earlier knowledge (which was also discovered by means of experiment). Without this conceptual framework, as we may call it, Franklin could only have stared uncomprehendingly at sparks and shocks. Given such a framework, however, he can at once identify what he is seeing: The kite apparatus is a long conductor, and thus the electrically charged thundercloud causes [the Leyden jar to become charged]. Once Franklin can identify what he is seeing in such terms, his conclusion—the generalization—follows directly. (p. 32)

Harriman then discusses at length the progress of scientific knowledge in astronomy, physics, and chemistry by the "greats" such as Copernicus, Galileo, Kepler, Newton, Lavoisier, Dalton, Maxwell, and Mendeleev and brings out the mechanics of valid induction, though the accounts might be construed as rather Whiggish, wherein the later theory is accepted as correct, the good guys are the ones who got the answer right, and the bad guys are the ones who tried to resist the right answer.

From this survey, Harriman shows when induction is valid and delineates several fallacies which make induction appear invalid:

- a) Dropped context: To say Newton's laws are falsified by the development of relativity and quantum mechanics is to drop the context. They are true in the context of the mechanics of ordinary bodies and the motion of planets, in which context the laws were validly induced. (p. 8)
- b) Substituting a regularity for a cause: Lavoisier thought that the presence of oxygen in a chemical compound was what made the chemical acidic. This was merely a regularity in those acids he studied and was not found in hydrochloric acid (then known as muriatic acid). (p. 196)



- c) Inadequate experimental controls: Galvani thought that the reason a frog's leg placed on a silver plate jerks when touched by a bronze hook was because electricity was stored in the leg. Volta thought the reason was contact of the different metals and the frog was irrelevant for the production of electricity. Galvani and Volta both performed variations of the experiment which 'proved' their point. Davy later showed that the frog's leg provided a salt solution vital for the operation of the silver-bronze battery. (p. 200)
- d) 'Cognitive fixation': The physicist Lord Kelvin 'refuted' the up-and-coming science of geology on the grounds that the age of the Earth, according to the then known physics, was too young for the formation of mountains as postulated by the geologists. Kelvin could not see that the facts of geology suggested another energy source apart from gravity, on which he based his calculations. (p. 206)
- e) 'Cognitive promiscuity': Pons & Fleischman proclaimed they had been able to obtain the 'cold fusion' of deuterium atoms in a room-temperature electrolysis experiment, "despite weak evidence and a context that makes the idea implausible. . . . A mind that is open to any 'possibility', regardless of its relation to the total context of knowledge, is a mind detached from reality and therefore closed to knowledge." (p. 207)
- f) 'Theory stealing': Accepting a theory as an instrument for research whilst not believing that the theory refers to reality. This was the situation through much of the 19th century when many chemists did not believe that atoms actually exist, whilst still using the theory to guide their research. (p. 220)

In the final chapter, Harriman turns his attention to quantum theory.

As a mathematical formalism, quantum theory has been enormously successful. It makes quantitative predictions of impressive accuracy for a vast range of phenomena, providing the basis for modern chemistry, condensed matter physics, nuclear physics, and optics. It also made possible some of the greatest technological innovations of the twentieth century, including computers and lasers. Yet as a fundamental theory of physics it is strangely empty. . . . It gives a mathematical recipe for predicting the statistical behavior of particles but fails to provide causal models of subatomic processes. (p. 248)

According to Harriman, the *necessity* of supposing that a single reality exists, that the human mind has a reasonably clear access to it, and that the scientist can explain it, has been surrendered not by reference to experimental facts ("the knowledge gained by experimental discovery of facts can never lead to the denial of knowledge and fact") but by the influence of post-Kantian philosophy,

an enemy that operated behind the front lines and provided the corrupt framework used to misinterpret facts. By rejecting causality and accepting the unintelligibility of the atomic world, physicists have reduced themselves to mere calculating machines (at best)—and thus they are unable to ask further questions or to integrate their knowledge.

Harriman does not discuss the double-slit experiment, the EPR experiments of Alain Aspect and others, the quantum Zeno effect, quantum computation, and the various other puzzling phenomena in quantum physics. Harriman himself seems to be “theory stealing” here in that he is willing to accept the benefits he lists from quantum theory without subscribing to the theory itself, nor addressing the really puzzling *experimental* facts on which the theory is based. There is no explanation of why quantum mechanics gives such precise answers whilst it does not correspond to reality.

I do not deny that modern physics is in something of a crisis. 96% of the universe as we know it consists of ‘dark matter’ and ‘dark energy’ which we have only the vaguest idea about. The two most successful theories we have, quantum mechanics and general relativity, refer to completely different contexts and are deeply incompatible in those areas where perhaps they both apply (such as black holes). The effort to unify these two great theories has stimulated physicists to retreat into metaphysical speculation of great mathematical complexity (string theory) with as yet no hint of an experimental test.

In short, Harriman presents a reasonable theory of how a science can proceed by induction to true theories (provided you read “true” as “true in context” and not “absolute truth”). He shows, following Rand, that the problem of induction depends on prior concepts that had not been examined by Hume and that science is possible (contrary to the pessimistic conclusions of certain philosophers over the centuries). I am skeptical about his insistence that physics must conform to some pre-ordained form (which might be construed as “cognitive fixation”). As Neils Bohr said in response to Einstein’s insistence that “God does not play dice with the universe,”: “Do not tell God what to do.”

“Physics is the most universal of the natural sciences” (p. ix), and Harriman does not address the sciences such as biology, psychology, sociology, which suffer from “physics envy” but rely even more on statistics than quantum mechanics. It is here that his theory of induction might meet even tougher challenges.

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Paranormal America: Ghost Encounters, UFO Sightings, Bigfoot Hunts, and Other Curiosities in Religion and Culture by Christopher D. Bader, F. Carson Mencken, and Joseph O. Baker. New York University, 2010. 272 pp. (paperback). \$20. ISBN 9780814791356.

To belong to the SSE is, de facto, to be a member of “Paranormal America,” and so we are all fit subjects for this informative book. The three sociologists (hereafter BMB) who authored this study drew chiefly on the data from two waves (2005 and 2007) of the Baylor Religion Survey, funded by the John Templeton Foundation (<http://www.isreligion.org/programs-research/surveys-of-religion/>). Administered by the Gallup organization for the Baylor Institute for Studies of Religion, these surveys were large national samples of American adults that asked a wide-ranging set of questions about religious beliefs and practices, but also about a number of paranormal beliefs, including some of those that preoccupy us at the SSE.

Social scientists have investigated those who profess a religious faith from many angles, and a portion of these studies have attempted to understand the sociology, psychology, and motivations for religious belief. Another, closely related, strand of work has been a parallel examination of believers (a label many of us reject) in various paranormal phenomena—psi, UFOs, cryptozoology—with broadly the same aims. These studies have usually been relatively small in scale. Many of the major survey organizations have regularly conducted polls asking the public’s opinion on paranormal topics, demonstrating (as we well understand) that interest and belief in some of our favorite subjects is widespread.

The chief contribution of BMB is to look jointly at attitudes toward religion and paranormal beliefs with enough subjects that all sorts of interesting relationships can be teased from the data. All three authors have experience as scholars of religion, so they are well-situated to conduct this study. As BMB are sociologists, there is very little mention, perhaps mercifully, of the psychology of belief. The focus is first on demographics and social status: who believes, or not, in various subjects or religious tenets. Then BMB explore how religious and paranormal beliefs are intertwined and whether some are more commonly associated, some not.

All of this is relevant to those who study phenomena rejected by science. It is useful to know the proportions of the public who express belief in these phenomena, as that belief may translate into various forms of support. And, as I discuss below, it is valuable to understand what factors are related to support, or to disbelief.

BMB necessarily asked about a limited, though reasonable, set of

paranormal beliefs. And, unavoidably, one must ask a survey question using particular language, so it is easily possible to disagree with their constructions. For example, the question about UFOs asks “Some UFOs are probably spaceships from other worlds.” It may seem straightforward, and it certainly captures what many might consider the most exciting possible origin for unexplained sightings. However, stating the question that way ignores the possibility that UFOs might be time travelers, or come from other dimensions (does that count as “other worlds” or as a “spaceship”?), let alone more esoteric, but still currently inexplicable, generating mechanisms. Choices such as this are why the *absolute* percentage of respondents answering in the affirmative must be viewed with caution, and why relationships between attitudes are perhaps more revealing.

Within *paranormal* beliefs BMB include psychokinesis (PK), fortune-telling, astrology, the existence of Atlantis or other lost civilizations, communication with the dead, haunted houses, premonitory dreams, UFOs, and crypto animals. They also asked about alternative medicine and whether we are entering a New Age that will radically change our current views. BMB are not always careful with the distinction between the *supernatural* and the *paranormal*. The former refers to phenomena that appear to transcend the laws of nature or be inexplicable by science. The latter refers to phenomena that are not generally accepted by science (UFOs) or outside of normal sensory channels (psi).

The book is targeted at a popular audience, and so while well-written it includes interspersed accounts of one or more of the author’s visits to persons who are interested in one of these subjects, or even actively investigating them (e.g., Bigfoot hunters in Texas). These anecdotal reports enliven the text, and they allow the authors to provide some needed background information on various anomalous subjects that is helpful to the unfamiliar reader. But they hardly contribute much to our knowledge of these subjects, and they sometimes blur important distinctions between those who simply profess belief in a paranormal topic, and those who are actively involved in studying it and making their beliefs public by joining a group, attending meetings, etc. The vast majority of those interested in one or more paranormal topics expresses that interest privately to friends and family (otherwise membership in various paranormal-oriented groups would be huge) and confines that interest to the occasional book, television program, or website visit.

So what did BMB learn about the public’s belief in these topics? They explain to the reader the standard disdain that the academy and the establishment hold toward such beliefs, and so they are a bit astonished to report that these beliefs are widespread and exist among all segments of the population. The exact numbers, again, depend on the mix of beliefs and question wording, but

overall, about 68% of adults believe in the reality of at least one of the above phenomena.

Given the diversity of paranormal topics, of just as much interest to *JSE* readers may be the percentage who believes in the three key topics of PK, UFOs as spaceships, and crypto animals. While about half of the sample (from 2005) believes in at least one of these, only 6% agree in the reality of all three. While not focusing on the exact percentages, this pattern illustrates why each of these areas attracts its own supporters and how there isn't one constituency for the paranormal in America (or elsewhere). Instead, as BMB point out, there is a continuum, ranging from paranormal *particularists*, with a belief in one or a few anomalous phenomena, to paranormal *generalists*, with multiple beliefs. These results also underscore the importance and unique position of the SSE in the study of rejected and anomalous topics. The SSE is a welcoming home for the full spectrum of such subjects, with some of the concomitant internal tensions.

Females generally have a greater belief in most paranormal phenomena, sometimes much bigger (i.e. 27% to 14% for males for the possibility of communicating with the dead). They are no different from males in their beliefs about large crypto animals. Only on UFOs do they have lower levels of belief than males. For race, a higher proportion of non-whites has paranormal beliefs compared to whites, with the greatest difference on belief in PK. The relationship with education is more complicated, but looking at those who didn't complete high school versus those who have high school education or above, those who dropped out of high school have substantially higher belief in fortune tellers, astrology, and ghosts.

As BMB state, people who believe in the paranormal are different, and in the ways detailed above, consistent with the hypothesis that they are more likely to be in marginal social positions, using paranormal beliefs to gain some measure of control or power. Nevertheless, to their credit, BMB note that "in spending time with people who have experienced the paranormal, we have been continuously struck by how poorly they seem to fit a marginal person model." The Baylor surveys also asked about paranormal experiences in these nine areas and found inconsistent relationships with standard demographic characteristics. BMB declare that "To attribute these beliefs and experiences to being 'crazy,' we would have to believe that more than half of the adult population of the United States is 'crazy,' a frightening prospect, to be sure." This may be the chief contribution for academics and the general public (though I have more faith in the latter in this regard) of *Paranormal America*: making it plain that *normal* people believe and experience these things.

The authors investigate several other hypotheses about paranormal beliefs. One that you may find credible is the idea that those who are less tied to the

conventional order of society are more prone to unconventional beliefs. Consistent with this, persons who are cohabiting have a higher level of belief, as do political independents. But there are no differences by one's involvement in community groups.

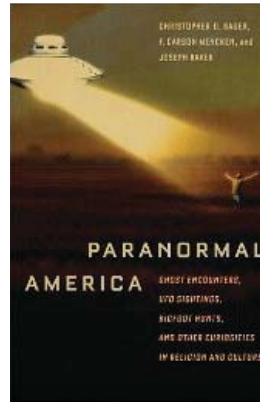
By creating a scale of conventionality, though, BMB are able to show that there is a clear relationship on the whole, such that as a stake in conformity increases, paranormal belief decreases. This has immediate relevance for the SSE, and I have personally observed the pattern in the reaction to and evaluation of the UFO phenomenon. The elites of society—political, media establishment, and the academy—are more negative about UFOs than the average person in the street. It is plausible that *one* factor (nothing is simple in society) is their stake in the status quo. This is certainly the feeling one gets from observing organized skeptics (e.g., CSI), who have an amazing ability to defend the current scientific status quo as if their system of beliefs/worldview depended on it.

Turning to religion and its association to the paranormal, we find another mixed bag of findings that is not supportive of a simplistic view. In overall belief, the various religious traditions (Catholic, mainline Protestant, evangelical Protestant, etc.) are about equal, with Jews and evangelicals evincing a bit less belief, those from other religions—Hinduism, Buddhism, and so forth—having the highest level of belief. Those with no religious affiliation have about average levels of belief. BMB expected larger differences between the religious traditions based on past work.

Some headway is made when the relationship between various types of religious behavior and belief are contrasted with paranormal belief. Those who hold the view that the Bible is literally true have a lower level of belief, but those who are on the opposite end of that spectrum and think it a “book of fables” do not have the highest belief. Instead, it is the group who believe it “contains some human error” that has the most belief in the paranormal. In a similar vein, those with a moderate level of church attendance have the highest paranormal belief and paranormal experiences. In other words, it is those with a middling level of commitment to conventional religion who are most open to the paranormal.

Unconventionality also appears again, as those who view God as a “cosmic force” have a higher level of belief compared to believers in a literal God (with doubts or without).

In summary, people open to religious ideas but more liberal in their view of religion have higher levels of belief than strong believers or nonbelievers.



As is usually the case in social science research, there are some caveats to all this. It is basically impossible in these studies, which were cross-sectional, to estimate with any certainty whether the relationships BMB find are causal, and, if so, the direction of the effect. Does being more of a religious literalist lead to lower paranormal belief? Does being unconventional lead to higher paranormal belief, or is there mutual reinforcement? Second, the amount of variance explained in BMB's multivariate models is modest. A complete understanding of what causes someone to believe in a paranormal topic lies beyond our current knowledge, although here an integrated multidisciplinary approach would be necessary. No sociological theory about belief can be more than a component of a full model.

Paranormal America would make an excellent reference to use to reinforce the point, with data, that those who believe in various anomalous subjects are not that different from anyone else. As BMB conclude, "Statistically those who report a paranormal belief are not the oddballs; it is those who have *no beliefs* that are in the significant minority" (emphasis in original). That is no small comfort for those of us involved in the serious business of studying topics rejected by mainstream science.

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Loch Ness, Nessie, & Me: The Truth Revealed by Tony Harmsworth. Drumadrochit: Harmsworth.net, 2011. 356 pp., b/w illustrations, index, photograph list, references. \$22.66 (paperback). ISBN 9781446734865.

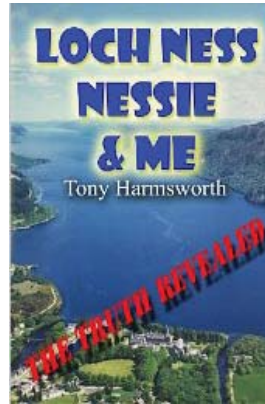
Over the years, virtually every major personality in the long-running cryptozoological saga of the Loch Ness Monster (LNM) has published one or more books, reports, or scientific papers on this ever-intriguing subject—Professor Henry Bauer, Dr. Maurice Burton, Tim Dinsdale, F. W. Holiday, Professor Roy Mackal, Dr. Robert Rines, Sir Peter Scott, Adrian Shine, Nicholas Witchell, even notorious photo-hoaxer Frank Searle. Indeed, only two notable omissions from this eminent list of Nessie-linked names come to mind. One is Steve Feltham, who has spent much of the past 20 years living in a converted mobile library on the shores of Loch Ness, hoping to make that breakthrough Nessie sighting one day, and who will assuredly write a book of his extraordinary life at some point in the future. The other is Tony Harmsworth, founder of the original LNM exhibition centre in the Scottish Highlands village

of Drumnadrochit, on the west shore of Loch Ness, during the early 1980s, but whose long-awaited story has now finally been published—and what a story it is.

Unlike previous Nessie books, this volume is not devoted exclusively to the LNM. Instead, it is Harmsworth's own autobiography, documenting an eventful life, but in which Nessie has certainly played a major part. Consequently, its text, arranged chronologically as one would expect with a book of this nature, has for the most part a much less formal style than those of its predecessors. Only when dealing with various key pieces of evidence, such as the sonar traces and controversial “flipper” photos, does it become rather more technical. Inevitably, it covers much the same ground as other Nessie books when documenting the LNM's history, but what makes it unique and particularly interesting is its personality-driven format, so very different from the vehemently objective style of presentation typifying previous LNM coverages.

As his life story unfolds, Harmsworth reveals all manner of Nessie-linked facts and insights that have not previously been documented or widely publicized. His prolonged but ultimately unsuccessful battle to retain part ownership of the exhibition that he conceived is especially revealing. So too is the saga of *Nessie Hunt*, an award-winning LNM-seeking board game that he also conceived, and which received considerable critical acclaim. Sadly, however, it never attracted a comparable degree of commercial success, despite receiving some welcome publicity from none other than Doctor Who—or at least the actor Colin Baker who played the television Time Lord during the mid-1980s. Another hitherto-unsuspected event is the somewhat hapless albeit unfortunate loss en route by aeroplane from the States to Scotland of an 8-ft.-long fiberglass replica of one of the famous flipper-like images snapped underwater at the loch by Rines's research team during the early 1970s. Imagine having to claim for “One Loch Ness Monster flipper” on the Lost Property form at the airport!

What is most entertaining and informative of all, however, is Harmsworth's own take on every noteworthy LNM personality (having met them all at one time or another during his extensive, ongoing involvement with this most famous of all cryptozoological cases), and also on every newsworthy piece of research or evidence brought to public attention during the previous decades, including all of the most celebrated photos purported at one time or another to show Nessie. He is not afraid to state his own views, and his gradual transformation from an enthusiastic optimist to a somewhat-resigned apparent



agnostic (notwithstanding his own putative Nessie sighting) as to the existence in the loch of a bona fide mystery beast makes absorbing reading. So too does his elucidation of how Nessie herself has metamorphosed in the eyes of her eyewitnesses through that same period, from a large fish to a Jurassic Park-style prehistoric survivor of plesiosaurian persuasion and then back again to a large fish—with such metamorphoses seemingly effected more by outside influences than by what the eyewitnesses were actually observing.

The book is illustrated by more than 200 b/w photographs, but although an entertaining read it would certainly have benefited from an experienced proofreader, because a fair number of typographical errors have crept in. So too, rather more worryingly, have some factual mistakes of the kind that should have been readily spotted and eliminated. For instance, when documenting a certain extremely famous bestselling author and Conservative Party peer, Harmsworth consistently refers to him not as Jeffrey Archer but as Geoffrey Archer (who is a totally separate writer of thriller novels). Similarly, on p. 142, “MP Charles Brandreth” should read “future MP Gyles Brandreth” (Charles was his non-MP father, and Gyles himself was not an MP during the period documented on that page). And when ruminating upon the annual Eurovision Song Contest, Harmsworth states “It is always thoroughly enjoyable” (i.e. present tense) listening to UK compere Terry Wogan’s much-loved humorous asides—even though Wogan had actually resigned from this post back in 2008 (having been replaced from 2009 onward by Graham Norton). One can only hope, therefore, that his Nessie coverage, a subject upon which he is no doubt far more knowledgeable, does not contain any such slips.

That aside, however, I certainly recommend Harmsworth’s book as an enjoyable, often eye-opening, and very personal view of the LNM’s colorful history and enduring mystery, and I for one will in any event always be thankful to him for providing one of the most memorable cryptozoological statistics ever—which I freely confess to having used on more than one occasion myself since. While chatting as a guest on *Saturday Superstore* (a British teenage television show) one autumn morning in 1985, Harmsworth stated: “You can put the entire population of the world, every man, woman, and child on Earth, in Loch Ness THREE times over. And you’d still have room for a few mysteries.” Surely, then, somewhere amid that unutterably vast volume, there is enough room for at least a few monsters too . . . isn’t there?

KARL P. N. SHUKER

Conscious Connections: About Parapsychology and Holistic Biology by Göran Brusewitz. Saarbrücken, Germany: VDM Verlag Dr. Müller, 2010. 100 pp. \$68 (paperback). ISBN 9783639291148.

The first question when holding this book in my hands was: Why is it so expensive? For a book of 100 pages, \$68 is not a usual price. The author has informed me that he was unaware of this high price when he closed an agreement with the publisher, so I regard it as a matter of publisher policy. Materialistic issues aside, the book is valuable in several regards. It starts with an approving Foreword by Stanley Krippner, and continues with an Introduction to the contents of the book. After that, three somewhat heterogeneous chapters follow. The first describes an experimental study the author has performed, the second chapter is a review of modern research in parapsychology, and the third consists of a review of the research performed in the field of bioenergetic effects on organisms. I will highlight the contents of these different sections below.

The Introduction contains a short description of the skeptical movement in Sweden and some of their critics. Among them is Martin Gustafsson of the University of Stockholm. Brusewitz summarizes an interesting line of reasoning put forward by Gustafsson. Among other “ideals,” the Swedish skeptics profess to continue to use the principles of the philosophers of the Enlightenment era to strengthen the resistance of people to irrationalism by popularizing the methods of and the results gained in science. However, Gustafsson argues that there is an obvious discrepancy between the aim of the philosophers of the Enlightenment, who aimed at awakening people’s motivation to educate themselves and not to simply trust in authorities, and to persuade people to trust in the methods and results of academic authorities. Clearly, this latter recommendation is *not* what the philosophers of the Enlightenment had promoted. Gustafsson makes a good point here, and it might be appreciated by all those who argue with skeptics every now and then. This revelation is characteristic of the book: The author draws much of his work from Scandinavian and Eastern European literature that is not well-known in the West by those writing on the border areas of science, and I found it refreshing to read about persons and experiments I had never heard of before.

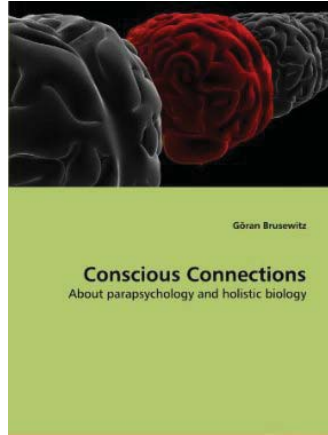
The first chapter describes an experiment that Brusewitz performed at the University of Stockholm to detect effects in electrodermal activity in persons as a response to remote “sending” individuals—effects that had been reported in earlier studies. However, the replication attempt by Brusewitz failed. To account for the negative results, the author raises several methodological issues and provides suggestions for future research.

The second chapter contains the mentioned overview on recent research

in parapsychology, supplemented by an impressive reference list. Among other topics, Brusewitz includes such diverse themes as Ganzfeld studies, fMRI studies, telepathy between twins and also between animals and humans, near-death experiences, apparitions and hauntings, but also an overview on the cutting edge studies on quantum physics in biological processes.

Chapter Three, titled “Biomagnetism, Biofields and Holistic Biology,” constitutes the most important part of the book, being a valuable introduction into studies assessing bioenergetic or psychoenergetic effects on organisms. Brusewitz expounds on many different aspects of research into bioelectricity and biomagnetism, such as the influence of electrical and magnetical fields on organisms, bioelectrical systems operating in the body, “biolight” (infrared light that is said to stimulate wound healing), and “biophotons” (very low amounts of coherent light emitted by organisms), the role of the heart in the body apart from being a blood pump, but also animal navigation, aspects of dowsing, and possible connections between this field of research and parapsychological findings. He briefly discusses holistic biology and vitalistic concepts of life, and concludes by describing the basics of a new view of life, which he conceives as being rooted in some kind of bioelectrical field. All this results in an intriguing line of reasoning, which updates previous similar concepts and weaves together aspects of diverse contemporary fields of research. However, there is one detail in this chapter that I found particularly intriguing. Here, Brusewitz briefly summarizes research performed by Swedish artist Göte Andersson. Andersson had experimented with an apparently highly psychic boy, who, among several other remarkable faculties, seemed to be able to perceive luminous emanations around the poles of magnets. Apparently, these emanations seemed of different quality above each pole to the boy, and he was able to distinguish correctly the poles of a magnet in prolonged series of blind and double-blind trials—making no mistakes. This curious ability has been reported before, starting with the first writings of Baron Karl von Reichenbach (1849) on the “Od” he claimed to have discovered, a universal vital force permeating all matter, but being concentrated in crystals, magnets, and living organisms. The experiments performed by von Reichenbach with his “sensitive” persons are usually regarded as ill-founded, with the results produced by (auto-) suggestion, but it remains remarkable that the observations described were also reported by several subsequent authors (e.g., Barrett et al., 1882–1883, Büchner, 1854, de Rochas, 1895, Durville, 1895–1896). One of them, Floris Jansen (1907) in The Netherlands, has even implemented a fully automatized laboratory setting. It is intriguing that a boy who has stated that he had never heard of these experiments before 2010 (Brusewitz, personal communication, 2011) seemed to confirm these earlier reports. And, as with other things in his book, Brusewitz deserves credit for his making this quite-unknown Scandinavian episode known to a broader audience.

However, I'd also like to highlight one weakness of the book. Sometimes important background information and historical concepts dealing with the introduced phenomena are described too superficially for my (admittedly historically biased) taste, or even misleadingly. For example, the concepts of holistic biology and vitalism as discussed by Brusewitz need clarification. The author acknowledges that there are unsolved problems in biology, and he seems to think that electrical processes in the bodies play an important role in governing some of these phenomena. He seems to conceive holistic biology as being based on bioelectrical foundations, a perspective that appears too limited. Similarly, Brusewitz asserts that vitalists “believe that biological life is based on electricity and solid-state physics in biology” (p. 50), apparently relying on secondary sources that have characterized vitalism in inappropriate terms. The essence of (neo-) vitalistic concepts lies in the propositions that the functions of a living organism are not explicable by the laws of physics and (organic) chemistry alone, but are mediated by a vital principle distinct from the factors governing physico-chemical reactions, and that organisms display self-determining and autonomous qualities (Driesch, 1928, 1935a, von Hartmann, 1925, *Merriam-Webster Dictionary*, <http://www.merriam-webster.com>). In short, vitalistic concepts typically go far beyond entailing electric fields as a vital principle of organisms, and several influential vitalists such as Hans Driesch and Eduard von Hartmann explicitly referred to this vitalistic life principle as being immaterial by nature. Hence the many writings of Driesch about possible connections between vitalism and the phenomena assessed in parapsychological research, most of which certainly cannot be explained by some kind of (bio-) electrical field or force (e.g., Driesch, 1933, 1939). Moreover, Brusewitz characterized Driesch as having postulated an “extrabiological” principle guiding the structural development of organisms—quite misleading terminology. Rather than being “extrabiological,” the vital guiding principle in Driesch’s philosophy, *entelechy*, is the fundamental and dynamic source of life without which no biology would be possible. It lies at the heart of all biology and distinguishes life from inanimate matter. Apart from governing physiological processes and form development on a mere biological level, it also comprises a soul-like quality that also governs actions on a higher level of biological organization—then being termed *psychoid* (Driesch, 1928). In addition, it entails a primordial quality of wholeness that mediates



the orchestrated functioning of an organism by implying a characteristic form of causality that Driesch had termed *wholeness-causality*. It can be conceived as an advanced form of the older—and, according to Driesch, sometimes ambiguous—concepts of *teleology* and the *causa finalis* in the Aristotelian philosophy (Driesch, 1927, 1928, 1935b).

The misconception that vitalists endorsed electrochemistry to explain unsolved riddles in biology becomes also apparent when Brusewitz states that a specific chemical model which describes hypothetical pathways leading to the origins of life, relying on electrochemical properties of the molecules involved, could provide connections to the vitalistic view of life (p. 50). No vitalist I am aware of would have subscribed to this idea. And, I take the opportunity here to stress that the origins of life are far from being understood at present, despite recurrent proclamations in scientific journals and in popular newspapers that state the opposite. In a previous publication (Nahm, 2007), I have identified and discussed 24 serious problems for pre-biotic chemistry that need to be overcome both in theory and in practice before it can be stated with justification that life has developed “by itself” through mere physicochemical reactions, including the fashionable concept of self-organization as a means to enhance these hypothetical processes. Although interesting articles have been published in the meantime (e.g., Powner et al., 2009), the situation has basically remained unchanged. Almost 60 years after the famous Urey-Miller experiments, we still don’t have the slightest clue about the historical pathways that have led to the origins of life on our planet. On closer look at the details, all we have are highly speculative and problematic hypotheses that rest on doubtful experiments with largely disappointing results, focusing on isolated and primitive aspects of organic chemistry.

Be that as it may, I conclude by stating that apart from the conceptual drawbacks just discussed, I deeply appreciate the way in which Brusewitz has highlighted unsolved problems in biology, has pointed to their possible connection with related findings in parapsychology, and has underscored that the prevalent paradigm in mainstream biology, namely focusing on molecular biology and biochemistry, implies severe deficits prohibiting a deeper understanding of the nature of life. For my part, I am sure that he is on the right track here, and that following this track has the potential to provide an important step forward toward a fruitful and innovative branch of future biology. May his book contribute to increasing the interest in these intriguing phenomena, and in their implications for a better understanding of life, including human nature.

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Science & Spirit by Hernani Guimarães Andrade (edited and with an Introduction by Guy Lyon Playfair). London: Roundtable, 2010. 198 pp. \$17 (paperback). ISBN 9780956449337.

In a well-written Introduction, Guy Lyon Playfair presents Hernani Guimarães Andrade’s significant biographical data and how important he is for Brazilian Spiritism. Andrade’s works are crucial for those Spiritists who study mediumistic phenomena. Andrade is important in this context not only because he is considered one of the most charismatic and sympathetic among Spiritists, but especially because his work had—and still has—a strong impact on the Spiritist culture in Brazil. With a flawless method of data collection, Andrade has investigated a wide variety of cases related to psi phenomena, such as cases of reincarnation and poltergeists, healings, and other manifestations of mediums. In addition to case studies, Andrade conducted experimental research on his theory of a “biological organizing model,” an anticipation of Sheldrake’s morphic fields.

As can be seen, Andrade was productive, having collected case studies,

conducted experiments, and built theoretical models. The book *Science & Spirit* aims to present part of his huge production with the publication of four papers that are representative of a part of his work. It presents three case studies: a poltergeist case, a “drop-in” case, and a case suggestive of reincarnation. The descriptions of the cases are extremely detailed, and show how rigorous Andrade was when he was collecting data. The book also presents his “biological organizing model” in the last chapter.

The first chapter presents a poltergeist case study that occurred in Suzano, a small city close to São Paulo City in Brazil. In this case—which was called The Poltergeist of Suzano—the occurrences were characterized by the appearance of spontaneous fire in a humble house. The spontaneous fire started in May, 1970. However, for about two years before the fires had started, stones had been thrown at the house in a mysterious way.

Andrade’s team took note of the case through the press. Soon they went to the location of the poltergeist-like occurrences, which was already being investigated by the police. Andrade’s team started collecting data, including interviewing the people involved. The interviews were later transcribed in full. Through the interviews it was possible to raise the family history and discover a plot that, according to Andrade, could be the cause of the paranormal occurrences. The father of the family, Jeziel Eleuterio de Souza, had an extramarital affair with Maria Cristina Silva. Both abandoned their families to live together. The families that were abandoned suffered to maintain themselves. Laura, who was Jeziel’s daughter, had to abandon school to care for siblings and keep house. Four years after the separation, Jeziel decided to leave Maria Cristina and return to his family. So, Maria Cristina decided to perform rituals of Umbanda, a magic Brazilian religion, with the aim of causing harm to Jeziel and his family. Laura and her father did not get along. In addition, Laura had fallen in love with a man who was not interested in her, so she was also unhappy because of that, too. Then, the phenomena began to occur. Several expedients were used to try to stop the phenomena: A Catholic priest and two Protestant pastors blessed the house and other people performed Candomblé rituals, but nothing worked. Only after an exorcism performed in the Spiritist Center *Mãe Pobre* did everything return to normal. According to the center’s staff, a strong magic ritual had been performed against Jeziel’s family. The entities that were around his house were virgins, that is, they had never incarnated because they constituted a legion of evil spirits.

Upon completion of the case, Andrade examined the factors involved: the historical antecedents of Jeziel’s family; the tension between Laura and her father; the threats made by Maria Cristina; the intervention of various religious people; the cessation of events when Laura was kept far from the house for a few days; and the cessation of events after the Spiritist exorcism. Andrade

dismisses any possibility that psychological trauma caused by the separation between Laura and her father could have been a cause or even that the contact with the religious people who tried to solve the case could have reduced tension and thereby cooled the occurrences. He says that the first hypothesis is untenable, arguing that

... if Laura's psychic tension came to provoke such a violent phenomenology, it was because her emotional imbalance may have reached a plateau near the climax. A patient in this condition would require months or years of psychotherapeutic treatment to be normal again. (Andrade, 1988:117)

Andrade concludes that the case of Suzano meets the four conditions proposed by his model for poltergeist occurrences. There was a wizard (first condition) who, sought by Maria Cristina, performed a ritual of black magic (second condition) against the family of her ex-lover, enabling evil entities (third condition) to use Laura's energy (fourth condition) to provoke the phenomena in order to meet the goals of Maria Cristina's revenge against Jeziel. During the Spiritist exorcism, the entities were removed, thereby blocking one of the conditions necessary for the occurrence of the phenomena, namely the presence of incorporeal agents.

Chapter 2, titled "The Ruytemberg Rocha Case," discusses a "drop-in" case, i.e. the alleged manifestation of a spirit unknown to everyone present at the seance. On November 6, 1961, during a seance, several people witnessed the words of the medium in trance, Dona Tulia, introducing herself as another person, a man, providing many details of his life, as well summarized by Andrade:

... a. his name was Ruytemberg Rocha; b. he was a pupil in the second year of School for Officers of the São Paulo State Police; c. he had been established in the Marcílio Franco Battalion engaged in fighting on the Buri front, in the State of São Paulo, during the military operations of the 1932 Constitutionalist Revolution; d. he had been wounded by grenade shrapnel and felt much pain in the region of the upper clavicle (or on the left side of the breast) over which place the entranced medium kept her open hand for practically the whole session; e. he had been brought to the session by his father and some friends; f. he had been born in São João da Bacaina, State of São Paulo, in 1908 (his town is now called just Bocaina); g. his father's name was Osório Rocha; h. his mother's name was Julieta Simões. He also gave her a nickname (which the witnesses unfortunately could not remember, although some thought it was "Lilita"); he had a sister, whose name he gave at that time, but the witnesses could not recall as they had not taken it down. Marina [one of the participants of the seance] however remembered that the name given was Olinda. (p. 84)

Some participants of the session commenced an investigation into Ruytemberg Rocha. They went to the school for the Preparation of Officers

of the Police Force, searched for information about him, and looked for his personal records. Many details given by the medium seemed confirmed. They also found two newspapers that announced Rocha's death, which also seemed to confirm data provided by the alleged entity.

Andrade did not attend the session. The data were passed to him by a doctor and parapsychologist friend, Dr. Alberto Lyra, who in his turn was a friend of a person who attended the session called Waltencir Linhares. Andrade learned of the séance about eight or nine years after its occurrence. In 1970, he and his team began the investigation, collecting data through interviews and written testimonies from people who had attended the sessions. Andrade considered it unlikely that the event was a fraud, considering the medium was a "person of social standing and clear moral sense," and that her activities as a massage therapist would not have allowed her the time to search for information about the deceased. So the first objective was to find some information that could support the hypothesis of unconscious memory (cryptomnesia), i.e. that the medium would have retained information about the Rochas, even without remembering it consciously. The historical material consulted allowed researchers to find a few references about Ruytemberg Rocha. Books, newspapers, public archives, and the police were consulted; relatives and friends were interviewed. Virtually all information provided by the supposed spirit was confirmed. However, some important information has not been confirmed, such as the cause of death (he had been shot in the head), the fact that his father would not be alive when Rocha died, and the fact that the name of Rocha's mother was *Julita* and not *Julieta*.

After presenting the case and its investigation, Andrade pointed to and discussed some explanatory hypotheses. As already mentioned, he thought it was unlikely this was a fraudulent case. The hypothesis of cryptomnesia was discarded. Andrade believed that misinformation (as about the cause of death) showed that the medium could not have had previous contact with and information about Rocha's death. He also rejected the hypothesis of extrasensory perception (ESP). Andrade believes that an ESP hypothesis does not explain a lot of data, such as the reason why the medium would have "focused" exactly on Rocha, the reason for the inconsistency about the cause of his death, the reason for the misconception of his mother's name, why the medium had "selected" the name *Olinda*, Rocha's closest sister among his several brothers and sisters, when she was already dead (1961), and the reason why the medium mentioned Rocha's military rank when he was alive—he was a lieutenant—while historical records say that he won a military rank as a Captain after his death from the government. Andrade presents an alternative hypothesis to those discussed above that he considers the most plausible: the manifestation of a disembodied agent (drop-in). This hypothesis, in his opinion, gave meaning to

the apparent inconsistencies in information. Firstly, the deceased knew of his military rank (lieutenant) while alive. To explain the misunderstanding of the cause of death, Andrade, builds an ingenious hypothesis:

Ruytemberg was killed by a shot through his forehead. This is the truth. What could Ruytemberg have felt when the bullet pierced his head? The impact must have been followed by a roar and a flash of light as a reaction to head concussion, and he may have felt pain. The shot, on piercing his head, might have excited the nerve centers corresponding to the place where he did feel the pain. In the fraction of the second before he died, Ruytemberg might have interpreted what he felt as the result of the explosion of a grenade, the shrapnel having hit him in the area corresponding to the nerve centres in the brain which had been excited. This, in our opinion, is the explanation for the discrepancy. (p. 133)

The third chapter is titled "A Case Suggestive of Reincarnation." This is the case of a girl whose pseudonym, given by Andrade, is Jacira, who not only remembered an alleged previous life, but also behaved as if she was the deceased. The deceased was her uncle, whose pseudonym is Ronaldo, her mother's brother, who killed himself about five years before Jacira's birth. Ronaldo committed suicide by drinking poison to kill ants mixed with *guaraná*, a typical Brazilian soda. After the suicide, the alleged spirit of Ronaldo was present in several seances at the spiritist center, and in one he gave an indication that he would return to his family. The confirmation that Ronaldo would actually reincarnate was provided by the spirit guide of the spiritist center attended by Jacira's parents. According to the medium who coordinated the spiritual work at this center, the spirit guide claimed that Jacira's mother was already pregnant and her baby girl would be Ronaldo reincarnated as a woman. The couple doubted this information because Jacira's "future" mother had no symptoms of pregnancy and also because she had been operated on to avoid getting pregnant. But the information was correct and when the message was given by the spirit guide, the woman was already pregnant for about one month, and Jacira was born in October 31, 1956. During pregnancy, her mother experienced various physical symptoms, as if she had drunk poison. In fact, the medium had predicted that the girl would not suffer anything because of poisoning from Ronaldo, but the mother would suffer the consequences. Jacira was born healthy and perfect but with a squint in both eyes, just like Ronaldo. Strabismus was corrected after a year. Over the first seven years of life, Jacira made several references to a previous life, but she forgot it later. Some of these references were: aversion to red liquid (which is related to the coloration of the poison drunk by Ronaldo); detailed memories of events experienced by Ronaldo in his childhood, as the occasion when the cow named Morena attacked him and other children, forcing one of his brothers to help them; when she talked

to her father, Jacira behaved like Ronaldo, speaking as a grown man, despite being a two-year-old girl; she showed her displeasure about not having the same name (Ronaldo) from her other life; when she was three years old, she wept when she learned that the former fiancée of Ronaldo would marry. Andrade presents 27 memories like these in detail, by presenting the transcription of reports by Jacira's parents. Andrade discusses several hypotheses for the case: deliberate fraud, cryptomnesia, telepathy, memory, genetics, reincarnation, and psychic incorporation. After presenting counterarguments for each of the first hypotheses, he concludes that the latter is the best that could explain both the history of the case—such as the information that Jacira's mother was pregnant—and the memories of the girl, in addition to the “birthmark” (strabismus).

The last chapter of *Science & Spirit*, entitled “PSI Matter,” is a conceptual presentation of Andrade's biological organizing model. Andrade argues that biological life can only be understood if we assume an extramaterial principle, which would guide the laws of nature to intelligent action. Andrade called this principle the *psi factor*. Through a complex action of this extramaterial principle over matter, little by little life would be organized from the simplest organisms to the human constitution.

In another study (Andrade, 1984), published 14 years after “PSI Matter” was written, his biological organizing model was again developed, now in greater detail and relating it to various forms of paranormal phenomena. Basically, he postulated that there would be a fourth dimension where incorporeal beings would live, who would be responsible for many of the allegedly parapsychological events. Andrade pursued this hypothesis throughout his life and, as the studies published in *Science & Spirit* can illustrate, this hypothesis was always chosen by him over the competing hypotheses, even if the latter were simpler. When in 1996 we visited Andrade in Bauru, a city in the State of São Paulo where he lived, he showed us his laboratory and his spatial electromagnetic tensioner (TEEM, from Portuguese *tensionador espacial eletromagnético*). According to Andrade, the TEEM would create an electromagnetic field so strong that it would be able to bend space, thus forming the fourth dimension. At that time, Andrade was conducting studies with the TEEM and bacterial cultures. His hypothesis was that the field formed by TEEM would have a biological nature, the same that allowed the existence of life on our planet. If the field really had a biological nature, the bacteria placed inside the TEEM would multiply more quickly than the control sample kept under the same environmental conditions outside the device. According to Andrade, the results of his research were encouraging. Unfortunately, his death in 2003 did not allow these experimental studies to be completed and published by him.

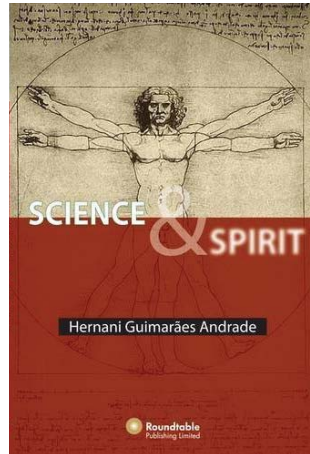
After finishing *Science & Spirit*, the reader realizes that Andrade was a man passionate about truth who was always concerned with methodological rigor.

We may not agree with his interpretations of his obtained data, but probably nobody can reproach or criticize him with regard to his ability to do research. It is amazing to see how meticulous he was in data collection, making a huge effort to have all the information necessary to evaluate his hypotheses. We are convinced that Andrade, in fact, believed that the assumptions chosen as preferred were consistent. He was a Spiritist and his preferred hypothesis met his personal beliefs. It suggests that Andrade's interest in this research topic was not merely theoretical.

Moreover, his choices show that his mind concepts were more static than psychology has revealed. For example, when considering the hypothesis of unconscious memory (cryptomnesia), Andrade argues that it is not acceptable when the information presented by the medium is inconsistent with the real information. Thus, if a small amount of information does not match the actual information, though most of the information does match, cryptomnesia could not have occurred. Andrade did not take into account studies on memory and how it can be modified by the subject. Regarding the ESP hypothesis, one can see that Andrade seems to understand the action of ESP as being limited to what the experiments show of its functioning. We know, however, that we know little about how ESP works out of a laboratory setting, and if there are limits for ESP we simply do not know them yet. But Andrade seems to believe in a simplistic way what is or is not possible with ESP.

Another of his criteria, in addition to evaluating the laboratorial limits, is the purported lack of bonding between the medium and the dead person. Andrade asks the reason for such "random choice," but he cannot find any, so he concludes that it cannot be ESP. But it is important to emphasize that Andrade, perhaps because he was not a psychologist (he was an engineer), had no clinical interviews with the medium, so how would he have known of the existence of a psychological bond between the medium and dead? Finally, probably because he was a good and well-intentioned man, Andrade has not assessed rigorously enough the possibility of fraud. Thinking that a person will probably not commit fraud because he or she is considered a "person of social standing and clear moral sense" seems wrong or at least naïve.

Thus, Andrade's preference for the spiritist hypothesis can be based on: (a) the limited view he had of ESP; (b) the "static" conception he had of human memory; and (c) his benevolence in considering the medium incapable



of fraud. We do not believe that Andrade would distort the facts to fit the spiritist hypothesis. Rather, we believe that he actually found the evidence he was searching for exactly because of the misconceptions he had about the hypotheses other than the spiritist one.

Science & Spirit is a well-balanced book, featuring some of the best cases studied by Andrade, and with a chapter devoted to his model. Playfair has written an excellent Introduction, which gives a good presentation of Andrade's work, contextualizing the chapters. Although not agreeing with the Andrade's case interpretations, we welcome this important example of the research effort Andrade represents in the study of anomalous experiences in Brazil.

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The Sixth Sense Reader edited by David Howes. Oxford/New York: Berg, 2009. 375 pp. \$44.95 (paperback). ISBN 9781847882615.

The Sixth Sense Reader is a product of the “Anthropology of the Senses,” a topical area of research within Cultural Anthropology. In the last two decades following Stoller’s (1989) seminal contribution, *The Taste of Ethnographic Things: The Senses in Anthropology*, the area has been systematically developed by the efforts and works of David Howes (e.g., 1991) and his colleague Constance Classen (e.g., 1993) at Montreal’s Concordia University. This includes Howes’ creation of a scholarly series of anthologies on all of the senses, called “Cultural Readers,” published by Berg (e.g., Drobnick, 2006, Howes, 2005). But what was missing in the series was a Cultural Reader on perceptions or senses that fell outside of the fivefold division of the Western “sensorium,” the “extra” senses or the “sixth” sense. In researching the topic, Howes soon learned that the search for such a sixth (or seventh, or eighth) sense had produced a substantial and valuable literature across several disciplines, with much to tell us about the different ways that diverse social and cultural groups conceive, use, and experience the senses and the “extra/senses.” He then selected articles from not only anthropology, but also from comparative religion, history, biology, and other fields. The result is this newest volume in the series, *The Sixth Sense Reader*, edited by David Howes.

The *Reader*’s seventeen articles are grouped into four parts, sandwiched between a substantive “Introduction” by Howes and an “ABCDERIUM of Extra/Sensory Powers.” The latter is a brief index of terms, concepts, or substances (e.g., hallucinogens) associated with “other-sense” or “extra/sensory” faculties, as identified and discussed in the book. All but one of the articles derive from previously published works, and most were abridged and arranged for the *Reader*.

Howes’ Introduction, “The Revolving Sensorium,” is an important contribution of its own, offering a cogent argument for the overarching rationale and contribution of the *Reader*, while introducing the terrain to be explored to support it. That central argument is that

one cannot know what the sixth sense entails in any of its contemporary manifestations unless one excavates its cultural roots and attends to its context of expression. (p. 34)

Thus, he shows us at the outset that a people’s “sensorium,” as a model of the senses (and what would fall outside of it, as “extra” senses), varies with the culture. For instance, the sensorium of the Cashinahua of Peru is based on

six, instead of five, “percipient centers”—skin, hands, ears, genitals, liver, and eyes—and all of their associated “senses” are conceived differently than the five Western senses (p. 2). Other sensoriums he describes are likewise culture-bound, including, he argues, our own Western sensorium.

Given that relativity, Howes then asks us to consider the biasing impact of our Western sensorial expectations on our research. In the case of animal studies, for example, it impeded the discovery of animal senses outside the Western sensorium (i.e. “extra”/senses), such as: “echolocation in bats, electroreception in eels, the internal compass and ‘celestial navigation’ in birds, infrared vision in reptiles, and vibrational or seismic sensitivity in elephants” (p. 12). One implication is that our Western sensorial expectations may be similarly impeding our research of human senses and “extra/senses.”

While the *Reader* covers many of the candidates for a sixth sense, from the stoics’ “inner sense,” an inner touching of the self, to the neuroscientists’ inner sensing of balance, motion, and posture, the primary candidate since the late 19th century has been some kind of psychic perception, solidified in the 1930s by J. B. Rhine’s work at Duke University (pp. 6–7). But here, Howes argues that the public’s embracing of Rhine’s modeling of a sixth sense derived from diverse social and cultural “gaps” that believing in it filled and continues to fill. In other words, our modeling of a sixth sense is culture-bound (pp. 7–8), and thus standard parapsychological research, guided by the Western premise of separate (independent), mostly organ-based senses, aims to eliminate those senses (as in the ganzfeld) in order to isolate psi functioning, or the sixth sense. Perhaps, freed from that Western premise, we might discover that the sixth sense is intimately intertwined with other senses (cf. Batchelder, 1984).

Part I, “Bearings,” continues Howes’ introduction to the terrain with a sampling of disciplinary approaches in four articles. In the first, **Nicholas J. Wade** traces the historical development of the search for the sixth sense in the budding field of neuroscience, from the biases of Aristotelian “senses” to the identification of muscle, vestibular (movement), and temperature “extra/senses.” **W. H. Hudson** (a 1920s naturalist) follows with his plausible suggestion, on the basis of his experiences with South American Indians and rural Gauchos, that humans, like animals, have a (“sixth”) sense of direction, a homing sense, though it may be suppressed in urban contexts. The article by **Wilhelm H. I. Bleek and Lucy C. Lloyd** is their translation of a Bushman elder’s fascinating description in his own words of how presentiment manifests as a sensation on the skin. It is akin to sensing touch and signals all kinds of things, such as that a certain game is nearby when that game’s hair is felt on one’s own back or that grandfather is coming when a sensation of tapping in a place on the body corresponds to a wound that grandfather had. Finally, **Jess Byron Hollenback** argues that a “mystic’s” “sight” or “experience” constitutes a sixth sense or set

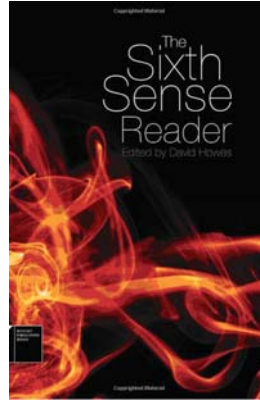
of “extra” senses (“I could see and hear in a totally different way” [p. 98]).

In Part II, “Historical Investigations,” the reader is treated to a host of in-depth examinations of the impact of notable figures and movements on the study and modeling of the sixth sense. **Louise Vinge** describes the invention of the five senses in the Western tradition by the ancients (e.g., Aristotle) and argues that their struggle to understand them (e.g., Xenophen and Philo) led to the modeling of a “spiritual sense,” much later, by Origen, an Early Church Father (AD 248), to explain the visions and experiences of the biblical prophets and Jesus.

Jessica Riskin then relates two extraordinary and instructive aspects of Anton Mesmer’s story. One was his magnetic-fluid model of a sixth sense, animal magnetism, where the magnetic fluid “provided a material foundation for sensation” and was at the same time “‘related to the whole universe’ and could perceive distant past and future events” (p. 128). The other was the explosive threat of Mesmer’s popular demonstrations of mesmerizing (and successful curing) to Western science’s sensationist principle, “that sensations necessarily originated in the world outside the mind” (p. 132), when the mesmerized could “see,” “hear,” or “feel,” without any outside stimulus. Reactionary investigations of Mesmer by the French Academy of Sciences led to the discovery of suggestion.

In the equally rich and provocative articles that follow, **Leigh Eric Schmidt** traces the impact of the Swedish 18th-century “national philosopher-turned-Christian-visionary” (p. 157) Emmanuel Swedenborg on the American New Age Movements at the time, particularly his “sensorium of the celestial world,” a synesthetic seeing, hearing, and talking with angels and spirits; **Pamela Thurschwell** unravels the role of Swedenborgians and Spiritualists in the modeling of the sixth sense by “scientific” psychical researchers of the newly founded British Society of Psychical Research in 1882, and in a second article she identifies the psychocultural functions of “ghost” beliefs, spirit photography, and phantom filming; and **Ruth Barcan** examines how “intuition” (“clairvoyance”) in alternative medicine and the current New Age Movement is conceptualized as part of an expanded sensorium.

Part III, “Uncanny Sensations,” offers two new models of uncanny sensing. In the first, **Rupert Sheldrake** draws from his book, *The Sense of Being Stared At and Other Aspects of the Extended Mind*, to present the basics of his model of human sensing. This includes “paranormal” sensing, which Sheldrake argues is a misnomer. For Sheldrake, psychic phenomena, like telepathy and precognition, are



“normal,” biologically based, abilities. They only seem paranormal in the context of the prevailing Western sensorium. What psychic phenomena suggest (as do sensory phenomena) is that the mind extends and interacts with other minds and objects. This extending is accomplished by what he calls mental pseudopodia of attention and intention (analogous to the very far-reaching physical pseudopodia of certain amoeba) that operate, detect, or sense within “morphic fields.” Through “morphic resonance,” one senses across time, not unlike (as Howes points out) Anton Mesmer’s model of a universal medium or “fluid” tied to all of nature and through which past and future events could be “sensed.”

In the second article, **Michael Taussig** outlines his complex model of a “mimetic faculty” employed in “sensuous knowing” and in sympathetic (or “imitative”) magic, where “like” is believed to influence “like” (e.g., stabbing an image, or “copy,” of someone affects the actual person). He aims to tie this mimetic human faculty to what he calls an “everyday tactility of knowing” (p. 269), a kind of taken-for-granted or habitual knowledge obtained in one’s distracted state of awareness and pre-conscious “sensing” of the ordinary (like one’s urban surroundings). Taussig is brilliant. But this rough-draft musing from a talk he gave in 1990 is unclear and disappointing, especially in light of Taussig’s (1993) later systematic explication of the model in *Mimesis and Alterity!* Read that!

The final Part IV, “Cross-Cultural Investigations,” begins with **Mircea Eliade**’s little-known but substantial and provocative essay (originally published in 1954; 1960 in English) on (primarily) the shamanic initiatory experience of illness, “death,” and “re-birth,” and its transformation of ordinary (profane) sensibility into extra-ordinary mystical (sacred) sensibility—including clairvoyance, clairaudience, and other forms of psi. Eliade offers a sample of many supporting accounts that he finds persuasive, such as of an Iglulik Eskimo shaman who becomes *elik* (i.e. “has eyes” or is clairvoyant), the paranormal powers described by ethnologists of Siberian Yakut, Chukchee, and Tungus shamans [note the typos, p. 287, of “Tonga” instead of Tungus], as well as those of Selk-nam shamans of Tierra del Fuego, Indo-Tibetans, and many others, with useful references to further reviews (cf. Giesler, 1984). Particularly interesting to me were his suggestions about what in the initiatory transformation of “madness (cf. Noll, 1983) lead to an awakening of the extra-sensory. **Barbara G. Myerhoff** follows with her classic account of a pilgrimage to *Wirikuta*, the sacred land of the Huichol Indians (of Mexico), with a group of Huichol and led by a Huichol shaman. She describes the careful preparations for the journey, their ritual ingestion of the sacred hallucinogenic plant, peyote, and their extraordinary perceptions and inner revelations versus those of the shaman. She then analyzes the structure of the mystical vision in the context of the whole

experience. In a similar vein, fellow anthropologist **Carol Laderman** describes her internalization of Malay beliefs about the spiritual aspects of the Malay self and her subsequent “sensing” of those aspects during and after a dramatic ritual trance experience induced by a Malay shaman. She argues that her ritual trance experience awakened, as Eliade put it in his article, an altered sensibility she had never experienced before.

In the last two articles of the section, **Bilinda Straight** and **David Chidester** describe very different African cases of magico-religious beliefs, practices, and “extra/sensory” or miraculous phenomena and their native interpretations and uses. **Straight’s** very interesting account of Samburu diviners of Northern Kenya, who “read” communications from Nkai, a divinity, in nature, like “reading” the “language” of animals’ movements, suggests another modality for psi functioning. But unfortunately, it seems completely disconnected from her treatments of other topics—Samburu conceptions of “cutting” (e.g., “cutting” a woman out of a girl), Piercian semiotics, and Samburu interpretations of actual cases of “near-death experiences.” **Chidester’s** piece, so different from others in the book, traces the development and impact of communications from Credo Mutwa, a self-proclaimed Zulu witchdoctor-turned-sangoma-turned-medium/victim of extraterrestrial influences, on a global New Age following over the Internet and charts his ever-evolving sensoriums.

Overall, *The Sixth Sense Reader* is a valuable collection of essays which, with the exception of Straight’s and Taussig’s pieces, encapsulate well the authors’ larger works and their informative, insightful, and provocative treatments of a “sixth sense” or “extra/senses” in historical, cultural, or theoretical context. However, as is often noted of anthologies, especially when diverse disciplinary approaches are represented, I found it difficult to obtain a unifying sense of this book when reading through it, though Howes’ portrayal of an overarching thematic in his Introduction was helpful. But even there, he had to divvy up his discussion of the book’s topical areas into twelve different sections, which deterred from its coherence! Nevertheless, apart from Sheldrake’s biological theory, the book as a whole does lend support to Howes’ important argument that “one cannot know what the sixth sense entails” without excavating its cultural roots and “its context of expression” (p. 34). For that, I believe, most SSE readers will want a copy to read, reflect on, and consult in the future.

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