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EDITORIAL

Cosmic Aesthetics

STEPHEN E. BRAUDE

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In my book *Immortal Remains* (Braude, 2003), I considered an intriguing argument William James offered against the suggestion that mediumistic evidence for postmortem survival could be explained away in normal, or at least non-survivalist, terms—that is, either by appealing to what I’ve called *The Usual Suspects* (e.g., misperception, hidden memories, fraud) or *The Unusual Suspects* (e.g., dissociation + latent abilities, exceptional memory, or living-agent psi). More specifically, James was concerned with a fascinating, but frustrating, feature of the material gathered from mental mediumship—namely, that even the best cases present a maddening mixture of (a) material suggesting survival, (b) material suggesting psi among the living, and (c) apparent rubbish.

At their best, of course, mediums furnish detailed information for which no normal explanation will suffice. In the cases most strongly suggesting survival, that information concerns the past lives of the deceased. But sometimes mediums also provide information on the *present* actions, thoughts, and feelings of the living, and that’s one reason why some cases suggest psi among the living, and why a living-agent-psi interpretation of mediumship is difficult to rule out. After all, information about present states of affairs is not something to which the deceased would enjoy privileged access.

Moreover, to complicate matters further,

. . . gems of correct, detailed, and relevant information are nearly always imbedded in an immense matrix of twaddle,

vagueness, irrelevance, ignorance, pretension, positive error, and occasional prevarication. (Broad, 1962, p. 259)

This mediumistic debris is difficult to interpret, and it's also difficult to ignore. But it's also important not to make too much of it. For one thing, it's easy to imagine why mediums might sometimes (or often) produce communications that are clearly irrelevant, ignorant, vague, etc., even if they get good hits on other occasions. For example, we can appeal to analytic overlay, noise in the channel, or communicator confusion produced by disembodiment. And for another, there's a large residue of impressive material that clearly can't be explained away in terms of the Usual Suspects (and, arguably, even in terms of some Unusual Suspects) and which can't be simply brushed aside. In fact, assuming that something paranormal is going on, the rubbish might even furnish valuable clues as to the underlying process. Needless to say, any such clues will be welcome; even after more than a century of careful investigation, the nature of mediumship remains largely mysterious. As Broad recognized,

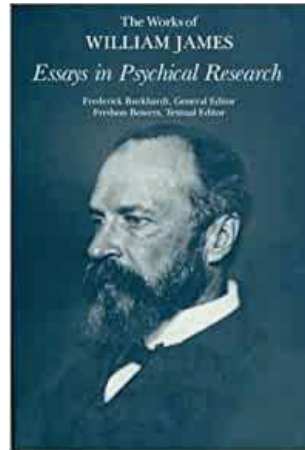
. . . although instructed opinion is almost unanimous in holding that trance mediumship supplies data which require a paranormal explanation of some kind, there is no consensus of experts in favour of any one suggested paranormal explanation. (Broad, 1962, p. 259)

Of course, there's no reason to suppose that the best cases of mediumship demand only one kind of paranormal explanation. In principle at least, they might exhibit a subtle mixture of psi among the living with manifestations of survival. And as James observed, when we consider the entire spectrum of mediumistic productions from the sublime to the absurd, it's tempting to think that the medium's organism

. . . not only transmits with great difficulty the influences it receives from beyond the curtain, but mixes its own automatic tendencies most disturbingly therewith. (James, 1909, p. 277)

Later, James suggests

Extraneous wills to communicate may contribute to the results as well as a will to personate, and the two kinds of will may be distinct in entity, though capable of helping each other out. . . . The two wills might thus strike up a sort of partnership and stir each other up. It might even be that the will to personate would be inert unless it were aroused to activity by the other will. (James, 1909, p. 356)



Gauld dubbed this the theory of "overshadowing." As he described it, behind the medium's

. . . dramatic rendering of communication from the dead, overshadowing it and somehow directing its course, there might sometimes lie those same deceased persons who figure as characters in the drama. The medium writes many of the speeches, and ensures continuity in the plot; but some of the lines (perhaps the most important ones) are filled in by outside authors. (Gauld, 1982, pp. 117-118)

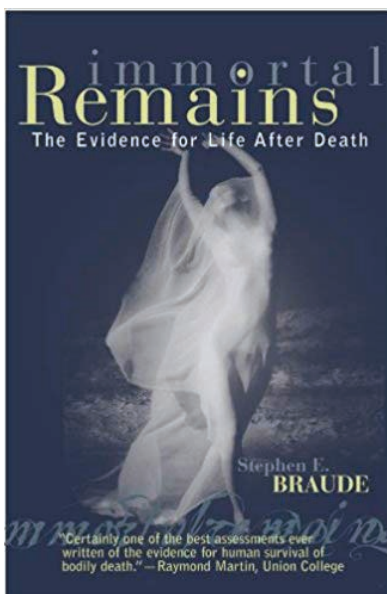
This brings me to the novel argument from James that I want to discuss. He suggested that it may be antecedently incredible that the entire mass of mediumistic communications is nothing but humbug, as it would be if we could explain away all instances of mediumship in terms of the Usual and Unusual Suspects, or even in terms of living-agent psi (LAP). All non-survivalist explanations of mediumship contend that "communications" from the deceased are really constructs by the living designed (consciously or unconsciously) merely to *appear* to be evidence of survival. The LAP versions of those explanations hold that mediums (and maybe other living persons) subconsciously use their psychic abilities to generate these illusions. Of course, explanations in terms of subconscious deception avoid charging mediums with

criminal or blatant dishonesty. But according to James, as a general explanatory strategy, that gambit seems to posit an implausible degree of duplicity. He wrote,

The notion that so many men and women, in all other respects honest enough, should have this preposterous monkeying [subliminal] self annexed to their personality seems to me so weird that the spirit-theory immediately takes on a more probable appearance. The spirits, if spirits there be, must indeed work under incredible complications and falsifications, but at least if they are present, some honesty is left in a whole department of the universe which otherwise is run by pure deception. The more I realize the quantitative massiveness of the phenomenon and its complexity, the more incredible it seems to me that in a world all of whose vaster features we are in the habit of considering to be sincere at least, however brutal, this feature should be wholly constituted of insincerity. (James, 1909, pp. 284–285)

In *Immortal Remains*, I merely acknowledged this argument as a controversial appeal to cosmic aesthetics, and I noted that it was a strategy about which reasonable and informed people might disagree, or have contrary sensibilities. But now it seems to me that I let James off too easily. James's argument should indeed be considered seriously, but it deserves more commentary than I lavished on it earlier.

Let's first present James's argument somewhat more systematically, to reveal both its structure and its undefended assumptions. I think the following is a fair presentation of that argument:



- (1) If the totality of mediumistic survival evidence can be explained away without positing the survival of personal consciousness, then that body of evidence (a "whole department of the universe") is "run by pure deception."
- (2) But it's implausible to suppose that so many otherwise honest men and women would be so thoroughly deceptive in this domain.
- (3) Moreover, the "laster features" of nature, however brutal they may be, are at the very least sincere.
- (4) *Therefore*, it's plausible to suppose that this department of nature is consistent with the rest of nature and is not "wholly constituted of insincerity."
- (5) *Therefore*, the survivalist interpretation of mediumship seems more plausible than the view that the mediumistic evidence can be explained away without positing the survival of personal consciousness.

The first thing to observe about this argument is that it's not logically valid. Rather, it's a form of inference to the best explanation. Moreover, the argument is both vague and contentious in ways that contribute to whatever superficial plausibility it enjoys. Consider, first, James's appeal to a "whole department of the universe" and "laster features" of nature. To what, exactly, is James referring? How is he parsing the natural world into departments or features?

Domains governed entirely by physical laws (say, plate tectonics or planetary orbits) are neither sincere nor insincere. Indeed, it's a blatant category mistake to assert otherwise. So maybe James had in mind just domains involving living systems. But even that seems too broad; it would also be a category mistake to consider plant photosynthesis to be either sincere or insincere. Indeed, the category of sincerity seems applicable only to living creatures of a certain, and not necessarily very high, level of psychological complexity.

However, once we consider those domains involving living systems in which deception is *possible*, we find deception *throughout* nature. Even simple creatures rely on deception to attract and capture prey; many animals feign death in the presence of a predator (because many predators take only live prey); some animals feign injury to

attract or divert attention away from a mate or from offspring; and some chimps use a kind of verbal deception to mislead other chimps about the location of a food source (see, e.g., Mitchell & Thompson, 1986). Do these common animal behavioral strategies also count as departments of nature? If so, the mediumistic evidence would not be unprecedented even if it could properly be described as insincere. And needless to say, human deception is a pervasive fact of life in various social situations that equally deserve to be considered departments of nature. Consider courting behavior for example, or political campaigns, or playing poker. So, depending on how finely we choose to parse departments of Nature, why should it be remarkable that the evidence suggesting survival turned out to be largely, if not wholly, constituted of insincerity?

In any case, it's contentious and surprisingly simplistic for James to describe as insincere or deceptive the state of affairs we'd encounter if the mediumistic evidence could all be explained away in non-survivalist terms. There are several matters to consider here.

First, humans are especially complex psychologically, and they have many competing interests and needs or desires, not all of which are conscious. What's deceptive or misleading relative to one set of interests, etc., may be straightforwardly sincere or direct in connection with another. Consider white lies, for example, told in order to spare someone's feelings. They're deceptive by virtue of being intentional falsehoods; but they can nevertheless be sincere expressions of concern.

Moreover, it's clear that one can be consciously sincere while subconsciously carrying out a contrary agenda. Indeed, it's a familiar fact of life that we often subconsciously subvert the interests and goals we hold consciously. But when conscious and subconscious agendas are at odds, it's once again unacceptably simplistic and misleading to describe a person as either wholly sincere or insincere.

Besides (and perhaps most important), as far as the mediumistic evidence for survival is concerned, mediums and other survivalists can be *honestly* confused and mistaken about the origin of ostensible postmortem information, and simply not realize how that information could be accounted for in terms of (say) cryptomnesia or living-agent psi. In fact, that undoubtedly happens quite often. But then these would be instances of conceptual naïvete, not deception or insincerity. And that

would be the case even if *all* survivalists were honestly misinterpreting and presenting as evidence of survival material unwittingly gained normally or through living-agent psi.

In that case, however, the person who's confused isn't deceiving anyone. Moreover, the evidence itself is also not deceptive; only an *agent* of some sort can be deceptive or insincere. But then it's misleading and confused for James to suggest that the entire department of Nature (the totality of mediumistic evidence) could be wholly constituted of insincerity or deception. That's merely a very careless way to describe an easily understood state of affairs. Rather (and quite obviously), *the data is difficult to interpret*. Any errors and confusions are ours, quite understandably, and probably more often than not quite *genuine* and sincere. Similarly, those who for centuries thought the Earth was flat were not deceived by an insincere Earth or laws of optics. They simply lacked the means for understanding better what experience presented to them.

In some ways, it's surprising that James could have crafted an argument so psychologically glib. After all, he could be an exceptionally keen and sensitive observer of human behavior (as his *Varieties of Religious Experience* demonstrates so well). But James, somewhat notoriously, wrote so easily and so well¹ that he was not always as scrupulous about his arguments as some of his philosophical peers—for example, C. S. Peirce. So I suggest we reject James's appeal to cosmic aesthetics and focus instead on more compelling arguments in the debate over survival. There's still plenty to chew on.

NOTE

¹ Many would say he wrote better than his brother Henry.

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RESEARCH ARTICLE

An Analysis of the Alignment of Archaeological Sites

MARK J. CARLOTTO

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Abstract—There are hundreds, perhaps thousands, of sites of archaeological importance throughout the world. In this study, the alignments of more than two hundred ancient sites were measured and analyzed. Sites are organized into eight geographic regions: South America, Mesoamerica, North America, Europe, the Middle East, Africa, Asia, and the Pacific Ocean. Google Earth imagery and measurement tools were used to estimate the alignment of linear and rectilinear structures at these sites with respect to true (geographic) north. In considering standard celestial and geographic reasons for the alignments, many were found to be oriented to the cardinal directions, in the directions of solstices and other solar events, to lunar standstills, and to certain stars. A number of sites in China and Thailand were likely aligned to magnetic north at the time of construction using a compass. Some sites appear to have been aligned to “sacred directions” that include Islamic qibla and Quechua *ceques*. Site-alignment statistics reveal similarities and differences between geographical regions in terms of how sites within regions are aligned. Perhaps the most unexpected finding is that the alignment of about half of the sites could not be explained in terms of any of the explanations considered.

Keywords: archaeoastronomy; solstices; archaeological alignment; sacred places; sacred directions; lunar standstills

INTRODUCTION

Evidence throughout the world suggests that human civilizations have a tendency to build their cities, and sacred and other places of importance, in specific directions. Many of the oldest pyramids and temples are aligned to the cardinal directions—north, south, east, and

west, sometimes with uncanny precision, such as the pyramids on the Giza plateau in Egypt (Lehner, 1997). The Angkor temples in Thailand (Magli, 2016) and certain earthen mounds in China also are aligned to the cardinal directions, as were early Chinese cities (Sparavigna, 2013). Although the cardinal directions can be determined readily from the motion of the sun and stars, there is evidence that the Chinese used the magnetic compass in some cases to align places of importance based on principles of geomancy and Feng Shui (Charvátová et al. 2011).

There are many places that are aligned to the cycles of the sun and moon, specifically to the northernmost and southernmost rising and setting of the sun and moon, called solstices and lunar standstills, respectively. Stonehenge is aligned both to solstices and to lunar standstills (Hawkins, 1965). Some Egyptian temples, most notably the Temple of Amun-Re at Karnak, are aligned to the winter solstice sunrise/summer solstice sunset (Shaltout & Belmonte, 2005). The head of the Great Serpent Mound in Ohio points toward the summer solstice sunset (Hardman & Hardman, 1987). Some of the most sacred places on earth are aligned to the moon, including the Kaaba in Mecca (Hawkins & King, 1982) and the Golden Temple in Amritsar.

There is evidence that some sites may have been aligned to the point on the horizon where certain stars and planets of importance once rose. Examples include the ancient city of Teotihuacan, north of Mexico City, thought to be aligned to the Pleiades (Aveni, 2001) and the Temple of Hathor at Dendera in Egypt, aligned to Alkaid, a star in Ursa Major (Shaltout & Belmonte, 2005). The Caracol at Chichen Itza is believed to have been oriented to observe the planet Venus.

The misalignment of certain places with respect to the cardinal directions has been explained in terms of local factors including topography and landscape. A part of Mexico City surrounding the ancient Aztec capital of Tenochtitlan is aligned in a direction slightly south of east. One theory is that the site was rotated in order to compensate for the shift in the position of the sun when it rose over Templo Mayor on the equinox rather than directly east at the horizon (Aveni et al., 1988). Ridderstad (2009) proposes a number of reasons why Knossos on the island of Crete is misaligned by about 10° south of east.

Finally, there are sites aligned toward places of spiritual importance. Today many mosques face toward Mecca. However, there are

other sacred directions called qibla that are also used to align mosques (King, 2018). In Peru, imaginary lines known as ceques (Krupp, 1994) emanate out from the center of the city of Cuzco in all directions, one of which passes through the Inca fortress of Sacsayhuamān.

This paper analyzes the alignments of more than two hundred archaeological sites from across the world. The next section, Alignment Hypotheses, defines eight hypotheses against which alignments are assessed. The following section, Alignments of Archaeological Sites, presents our findings organized by geographic region. And the last section, Analysis of Alignments, summarizes the results of our analysis. Based on the distribution of site alignments, we show that there are interesting similarities and differences among geographic regions. Surprisingly, the alignment of about half of the sites considered in this study cannot be explained by any of the hypotheses considered.

ALIGNMENT HYPOTHESES

From a review of the archaeological and archaeoastronomical literature, eight basic explanations were identified to account for the orientation of an archaeological site: 1) to cardinal directions (i.e. facing north, south, east, and west), 2) to solstice sunrise or sunset directions, 3) to sunrise or sunset directions on days when the sun passes directly overhead, 4) to directions of major and minor lunar standstills, 5) to a planet, 6) to a star or constellation, 7) to magnetic north, and 8) in the direction of an earth site of religious or spiritual importance. We also discuss other explanations such as landscape and topography.

Cardinal Directions

The cardinal directions can be established either by observing the motion of stars at night or the path of the sun during the day or over the course of the year. A site aligned to the cardinal directions faces sunrise and sunset twice a year on the spring and autumn equinoxes.

Solstices

Many ancient sites reference the directions of the sun on the first day of summer and winter (solstices). To determine if a site is aligned to the solstices, define the following angles:

α ñ azimuth angle of the sun (measured clockwise with respect to true north),
 θ ñ elevation angle of the sun above the horizon,
 ϕ ñ latitude of the site,
 δ ñ solar declination. The tilt of the earth on its axis, the obliquity, ε , is what causes the seasons.

The solar declination is the tilt of the earth toward the sun, which varies with the season, $-\varepsilon \leq \delta \leq \varepsilon$, reaching its largest and smallest values on the summer and winter solstices, respectively. On the spring and fall equinoxes, $\delta = 0^\circ$

The following solar path equation (Figure 1) relates the solar azimuth, the solar elevation, the latitude of the site, and the solar declination:

$$\cos\alpha = (\sin\delta - \sin\theta \sin\phi) / \cos\theta \cos\phi \quad (1)$$

and can be used to calculate the azimuth angle of the sun at sunrise and sunset on the summer solstice

$$\alpha_{s\uparrow} = \cos^{-1}(\sin\delta / \cos\phi) \quad (2a)$$

$$\alpha_{s\downarrow} = -\cos^{-1}(\sin\delta / \cos\phi) \quad (2b)$$

and on the winter solstice:

$$\alpha_{w\uparrow} = \cos^{-1}(-\sin\delta / \cos\phi) \quad (3a)$$

$$\alpha_{w\downarrow} = -\cos^{-1}(-\sin\delta / \cos\phi) \quad (3b)$$

The obliquity changes slowly over time, less than 2° over a period of 41,000 years. The present value is 23.43° . Due to changes in obliquity, solar alignments established in the distant past no longer line up exactly. By inverting Equation 1 we can determine when an alignment at a given angle would have lined up with a solstice or some other event by solving for the obliquity as a function of azimuth angle at sunrise or sunset:

$$\delta = \sin^{-1}(\cos\alpha \cos\phi) \quad (4)$$

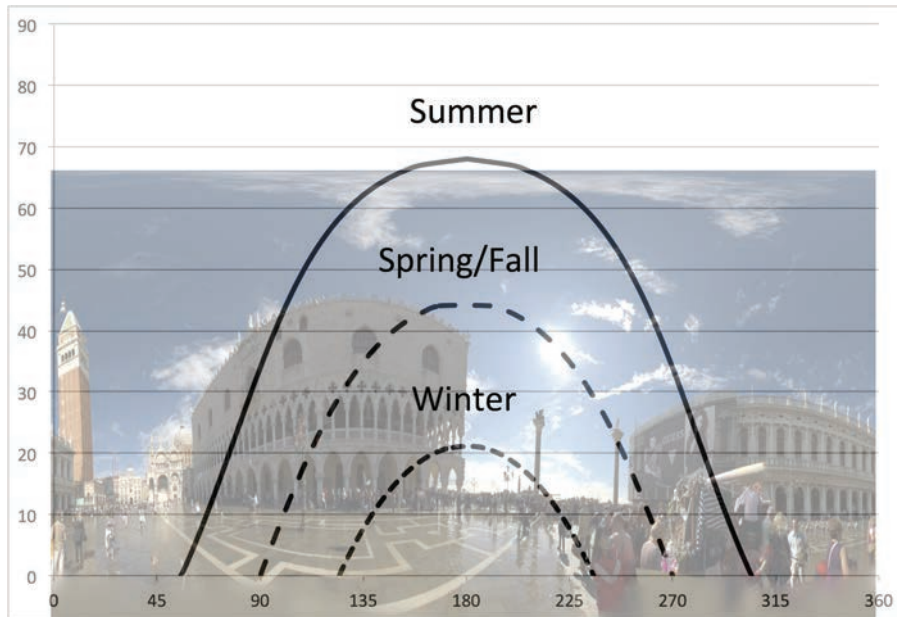


Figure 1. Seasonal path of the sun (Equation 1) plotted over panoramic photo facing south taken at Piazza San Marco, Venice. Photo credit: https://www.openfootage.net/Openfootage/Vorschau/ContactSheet_Piazza-San-Mar.jpg

It is noted that these equations do not take into account the local horizon, which may be affected by mountains and hills that cause the sun and moon to rise later and set earlier than over a flat horizon, and do not model atmospheric refraction that affects the appearance of celestial objects close to the horizon, both of which can be important factors in the alignment of certain sites.

Zenith Passage

At the equator, the sun passes directly overhead at noon on the equinox. Within the zone of the tropics, the sun can still pass overhead on certain other days. This occurs on days when the solar inclination is equal to the site's latitude. An alignment occurs either at sunrise or sunset when

$$|\phi| = 90 - |\alpha| \quad (5)$$

Lunar Standstills

The plane of the moon's orbit is tilted by 5.1° relative to the ecliptic. Because of its orbit, the moon can rise and set more northerly and more southerly than the sun. Due to the effects of the sun's gravity, the moon's orbital plane does not stay fixed in space but precesses, causing the monthly angles of moonrise and moonset to change over an 18.6-year cycle. Every 18.6 years the moon rises at its maximum northerly direction, which is known as a major lunar standstill. A minor lunar standstill occurs 9.3 years later when the moon rises at its minimum northerly direction. The moonrise and moonset azimuth angles at a standstill are

$$\alpha_{m\uparrow} = \cos^{-1}(\sin\mu / \cos\phi) \quad (6a)$$

$$\alpha_{m\downarrow} = -\cos^{-1}(\sin\mu / \cos\phi) \quad (6b)$$

where μ is the lunar declination which is $\mu = \pm (\varepsilon + 5.1^\circ)$ for a major standstill and $\mu = \pm (\varepsilon - 5.1^\circ)$ for a minor standstill.

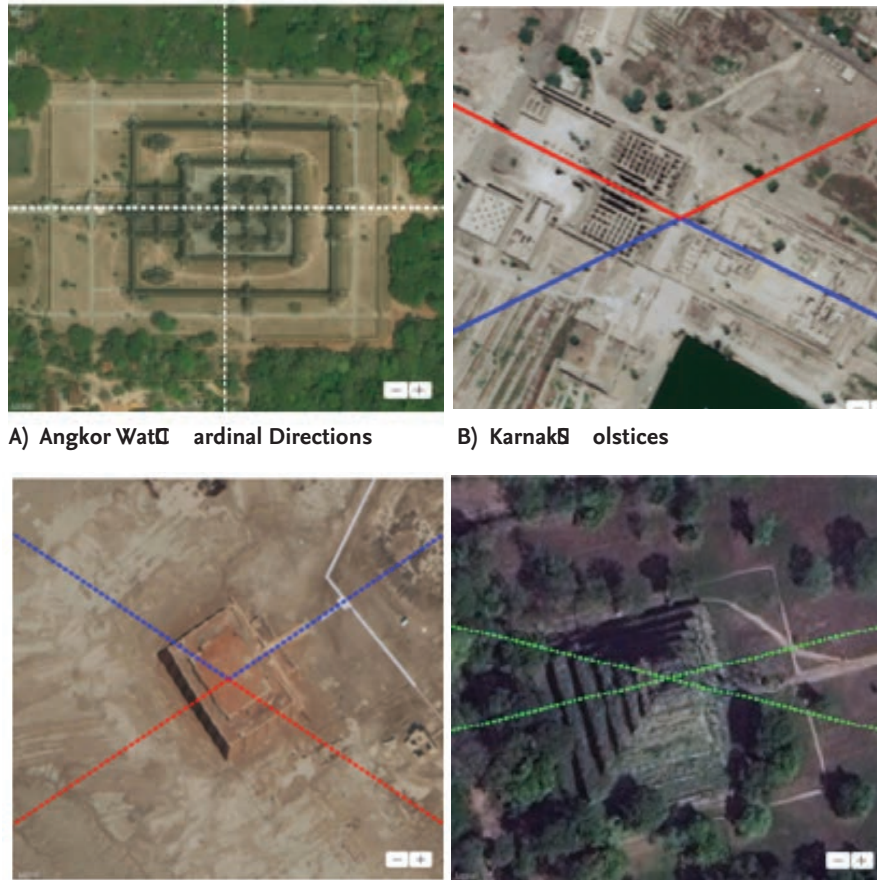
Figure 2 shows several examples of sites aligned to the sun and moon.

Planetary Alignments

The motion of the planets is along the imaginary line defined by the plane of earth's orbit around the sun known as the ecliptic. As a result, a planet can appear to rise anywhere between the summer and winter solstice sunrise directions and set anywhere between the summer and winter solstice sunset directions. For example, the maximum northern and southern setting directions of Venus observed at the Caracol in Chichen Itza are the same as the solstice sunset directions.

Stellar Alignments

It is convenient to think of the stars existing on the inside of a celestial sphere. As earth revolves on its axis, stars appear to rotate around the celestial poles. In addition to obliquity, the earth's axis precesses in a 26,000-year cycle about the ecliptic pole. The direction in which a star rises and sets on the horizon depends on its location on the celestial sphere, the latitude of the site where it is observed, and the time of observation with respect to the precessional cycle.



A) Angkor Wat Cardinal Directions

B) Karnak Solstices

C) Ziggurat of Ur Major Lunar Standstills

D) Koh Ker Zenith Passage

Figure 2. Examples of sites aligned to the sun and moon. There are two sets of lines in B) through D), since solstices, lunar standstills, and zenith passages occur twice a year. Photo credit: Apple Maps.

Alignments to Magnetic North

There is evidence that ancient sites in certain parts of the world were aligned using a magnetic compass. Unlike the geographic poles, the magnetic pole is constantly in motion (Figure 3). In order to determine the alignment of a site to a pole (or any reference location on the surface of the earth), let A, B, and C be the locations of a site, the geographic North Pole, and the magnetic pole at a given time, respectively (Figure 4).

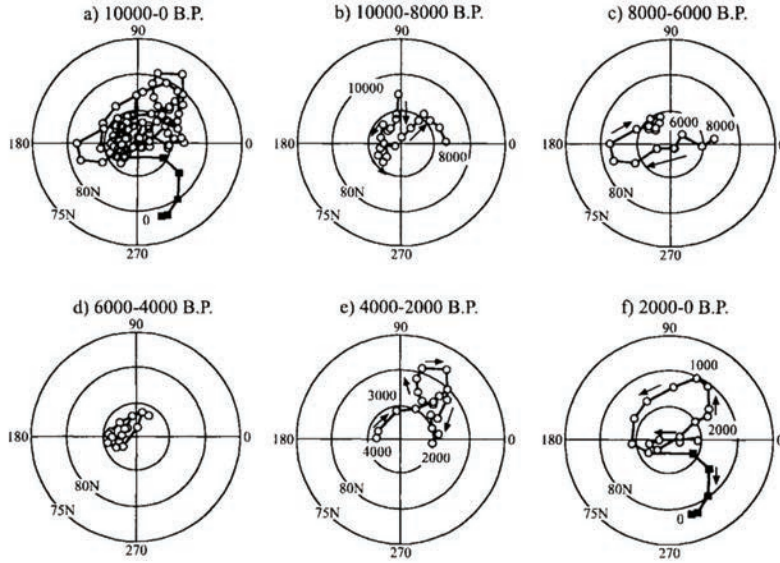


Figure 3. Estimated locations of the north geomagnetic pole over the past 10,000 years (from McElhinny & McFadden, 2000).

If (λ_A, φ_A) and (λ_C, φ_C) are the latitudes and longitudes of the site and reference locations, define the angles

$$\begin{aligned} a &= \frac{\pi}{2} - \lambda_C, \\ c &= \frac{\pi}{2} - \lambda_A \\ B &= \varphi_C - \varphi_A \end{aligned} \quad (7)$$

We wish to solve for the angle A (the azimuth angle of the reference location from the site) as a function of the locations of A and C on the sphere. Starting with the sine and cosine rules for spherical triangles:

$$\frac{\sin A}{\sin a} = \frac{\sin B}{\sin b} = \frac{\sin C}{\sin c} \quad (8)$$

and

$$\cos b = \cos a \cos c + \sin a \sin c \cos B \quad (9)$$

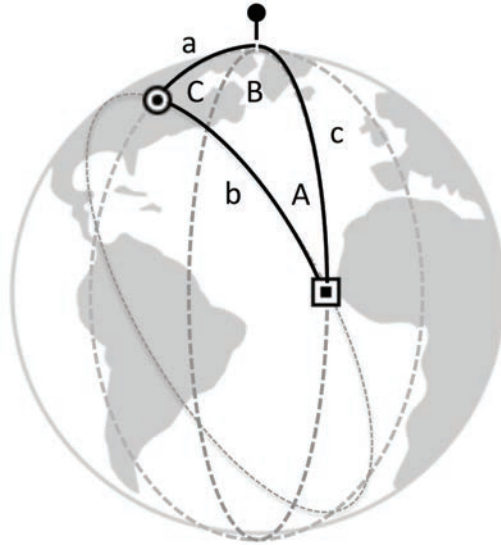


Figure 4. The locations of a site A, North Pole B, and reference C are the vertices of a spherical triangle. Edges of spherical triangles are great circles. The angle A is the azimuth of the reference location measured at the site.

$$\text{since } \sin b = \sqrt{1 - \cos^2 b}$$

$$\sin A = \frac{\sin a \sin B}{\sin b} = \frac{\sin a \sin B}{\sqrt{1 - \cos^2 b}} \quad (10)$$

$$A = \sin^{-1} \left[\frac{\sin a \sin B}{\sqrt{1 - (\cos a \cos c + \sin a \sin c \cos B)^2}} \right] \quad (11)$$

Using the estimated location of the north geomagnetic pole at a given time, it is possible to approximate the compass direction of magnetic north at a site at that time (Figure 5A).

Alignments to "Sacred Directions"

As noted above, Equation 11 can compute the azimuth angle at any location to any other location on the surface of the earth and can be used to evaluate alignments to "sacred directions" that include Islamic



A) Chongling Mausoleum of Emperor Dezong of Tang aligned to geomagnetic pole at $83^{\circ} 45'$. B) Dome of the Rock in Jerusalem faces Petra.

Figure 5. Sites aligned in other directions.

qibla and Quechua ceques (Lon, 2005). For example, using Equation 11 it can be determined that the Rock of the Dome in Jerusalem is aligned in the direction of Petra in Jordan (Figure 5B).

ALIGNMENTS OF ARCHAEOLOGICAL SITES

The selection of archaeological sites from across the world is a challenging exercise in itself. More than two hundred sites were identified from a variety of sources including UNESCO's World Heritage Center, Wikipedia, Google Earth, and scientific and popular literature. The selected sites contain linear and rectilinear structures that are well-resolved and visible in overhead imagery. Google Earth imagery and measurement tools were used to measure heading (azimuth) angles. Alignments are indicated in Tables 1-8 according to the following key:

- Cardinal directions, i.e. geographic poles, and equinoxes (E)
- Magnetic pole at the time of construction (X)
- Zenith passage (Z)
- Solstices (S)
- Major and minor lunar standstills (M,m)
- Stellar alignments (st)
- Alignments to "sacred directions"(D)

Measured angles of rectangular structures and rectilinear features are listed two ways: by a NW to NE facing angle between -45° and $+45^\circ$ and a NE to SE facing angle between 45° and 135°

In a previous aerial archaeological study using Google Earth (Lepionka & Carlotto, 2015), heading measurement errors were found to be as small as 0.1° between widely spaced, well-defined, point-like features. Measurement errors at some of the sites considered here could be somewhat higher, particularly for ruined structures that lack a well-defined edge and for smaller structures with short edges. In this study, a structure is classified as being in alignment with a cardinal or other direction if the sides of the structure are within approximately 1° of that direction. For solar and lunar alignments, a site is considered aligned to a solstice or lunar standstill if a structure at the site, or an alignment between structures at the site, is within the range of solstice or lunar standstill directions at that latitude over the earth's 41,000-year obliquity cycle.

In general the alignment hypotheses represent eight mutually exclusive directions or ranges of direction at a particular site (although at certain latitudes minor lunar standstill moonrise/moonset directions and zenith passage sunrise/sunset directions can overlap). In addition to these eight alignment hypotheses (plus "unknown"), there are sometimes other explanations for the alignment of the site as noted in the tables and discussed in the accompanying text.

Africa

Table 1 lists the sites examined in Africa, most of which are in Egypt. About half of the sites are aligned to the cardinal directions. Most of these are pyramids in Lower Egypt. Shaltout and Belmonte (2005) analyzed the orientation of more than one hundred temples in Upper Egypt and Lower Nubia to discover that they face many different directions with a somewhat greater concentration of alignments in the east-southeast direction. This is in agreement with our finding of sites aligned to solstices and major and minor lunar standstills. Their principal conclusion is that local topography (the course of the Nile River) was more important than astronomy in aligning the foundations of the temples. Our finding that half of the sites examined in Egypt do not appear to be aligned to obvious astronomical events is consistent

TABLE 1
Alignments of Sites in Africa

Name	Latitude	Longitude	North	East	Alignment
Algeria, Jabal Lakhdar	35.063404	1.183731	-5	85	
Egypt, Abu Rawash, Pyramid of Djedefre	30.032262	31.074714	0	90	E
Egypt, Abusir, Pyramid of Neferefre	29.893770	31.201454	0	90	E
Egypt, Abusir, Pyramid of Neferirkare	29.895093	31.202249	0	90	E
Egypt, Abusir, Pyramid of Sahure	29.897622	31.203367	0	90	E
Egypt, Abydos, Temple Ramses II	26.186426	31.916280	44.2	134.2	
Egypt, Abydos, Osirion	26.184099	31.918465	36.3	126.3	
Egypt, Abydos, Pyramid of Ahmose I	26.175056	31.937822	36	126	
Egypt, Abydos, Temple Seti I	26.184968	31.919183	36.3	126.3	
Egypt, Cairo, Mosque of Ibn Tulun	30.028691	31.249394	-39	51	
Egypt, Dahshur Pyramid of Senusret III	29.818888	31.225550	0	90	E
Egypt, Dahshur, Bent Pyramid	29.790449	31.209324	0	90	E
Egypt, Dahshur, Pyramid of Amenemhat II	29.805807	31.223038	0	90	E
Egypt, Dahshur, Red Pyramid	29.808882	31.206113	0	90	E
Egypt, Deir Bahari, Mortuary Temple of Mentuhotep II	25.737375	32.606178	23.2	113.2	S
Egypt, Deir el Medinah, Temple of Hathor	25.728846	32.602128	-40	50	
Egypt, Dendara, Sacred Lake	26.141807	32.669532	16.1	106.1	
Egypt, Dendera, Temple of Hathor	26.141914	32.670205	18.9	108.9	st ,m
Egypt, Edfu Temple of Horus	24.976747	32.873087	12.8	102.8	
Egypt, Elephantine, Temple of Khnum	24.084492	32.886206	-42	48	
Egypt, Giza, Khafre	29.975726	31.130800	0	90	E
Egypt, Giza, Khufu	29.979067	31.134040	0	90	E
Egypt, Giza, Menkaure	29.975811	31.131242	0	90	E
Egypt, Kom Ombo	24.452085	32.928353	43.3	133.3	
Egypt, Lisht, Pyramid of Amenemhat I	29.574802	31.225304	0	90	E
Egypt, Lisht, Pyramid of Senusret I	29.560160	31.221130	0	90	E
Egypt, Luxor West, Temple Ramses III	25.719683	32.600711	-42	48	
Egypt, Luxor, Karnak, Temple of Amun Re	25.718484	32.659044	26.6	116.6	S
Egypt, Meidum Pyramid	29.388368	31.157503	0	90	E
Egypt, Pyramid of Teti	29.875142	31.221847	-12.5	77.5	
Egypt, Saqqara, Mastaba of Shepseskaf	29.838852	31.215273	0	90	E
Egypt, Saqqara, Pyramid of Djedkare-Isesi	29.850983	31.220924	0	90	E
Egypt, Saqqara, Pyramid of Djoser	29.871397	31.216532	5	95	
Egypt, Saqqara, Pyramid of Khendjer	29.832363	31.224043	0	90	E
Egypt, Saqqara, Pyramid of Pepi II	29.840246	31.213496	0	90	E
Egypt, Saqqara, Pyramid of Qakare Ibi	29.841590	31.217712	-10	80	
Egypt, Saqqara, Pyramid of Unas	29.868182	31.215012	0	90	E
Egypt, Saqqara, Pyramid Userkaf	29.873332	31.219334	0	90	E
Egypt, Shunet El Zebib	26.189510	31.908055	-41.7	48.3	
Egypt, Siwa Oasis, Amun Temple	29.201375	25.516151			
Egypt, Temple of Edfu	24.978092	32.873475	3	93	
Egypt, Temple of Esna	25.293444	32.556125	-23	67	M
Egypt, Temple of Hathor, El Kab	25.138586	32.828651	-44	46	
Egypt, Temple of Isis at Shenhur	25.861040	32.776808	10	100	
Egypt, Temple of Ramses II	25.727588	32.610283	41	131	
Egypt, Zawyet El Aryan, Layer Pyramid	29.932820	31.161262	-12	78	
Ethiopia, Bete Giyorgis	12.031714	39.041190	5.8	95.8	m
Ethiopia, Yeha Temple	14.285703	39.019114	11.4	101.4	
Sudan, Dangeil, Amun Temple	18.131307	33.959800	16.5	106.5	

E = cardinal directions, i.e. geographic poles, and equinoxes. M,m = major and minor lunar standstills. S = solstices. st = stellar alignments (aligned to Alkaid in Ursa Major).

with this conclusion. The Temple of Hathor at Dendera was very likely aligned to the star Alkaid in the constellation Ursa Major, which is associated with the Egyptian goddess Hathor.

If no alignment is given, the explanation is unknown. In some cases, there may be more than one explanation for an alignment.

Asia

Table 2 lists sites examined in Asia. Many of the sites in China considered here are ancient earthen mounds that are aligned either to the cardinal directions or thought to have been aligned in the direction of the magnetic pole at the time of construction (Charvátová et al., 2011). Some of the sites considered in Thailand are temples that could also have been aligned to the north geomagnetic pole (Iyemori et al., 2011). Magli (2016) determined that a very clear pattern of cardinal orientation and alignment occurs in numerous temples in and around Angkor. Although some sites appear to reference the solstices in their construction and many are aligned to one another in solstitial directions, none of the sites themselves are aligned to the solstices. Unlike in Egypt, we were unable to find any sites in Asia oriented to solstices. Several were oriented, however, in directions that correspond to lunar standstills. Three sites located in the Tropic of Cancer might have been aligned to the sun on so-called "zenith passage days" when the sun passes directly overhead. McKim Malville (2015) analyzed 31 sites in India and found that two-thirds were aligned to the cardinal directions, solstices, and zenith passages. About half of the sites examined in other parts of India did not have an obvious explanation for their alignment.

Europe

Table 3 shows the alignments of ancient sites in Europe. Unlike Africa with many of its sites aligned in the cardinal directions and Asia with many of its sites aligned either to true (geographic) north or geomagnetic north, about half of the sites examined in Europe are aligned to solstices and lunar standstills. Palantine Hill, which was the earliest settlement in ancient Rome, is aligned to major lunar standstills. The Parthenon, which sits atop the Acropolis, is not aligned to solstices or to lunar standstills. Dinsmoor proposed that it was aligned to the

TABLE 2
Alignments of Sites in Asia

Cambodia, Koh Ker	13.783220	104.537453	-12.5	77.5	Z	
Cambodia, Preah Khan of Kompong Svay	13.403820	104.754210	-28.2	61.8	M	
China, Chongling Mausoleum of Emperor Dezong of Tang	34.707380	108.828530	-4.2	85.8	x	Aligns to geo-magnetic pole around 400 CE
China, Jinling Mausoleum of Emperor Xianzong of Tang	34.570992	108.265923	-9	81	x	Aligns to geo-magnetic pole around 600 CE
China, The Lianhu Altar	36.632869	101.746123	15.8	105.8	S	NE-SW diagonal aligned to solstice
China, Tomb of Consort Ban	34.379801	108.704492	-11	79		
China, Tomb of Emperor Ai of Han	34.400855	108.764606	0	90	E	
China, Tomb of Emperor Cheng of Han	34.374896	108.698001	-10	80	x	Aligns to geo-magnetic pole around 900 CE
China, Tomb of Emperor Gaozu of Han	34.434691	108.876647	-14	76		
China, Tomb of Emperor Hui of Han	34.422895	108.841317	-17	73		
China, Tomb of Emperor Jing of Han	34.443823	108.940784	0	90	E	
China, Tomb of Emperor Ping of Han	34.397774	108.712421	0	90	E	
China, Tomb of Emperor Wen of Sui	34.287850	108.022890	-3	87	x	Aligns to geo-magnetic pole around 400 CE
China, Tomb of Emperor Wu of Han	34.338085	108.569684	-8	82	x	Aligns to geo-magnetic pole around 700 CE
China, Tomb of Emperor Xuan of Han	34.181063	109.022312	0	90	E	
China, Tomb of Emperor Yuan of Han	34.390303	108.739114	0	90	E	
China, Tomb of Emperor Zhao of Han	34.361753	108.640108	-11	79	x	Aligns to geo-magnetic pole around 800 CE
China, Tomb of Empress Dou	34.235825	109.118614	22.6	112.6	m	
China, Tomb of Empress Dowager Bo	34.220993	109.096341	21.6	111.6	m	
China, Tomb of Empress Fu	34.402608	108.772545	-4	86	x	Aligns to geo-magnetic pole around 1000 CE
China, Tomb of Empress Lü	34.340327	108.562002	-9.5	80.5	x	Aligns to geo-magnetic pole around 800 CE
China, Tomb of Empress Lü	34.433824	108.881292	-10.2	79.8	S	NW-SE diagonal aligned to solstice
China, Tomb of Empress Shangguan	34.363135	108.630538	-8	82	x	Aligns to geo-magnetic pole around 900 CE
China, Tomb of Empress Wang (a)	34.393242	108.733835	0	90	E	
China, Tomb of Empress Wang (b)	34.446291	108.947500	0	90	E	
China, Tomb of Empress Wang (c)	34.178951	109.028396	0	90	E	
China, Tomb of Empress Xu (a)	34.374648	108.684740	-9.5	80.5	x	Aligns to geo-magnetic pole around 800 CE
China, Tomb of Empress Xu (b)	34.127340	109.055786	0	90	E	
China, Tomb of Empress Zhang Yan	34.423195	108.836961	-15	75		
China, Tomb of Marquis Zhang Ao	34.427745	108.851209	-15	75		
China, Tomb of Princess Chengyang of Emperor Taizong	34.615600	108.493140	-6	84	x	Aligns to geo-magnetic pole around 500
China, Tomb of Princess Xincheng of Emperor Taizong	34.623650	108.498880	-21	69		
China, Yarnaz Valley, Yarkhoto	42.952022	89.061138	-40	50	M	
India, Amritsar, Golden Temple	31.619938	74.876511	33.2	123.2	M	
India, Chidambaram, Chidambaram Nataraja	11.399234	79.693715	-1	89	E	
India, Chitour, Srikalahasti Temple	13.749686	79.698308	0	90	E	
India, Kanchipura, Ekambareswarar Temple	12.847302	79.699525	18.3	108.3	m	
India, Khadirbet, Dholavira	23.886907	70.213776	-5	85		
India, Madhya Pradesh, Sas Bahu Temple	16.018856	75.881959	-4	86		
India, Madhya Pradesh, Tigawa Temple	23.690196	80.066918	-10	80		
India, Mahabalipuram, Shore Temple	12.616492	80.199267	13	103	Z	
India, Rameshwar Mandir	16.217680	73.462012	-14	76		
India, Shri Martand Sun Temple	33.745588	75.220286	-13.9	76.1		
India, Sigiriya	7.957173	80.760031	8.3	98.3	Z	
India, Tamil Nadu					E, S, Z	Malville's analysis of 31 temples (see text).
India, Thanjavur, Brihadisvara Temple	10.782614	79.131735	-20.5	69.5	st, m	Aligned toward Pleiades at the time of construction
India, Tiruvannamalai, Annamalaiyar Temple	12.231884	79.066790	11.4	101.4	Z	
India, Udairpur Rajasthan, Sas Bahu Temple	24.735191	73.716283	-16	74		
India, Venkateswara Temple	13.683250	79.347195	-7	83		
Indonesia, Gunung Padang	-6.994518	107.056383	-20	70		
Inner Mongolia, Xanadu	42.356388	116.184304	0	90	E	
Japan, Osaka Castle	34.687298	135.525826	5.7	95.7		
Maldives, Thindhoo	0.530107	72.997170	43	133	D	Oriented in the direction of Petra
Pakistan, Harappa	30.628104	72.863909	0	90	E	
Russia Por-Bazhyn	50.615271	97.384872	9.5	99.5		
Thailand Angkor Wat	13.412469	103.866986	0	90	E	
Thailand, Ayutthaya, Wat Phra Mahathat	14.356943	100.567509	-5.3	84.7	x	Aligns to geo-magnetic pole around 900 CE
Thailand, Kao Klang Nai, Sri Thep	15.465521	101.144681	9.5	99.5		
Thailand, Prasat Hin Phimai	15.220930	102.493861	-22	68		
Thailand, Prasat Mueang Tam	14.496089	102.982608	-11	79		
Thailand, Prasat Phanom Rung	14.532044	102.940223	-5.5	84.5	x	Aligns to geo-magnetic pole around 600 CE
Thailand, Prasat Si Khoraphum	14.944574	103.798352	0	90	E	
Thailand, Wat Phra Sri Rattana Mahathat	14.798673	100.613862	0	90	E	

D = alignments to [sacred directions] E = cardinal directions, i.e. geographic poles, and equinoxes. M, m = major and minor lunar standstills. S = solstices. st = stellar alignments. X = magnetic pole at the time of construction. Z = zenith passage.

TABLE 3
Alignments of Sites in Europe

Bosnia, Pyramid of the Sun	43.977259	18.176514	8.4	98.4		Artificiality not established
Greece, Athens, The Parthenon	37.971517	23.726590	-13.5	76.5		Aligned to sunrise on Athena's birthday
Greece, Delphi Amphitheater	38.482477	22.500577	-38.2	51.8	D	Oriented in the direction of Knossos
Greece, Knossos	35.297863	25.163092	11.8	101.8		Adjusted equinox alignment
Greece, Mycenae, Lion Gate	37.730752	22.756500	-40	50		Aligned to topography
Greece, Mycenae, Tomb of Agamemnon	37.726725	22.754367	10.5	100.5		Aligned to topography
Greece, The Temple of Artemis	37.949611	27.363921	21	111		
Italy, Rome, Circus Maximus	41.885944	12.485215	36.7	126.7	M	
Italy, Rome, Palantine Hill	41.889209	12.487459	36.7	126.7	M	
Italy, Sardinia, Monte d'Accoddi	40.790754	8.448908	9.1	99.1		
Malta, Gozo, Ġgantija Temple	36.047260	14.269015	37	127	M	
Spain, Mosque-Cathedral of Cordoba	37.878906	-4.779387	-30.4	59.6	S	
Spain, Naveta d'Es Tudons	40.003075	3.891653	-19.2	70.8	m	
Turkey, Hagia Sophia	41.013140	28.983182	34.3	124.3	S	
Turkey, Hattusa	40.019943	34.615455	38	128	M	
UK, Calanais Standing Stones	58.197566	-6.745127				
UK, Glastonbury Tor	51.144444	-2.698611	-26.5	63.5	m	
UK, Stonehenge	51.178868	-1.826163			S,M,m	

D = alignments to [sacred directions] M,m = major and minor lunar standstills. S = solstices.

sunrise on the birthday of the Greek goddess Athena (Hannah, 2013). That the Acropolis also appears aligned in the same general direction and predates the Parthenon by hundreds, perhaps thousands, of years would seem to challenge that dating and the reason for its alignment. Maravelia (2002) proposes that the alignment of a number of tholus tubes in Mycenae are based on topographical not astronomical considerations.

North America

Most of the Native American/indigenous sites examined in North America are aligned to the cardinal directions, solstices, or lunar standstills (Table 4).

TABLE 4
Alignments of Sites in North America

Canada, AB, Badlands Guardian	50.010370	-110.113133			E	Geoglyph aligned to north. Artificiality not established
US, California, Blythe Intaglios, B1	33.800585	-114.532055	0	90	E	Geoglyph aligned to north
US, California, Blythe Intaglios, B3	33.800402	-114.538078	29	119		
US, Georgia, Ocmuige National Monument	32.838868	-83.606114	34	124	M	
US, New Mexico, Chaco Canyon, Pueblo del Arroyo	36.060854	-107.966300	24	114	M	
US, Ohio, Great Serpent Mound	39.026420	-83.431091	27.7	117.7	S	"Head" faces solstice
US, Illinois, Cahokia, Monks Mound	38.660158	-90.062466			S,M	

E = Cardinal directions, i.e. geographic poles, and equinoxes. M = major lunar standstills. S = solstices.

Pacific Ocean

About half of the sites in the Pacific appear to have astronomical alignments (Table 5). The Ahu platforms on which the Easter Island Moai look out to the sea were built in a variety of orientations around the island. Three of the alignments may be astronomical. The Temple of Nan Dawas at Nan Madol in Micronesia is aligned in the direction of the zenith passage sunrise. A megalithic structure called the Ha'amonga'a Maui Trilithon along with most of the structures on the island of Tonga are aligned in a northeast direction that has no known explanation.

TABLE 5
Alignments of Sites in the Pacific Ocean

Chile, Easter Island, Ahu Akivi	-27.115014	-109.395043	-2.7	87.3	E
Chile, Easter Island, Ahu Nau Nau	-27.074425	-109.322455	-19.6	70.4	m
Chile, Easter Island, Ahu Tahai	-27.140076	-109.427314	8.3	98.3	
Chile, Easter Island, Ahu Tongariki	-27.125774	-109.276933	30	120	S
Chile, Easter Island, Ahu Vinapu	-27.174098	-109.405737	8.1	98.1	
Micronesia, Nan Madol	6.844537	158.335795	-33	57	M
Micronesia, Nan Madol, Temple of Nan Dawas	6.844537	158.335795	7	97	Z
Samoa, Pulemelei Mound	-13.735237	-172.324399	-7.3	82.7	
Tonga, Ha'amonga 'a Maui Trilithon	-21.136606	-175.048087	32.7	122.7	*

* Entire island of Tonga aligned in the same direction. E = cardinal directions, i.e. geographic poles, and equinoxes. M,m = major and minor lunar standstills. S = solstices. Z = zenith passage.

The Middle East

Only four of the sites examined in the Middle East have an apparent explanation for their alignment (Table 6). The Kaaba in Mecca analyzed in detail by Hawkins and King (1982) was found to be most accurately aligned to the moon, which is one of several directions or qibla that are sacred in Islam. The Ziggurat of Ur (Sparavigna, 2016) and the Great Mosque of Sana'a in Yemen also are aligned to the moon. The Dome of the Rock in Jerusalem is oriented toward Petra in Jordan.

South America

About a third of the sites examined in South America are aligned to the cardinal directions, solstices, or lunar standstills (Table 7). Another third appear to be aligned to face either the city of Cuzco in Peru's Sacred Valley or the city of Caral in the Supe Valley. A number of lines

TABLE 6
Alignments of Sites in the Middle East

Iran, Chogha Zanbil	32.008997	48.521593	-43.5	46.5	
Iraq, Dur-Kurigalzu	33.353671	44.202164	-39.6	50.4	
Iraq, Tower of Babel	32.536284	44.420803	-11.3	78.7	
Iraq, Ziggurat of Ur	30.962711	46.103126	-33.3	56.7	M
Jerusalem, Dome of the Rock	31.778087	35.235306	-7.3	82.7	D
Jerusalem, Western Wall	31.776657	35.234470	-12.1	77.9	
Jordan, Petra, Temple of the Winged Lions	30.330297	35.442554	17.5	107.5	
Jordan, Qasr Il-Abd, Irak Al-Amir	31.912785	35.751941	-15	75	
Jordan, Umayyad Mosque in Amman	33.511593	36.306657	-6.4	83.6	
Lebanon, Baalbek, Temple of Jupiter	34.006694	36.203826	-12.2	77.8	
Saudi Arabia, Mecca, Kaaba	21.422510	39.826174	-34.9	55.1	M
Turkey, Harran	36.865021	39.031565	9.6	99.6	
Yemen, Great Mosque of Sana'a	15.353123	44.214876	-25	65	M

* Oriented in the direction of Petra. D = alignments to sacred directions □ M = major lunar standstills.

TABLE 7
Alignments of Sites in South America

Bolivia, Chincana Labyrinth	-15.990127	-69.202952	44	134	D	Oriented in the direction of Cuzco
Bolivia, Puma Punku	-16.561720	-68.680046	2	92		
Bolivia, Quenauani	-16.259407	-69.171270	-20	70	S	
Bolivia, Tiwanaku	-16.554933	-68.673487	2	92		
Peru, Caral-Supe	-10.893458	-77.520540	19.5	109.5	S	Oldest city in the Americas
Peru, Caral-Supe, Huanca Pyramid	-10.893458	-77.520540	19.5	109.5		
Peru, Chan Chan	-8.103554	-79.070760	19.5	109.5	m	Name "Chan Chan" may refer to sun or moon
Peru, Chavin	-9.594527	-77.177002	14.7	104.7	D	Oriented in the direction of Caral-Supe
Peru, Cuzco	-13.518587	-71.975952				Center of Quechua ceques or pathways
Peru, Huanuco Pampa	-9.875388	-76.816395	0	90	E	
Peru, Huayna Picchu, Temple of the Moon	-13.151931	-72.546507			M	Faces north to view full range of lunar motion
Peru, La Centinela	-13.450075	-76.172233	5.6	95.6		
Peru, Machu Picchu, Temple of the Three Windows	-13.163592	-72.545414	-34.7	55.3		
Peru, Machu Picchu, Terraces	-13.164219	-72.544831	-25	65		Oriented in a solar direction
Peru, Marcahuasi, Face	-11.775670	-76.581853	43	133	D	Oriented in the direction of Caral-Supe
Peru, Nazca Lines	-14.712825	-75.174850	19.3	109.3	D	Oriented in the direction of Cuzco
Peru, Ollantaytambo, Temple of the Sun	-13.257536	-72.267129	-35	55		
Peru, Sacsahuaman	-13.509330	-71.980916			D	"Head" of a puma represented by the city of Cuzco
Peru, Sechin Bajo	-9.464809	-78.265259	-25.5	64.5	S	
Peru, Warawtampu	-10.465490	-76.536647	-24.2	65.8	D	Oriented in the direction of Caral-Supe
Peru, Chotuna	-6.720363	-79.952796	0	90	E	

D = alignments to sacred directions □ E = cardinal directions, i.e. geographic poles, and equinoxes. M, m = major and minor lunar standstills. S = solstices.

and geoglyphs in Nazca appear to point toward, away from, or at right angles to Cuzco. The alignment of sites to Cuzco is consistent with a set of directions that emanate from Cuzco called ceques. The remainder of the sites in South America have no obvious explanation for their alignment, including the large megalithic structures at Machu Picchu, Ollantaytambo, Tiwanaku, and Puma Punku, whose origins are poorly understood.

Mesoamerica

In analyzing the alignments of Mayan sites, Aveni found that 16 percent are aligned west of north, while the other 86 percent are aligned east of north (Aveni, 2001). He concludes that an eastern skew was a standard architectural practice over a wide area in Mexico. A peak around 25° south of east suggests that many sites were aligned to solstices. As shown in Table 8, more than 75 percent of identified alignments lie in solar or lunar directions. What is particularly interesting about Mesoamerica is the large fraction of sites whose alignments are unknown. Fuson (1969) suggested the possibility that Mayan temples were aligned to magnetic north using a compass. Carroll (1979) analyzed about four dozen Mesoamerican sites and found that almost all of them were not aligned to magnetic north, based on their assumed date of construction.

TABLE 8
Alignments of Sites in Mesoamerica

Belize, Altun Ha, Sun God Pyramid	17.763950	-88.347061	7.6	97.6		
Belize, Xunantunich	17.088922	-89.141631	-10.3	79.7	D	Oriented in the direction of Uxmal
El Salvador, Tazumal	13.979547	-89.674131	18	108	m	
Guatemala, Mixco Viejo	14.871668	-90.664167	12.5	102.5	D	Oriented in the direction of Uxmal
Guatemala, Tikal	17.222094	-89.623614	8.6	98.6		
Guatemala, Yaxchilan	16.899655	-90.967093	30.4	120.4	D	Oriented in the direction of Chichen Itza
Honduras, Copan, Step Pyramids	14.840000	-89.140000			Z	Multiple orientations between -4 and +4 deg.
Mexico, Acatitlan	19.550000	-99.170000	20.3	110.3	Z	
Mexico, Alta Vista	23.478544	-103.945607				Multiple alignments
Mexico, Bonampak	16.704000	-91.065000	38	128		
Mexico, Calakmul	18.105392	-89.810829	8.8	98.8		
Mexico, Calixtlahuaca	19.335038	-99.697570	-30	60	M	
Mexico, Chalcatzingo	18.676715	-98.770783	6.8	96.8		
Mexico, Chichen Itza	20.680000	-88.570000	21	111	M,Z	Also cenotes, crop cycles, Venus min/max settings
Mexico, Chimalacatlan, C1	18.446236	-99.105878	-34.7	55.3	M	
Mexico, Chimalacatlan, C2	18.444804	-99.104331	28.7	118.7	m	
Mexico, Cholula	19.058305	-98.301906	25	115	S	
Mexico, Coba, Grand Pyramid	20.492974	-87.724195	-39	51		
Mexico, Comalcalco	18.278200	-93.200327	24	114	S	
Mexico, Cuauhtinchan Archeological Site, Cuauhcalli	18.953500	-99.502888	15.4	105.4	m	
Mexico, Cuiculco	19.301021	-99.183798				Circular structure
Mexico, El Cerrito Archaeological Zone	20.551376	-100.444027	7.4	97.4		
Mexico, El Tajin, Pyramid of the Niches	20.448058	-97.378242	14.5	104.5		
Mexico, El Tajin, Southern Ballcourt	20.448058	-97.378242	0	90	E	
Mexico, El Tajin, Tajin Chico	20.448058	-97.378242	40	130		
Mexico, El Tepozteco	19.000786	-99.101558	26	116	m	
Mexico, La Venta	18.103191	-94.040946	-12.2	77.8	D	Oriented in the direction of Comalcalco
Mexico, Mayapan	20.629823	-89.460590				Multiple orientations between -5 and +10 deg.
Mexico, Mitla	16.927049	-96.359348	12	102		
Mexico, Monte Alban	17.042122	-96.768184	6.45	96.45		
Mexico, Monte Alban, Building J	17.042122	-96.768184	-43	47	st	Aligned to Capella, points to Building P with zenith tube.
Mexico, Palenque, North Group	17.483978	-92.046320	10.1	100.1		
Mexico, Palenque, Temple of the Inscriptions	17.480000	-92.050000	20.6	110.6		
Mexico, Tenango	19.108425	-99.597693	14	104		Multiple orientations between 12 to 16 deg.
Mexico, Tenochtitlan	19.435000	-99.131389	7	97		Adjusted equinox alignment
Mexico, Teotihuacan	19.692500	-98.843889	15.6	105.6	st	Pleiades. Also mountains, pecked crosses, 260 day cycle
Mexico, Tlatelolco	19.450994	-99.137510	8.5	98.5		
Mexico, Tula	20.064451	-99.340500	15.47	105.47	m	
Mexico, Tulum	20.210000	-87.430000	22.3	112.3		
Mexico, Uxmal, Palace of the Governors	20.359444	-89.771389	30	120	S	Most southern Venus rise, 750 CE
Mexico, Uxmal, Pyramid of the Magician	20.359444	-89.771389	9.2	99.2		
Mexico, Uxmal, Templo Mayor	20.359444	-89.771389	19.6	109.6	Z	
Mexico, Xochicalco, Grand Pyramid	18.803889	-99.295917	0	90	E	
Mexico, Xochicalco, Temple of Quetzalcoatl	18.803889	-99.295917	15.4	105.4		

D = alignments to ♀sacred directions□ E = cardinal directions, i.e. geographic poles, and equinoxes. M,m = major and minor lunar standstills. S = solstices. st = stellar alignments. Z = zenith passage.

ANALYSIS OF ALIGNMENTS

The graphs in Figure 6 plot the distribution of site alignments within each of the eight geographic regions. Site distributions are con-

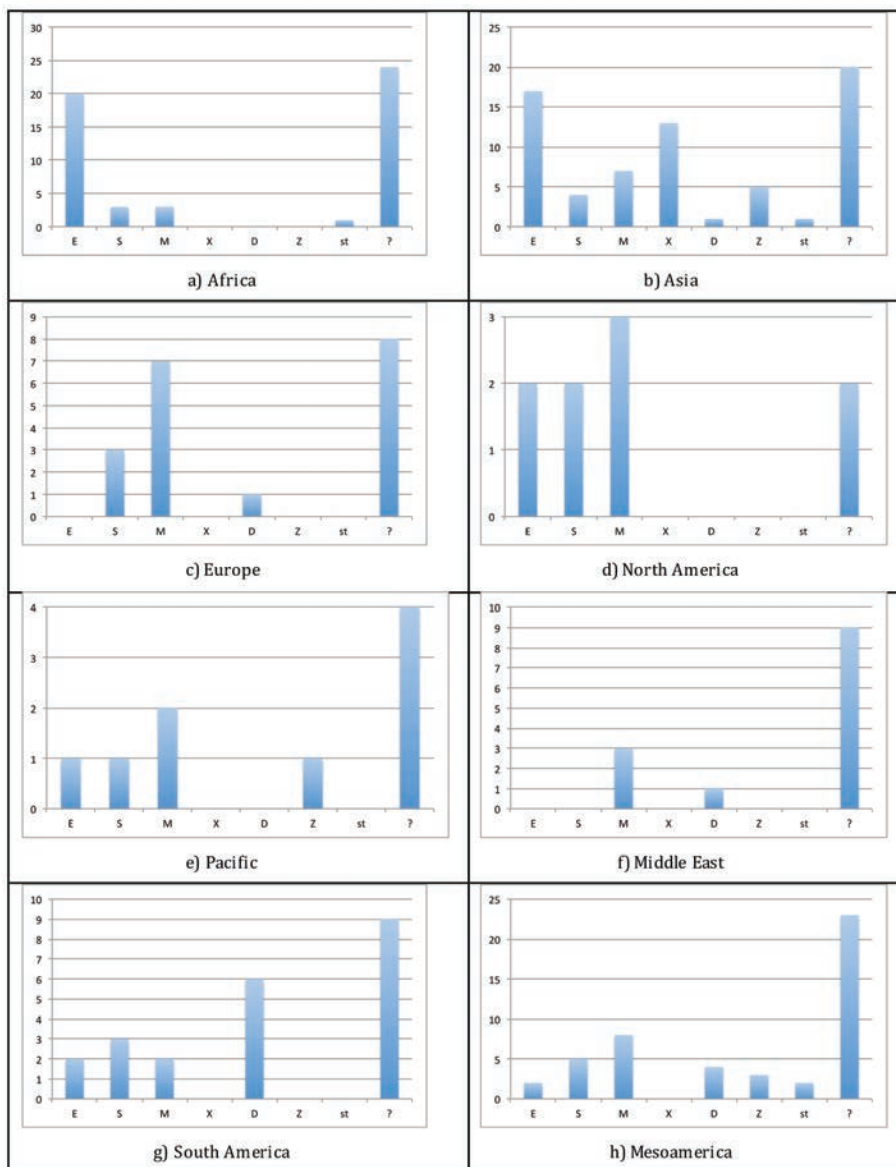


Figure 6. Site alignment distributions.

TABLE 9
**Region to Region Similarity (Euclidean Distances)
 Based on Similarity of Site Alignment Distributions**

	Africa	Asia	Europe	North America	Pacific	Middle East	South America	Mesoamerica
Africa		0.236314729	0.860343049	0.339688139	0.425130316	1.033093278	0.574979099	0.536565501
Asia	0.236314729		0.491470099	0.210654053	0.185381944	0.634548611	0.340786284	0.223090278
Europe	0.860343049	0.491470099		0.13324338	0.149421488	0.112603306	0.395618368	0.131227043
North America	0.339688139	0.210654053	0.13324338		0.055510204	0.329081633	0.308899891	0.106363379
Pacific	0.425130316	0.185381944	0.149421488	0.055510204		0.305	0.316686391	0.058472222
Middle East	1.033093278	0.634548611	0.112603306	0.329081633	0.305		0.477071006	0.253472222
South America	0.574979099	0.340786284	0.395618368	0.308899891	0.316686391	0.477071006		0.147209895
Mesoamerica	0.536565501	0.223090278	0.131227043	0.106363379	0.058472222	0.253472222	0.147209895	

verted to probabilities (relative frequencies) over the set of alignments $\{E, S, M, X, D, Z, st\}$ where \square represents both major and minor lunar standstills. If $\vec{r}(i)$ and $\vec{r}(j)$ are the alignment probabilities within two geographic regions, we define the similarity between the two regions by

$$d(i, j) = \|\vec{r}(i) - \vec{r}(j)\|$$

Table 9 lists similarities between regions in terms of their alignment probabilities.

Figure 7 depicts the similarity between geographic regions using a distance-preserving nonlinear mapping algorithm (Carlotto, 1993). Regions on the edge of the map are the most distinct from other regions in terms of their alignment statistics. For example, South America is different from the other regions in terms of the large number of sites that are aligned to other sites. Africa, mainly Egypt, is distinguished by its many pyramids aligned to the cardinal directions. Asia is unique in that most of its sites are aligned either to true north or to geomagnetic north. Most sites in Europe are aligned to solstices or lunar standstills, while sites in the Middle East are aligned only to the moon. Almost all of the sites in North America that were built by indigenous people are aligned to the sun or moon.

DISCUSSION

Across all eight geographic regions, 19% of the sites considered are aligned to the cardinal directions, 9% to solstices, 15% to lunar standstill, 5% to the geomagnetic pole at the time of construction, 5% to other sites, 4% to zenith passages, and 1% to stars. About 42% of the sites (95 out of 224) are anomalous in that they cannot be explained by

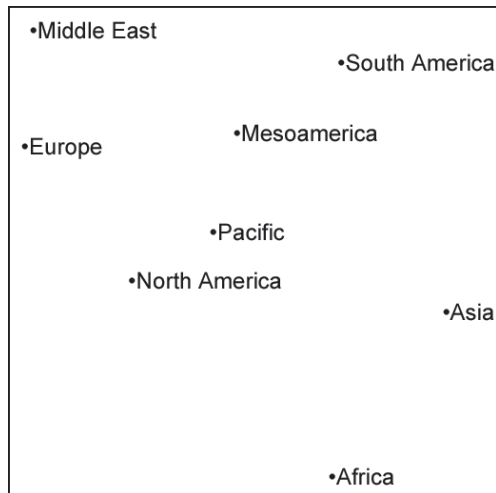


Figure 7. A 2D map depicting similarities between geographic regions based on their site distribution statistics.

any of our alignment hypotheses. Some of these sites may have aligned for other reasons, e.g., the alignment of the Parthenon to the sunrise on Athena's birthday or to conform to the landscape and topography as at Teotihuacan. Other structures such as Hindu temples in India (Daware, 2017) may have been aligned at the discretion of the builder without any obvious plan. It is also possible that some sites may not have been purposefully aligned at all.

That the alignment of so many sites cannot be explained is surprising. About half of the sites, on average, within all of the geographic regions (with the exception of North America) cannot be explained in terms of alignment (Figure 8). This would suggest that the reason for the non-alignment could be global and not local in nature. This possibility is considered in a subsequent paper.

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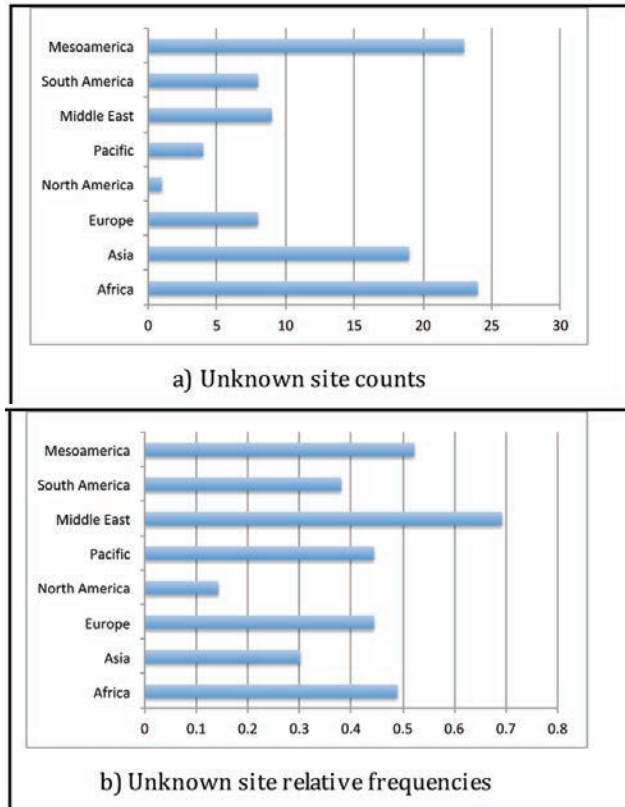


Figure 8. Geographic distributions of unknown alignment sites.

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RESEARCH ARTICLE

Development and Deployment of the Windbridge Psi and Related Phenomena Awareness Questionnaire (WPRPAQ)

JULIE BEISCHEL

Windbridge Research Center, Tucson, AZ, www.windbridge.org

MARK BOCCUZZI

Windbridge Institute, Tucson, AZ, www.windbridgeinstitute.com

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Abstract—Surveys regarding anomalous beliefs and exceptional experiences are an important methodology in sociology and psi-related research. Previously published questionnaires, however, contain various limitations in their philosophy, language, and usefulness. This study aimed to develop a psi survey and collect data from an experience-centered perspective. Established survey development and piloting methods were used to create the Windbridge Psi and Related Phenomena Awareness Questionnaire (WPRPAQ), a novel, 10-item, web-based instrument which phenomenologically describes experiential phenomena without using problematic terms and asks respondents to signify whether they are aware of the phenomena or not and, if so, what experience they have had with them. For analysis, WPRPAQ items were categorized as bidirectional which involve two or more people and can be given and/or received (energy healing, mediumship, and telepathy) or unidirectional which generally involve only the experiencer/respondent (clairvoyance, micropsychokinesis [microPK] and macropsychokinesis [macroPK], out-of-body experiences, near-death experiences, children’s memories of previous lives, and precognition). Online survey response data were collected from self-identified mediums ($n = 316$) and non-mediums ($n = 1,030$) with no demographic statistical differences: 53.2 ± 10.1 and 53.9 ± 11.9 years of age, respectively; 89.5% and 85.5% female, respectively; both roughly 95% white. More than 80% of each participant sample reported being aware of all 10 phenomena. The portion of mediums who reported

awareness of microPK and macroPK was significantly larger than the portion of non-mediums for those phenomena (each $p < .00001$). A significantly larger portion of mediums than non-mediums reported experiencing each of the 10 phenomena (all $p < .0001$). Ideally, the WPRPAQ can be used by other researchers to assess awareness of psi and related phenomena and the prevalence of those experiences in other populations.

Keywords: psi survey; microPK; macroPK; mediums; psi questionnaire; psi phenomena

Surveys regarding anomalous beliefs and experiences have regularly been an important methodology in sociology, parapsychology, and psi-related research, reviewed, for example, by Irwin (2009). These studies have included examinations of experiences in samples from the general population (e.g., Castro et al., 2014; Palmer, 1979) as well as samples from specific populations such as Association for Research and Enlightenment (ARE) members (Kohr, 1980) and Spiritualist mental mediums (Roxburgh & Roe, 2011). Comparisons of both types of samples also have been done. Fach et al. (2013), for example, compared the experiences of a cross section of the general population to those of clients reporting exceptional experiences who actively sought advice from counselors at the Institut für Grenzgebiete der Psychologie und Psychohygiene (IGPP; Institute for Frontier Areas of Psychology and Mental Health). Often, the aim of these questionnaire studies is to examine relationships between experiences or beliefs and, for example, psychological factors (e.g., Rabeyron & Watt, 2010), well-being (e.g., Kennedy et al., 1994), and trauma (e.g., Irwin, 1994).

Previously published questionnaires, however, contain various limitations; this extends beyond simple participant burden issues (i.e. large numbers of items). Goulding and Parker (2001) found that the use of psychometric instruments to measure psi-related abilities, beliefs, and/or experiences is steered to a large extent by the underlying model or ideology concerning what psychic experiences are (p. 73). They emphasized an "abated" trend by researchers to focus on the dysfunctional aspects of psi-related experiences such as lack of critical thinking ability and proneness to psychosis in their instruments. In reality, these experiences are frequent within the general, non-clinical population and not usually associated with mental disorders (e.g., Moreira-Almeida & Lotufo-Neto, 2017).

Other more specific issues also exist. Several instruments use loaded/leading terminology (e.g., Otis & Alcock, 1982). For example, the Paranormal Belief Scale (Tobacyk & Milford, 1983) includes the item "Reincarnation does occur;" a term related to specific religious and spiritual worldviews. Similar issues arise with the widespread use of the terms *soul*, *spirit*, *ghost*, *God*, *miracle*, etc. The use of these types of terms is problematic as some may inhibit respondents from reporting the experience of interest (Moreira-Almeida & Lotufo-Neto, 2017). This may be a general issue with instruments referring to relevant experiences as *paranormal* within the survey title (e.g., Randall, 1997, Tobacyk & Milford, 1983), though modern research has shown that "the paranormal is (still) normal" (Castro et al., 2014, p. 1).

Some instruments use unclear language, making it potentially difficult to quantify one's agreement with a particular item. For example, the first item in the Paranormal Short Inventory (Randall, 1997) is: "It is probably true that certain people can predict the future quite accurately." The instrument asks respondents to strongly, somewhat, or slightly agree or disagree with the *probable* truth about the *quite* accurate abilities of others. Other items in this instrument ask respondents to quantify their agreement with items including "for the most part," "it is quite possible," and "as a general rule."

Terms with no associated definitions are regularly used in instruments (e.g., Van de Castle & White, 1955; Randall, 1997). For example, the Anomalous Experiences Inventory (AEI; Gallagher et al., 1994) includes the items "I have had a psychic experience," "I believe in the unconscious," and "I believe that many paranormal occurrences are real." Similarly, the Australian Sheep-Goat Scale (ASGS; Thalbourne, 1995) uses the terms *ESP*, *psychic*, and *telepathy* without defining them (the term *psychokinesis* is defined within the ASGS).

Many instruments use what is now considered discriminatory or disparaging language (e.g., Nixon, 1925). For example, the Paranormal Belief Scale (Tobacyk & Milford, 1983) includes items about belief in *witches* and *voodoo*, established international spiritual and religious practices (e.g., "Witches do exist") and combines these into a "Witchcraft" subscale. In the revised version of this instrument (Tobacyk, 2004), the items referencing voodoo have been changed to refer instead to formulas, incantations, and casting spells.

Often surveys involve an interdependence of items (e.g., Gallagher et al., 1994). For example, the ASGS (Thalbourne, 1995) includes the items "I believe in life after death" and "I believe that some people can contact spirits of the dead" though the latter relies on the former being true.

Older instruments may contain items not widely relevant today. For example, Bhadra's attitude questionnaire (1966) includes the item "Have you ever known in advance that you are going to receive a particular letter on a particular day?" It is now possible to obtain this information through normal sensory means (digitally/online). Finally, many published instruments include items that refer to non-psi phenomena such as astrology, the Loch Ness monster, heaven and hell, aliens/UFOs, and drug use (e.g., Gallagher et al., 1994; Jones et al., 1977; Otis & Alcock, 1982; Randall & Desrosiers, 1980).

As cultural norms change, acceptable language is adjusted, psi research findings become more widespread, and psi phenomena are appropriately portrayed as prevalent in the popular culture, research instruments will need to follow suit to be useful. The aim of the current project was to develop a survey instrument that could collect data from an experience-centered perspective. This is in line with the recommended guidelines for researchers (Moreira-Almeida & Lotufo-Neto, 2017) for developing and refining surveys "in a more comprehensive and reliable way" including distinguishing the lived experience from its interpretations and adopting a neutral but empathetic attitude (p. 287). Moreira-Almeida and Lotufo-Neto also recommended that terminology be carefully chosen; that terms with causal or theoretical implications be avoided and, instead, that phenomenological descriptions be used.

Established survey development and piloting methods (Andrews et al., 2003; Dillman et al., 2014) were used to create the Windbridge Psi and Related Phenomena Awareness Questionnaire (WPRPAQ) which phenomenologically describes experiences without using potentially loaded or controversial terms. For each described experience, the respondent signifies whether they are aware of that phenomenon or not and, if they are, what experience they have had with it.

The WPRPAQ is a novel, web-based instrument. Web and mobile surveys are becoming increasingly common modalities for providing instruments to respondents (Dillman et al., 2014). The benefits of electronic surveys (Andrews et al., 2003) include increased feasibility;

cost effectiveness; quick distribution and response cycles; design principles similar to those of paper questionnaires; applicability of both open-ended and forced-choice items; formatting control; and enhanced survey presentation including colors, graphics, and animations. However, the nature of the Internet prevents random sampling, and nonresponse rates cannot be assessed. In addition, "economics, age, and ethnicity continue to produce significant gaps between online and offline populations" (Andrews et al., 2003, p. 190).

The WPRPAQ was initially used to collect data from self-identified mediums and non-mediums. Although it is possible for anyone to experience communication from the deceased and this experience has been reported across cultures since antiquity, a *medium* is someone who has this experience regularly, reliably, and often on-demand. During a modern mediumship reading, a medium shares information about and messages from the deceased with *sitters*, the living friends and loved ones of the deceased, for the purpose of generating for the sitters *assisted after-death communication experiences* (aADCs), one of the four types of ADCs (Beischel, 2019). Contemporary mediumship studies (reviewed in Beischel & Zingrone, 2015) have examined the ability of mediums to report accurate and specific information about the deceased under controlled laboratory conditions (Beischel et al., 2015) as well as their psychological (Roxburgh & Roe, 2011; Taylor & Murray, 2012) and physiological (Beischel et al., 2019) characteristics and their specific experiences of communication with the deceased (e.g., Beischel et al., 2017; Emmons & Emmons, 2003; Rock & Beischel, 2008).

METHODS

Addressing the limitations of previous instruments discussed above, we developed the 10-item, WPRPAQ instrument (see Appendix) and collected online responses from self-identified mediums and non-mediums. This occurred as part of a larger online survey project termed the Online Census of Traits and Observations (OCTO) Study. Other OCTO Study findings are reported elsewhere.

WPRPAQ Instrument

An online questionnaire hosting and development service (i.e. FormSite) was utilized to create and host the WPRPAQ survey items

and capture participant responses. Potential respondents were initially sent to a descriptive page on the Windbridge Institute website with links to the actual survey. The 52 OCTO Study items were completed by respondents in one sitting. No WPRPAQ items were required; initial survey items regarding participation requirements were necessary in order to submit a survey. OCTO Study data were collected during 2016 and 2017.

Piloting. The survey was developed using an established 4-stage survey piloting process (Andrews et al., 2003) which included (1) review by knowledgeable analysts (colleagues in or familiar with the field of parapsychology/psi-research) to ensure question completeness, efficiency, relevancy, scale, and format appropriateness; (2) "typical" participants (i.e. Windbridge Certified Research Mediums, WCRMs; Beischel, 2007) taking the survey while giving real-time as well as retrospective feedback to the investigators; (3) examination of the survey language, question interpretation consistency, and logical sequencing by employing a small number of pilot respondents from the general population; and (4) a final check to catch any inadvertently introduced typos or errors. Pilot data were collected from roughly 50 mediums and non-mediums prior to formal data collection. This piloting process established face validity to the instrument. Further, because the questions describe the phenomena of interest and ask if the respondent has ever heard of them, test/re-test reliability cannot be assessed since the process of taking the survey facilitates awareness. In addition, because each WPRPAQ item refers to an independent phenomenon, internal consistency reliability statistics are not appropriate and were not calculated.

Language. The WPRPAQ was designed to not include any terms (such as *telepathy*, *clairvoyance*, or *reincarnation*) that may be associated with respondents' biases or assumptions. This is similar to Palmer's (1979) psychic experiences survey in which the primary questions were phrased as precise descriptions of the experience or activity of interest, using the simplest words possible. In most cases, we avoided the use of labels . . . that might have different connotations for different respondents" (p. 224). In addition, the language used in the WPRPAQ does not include potentially offensive or disparaging qualifying terms such as *alleged*, *purported*, *supposed*, or *reported* to

describe participants' experiences. Though it is not possible to explain these types of experiences within the current mainstream materialist scientific paradigm, they "have been defined as real and important" by those having them and thus "are real in their consequences" (Nowatzki & Grant Kalischuk, 2009, p. 93). The WPRPAQ takes a neutral stance on the veridical nature of these experiences and instead just attempts to determine their prevalence.

Phenomena. Each WPRPAQ item describes an experience (most items begin with, "Some people report/experience . . .") and then asks the respondent about both their awareness of and their experience with that phenomenon. Because these are all experiences that have been reported by mentally healthy individuals, questioning participants' beliefs regarding whether or not these phenomena exist is not relevant and was not included.

Participants could choose responses asserting that they have never heard of the phenomenon, that they have heard of it but not experienced it, that they have heard of it but are unsure if they have experienced it, or that they have heard of it and experienced it. **B** refer not to say "was also an option for each item. Without using these terms, the WPRPAQ asks about: energy healing, mediumship, telepathy, clairvoyance/remote viewing (RV), micropsychokinesis (microPK), macropsychokinesis (macroPK), out-of-body experiences (OBEs), near-death experiences (NDEs), children's memories of previous lives, and precognition.

Items were numbered 1–10, and possible responses were labeled a, b, c, etc., for each item. The online hosting service allowed a participant to choose one radio button-associated response for each item within the WPRPAQ. The WPRPAQ was not named in the online questionnaire and was simply labeled "Section 7" within the OCTO Study. For use by other researchers, we recommend it be labeled by its acronym alone if a title is required.

The full WPRPAQ instrument is reproduced in the Appendix. It should be noted that #8 (NDEs) addresses only NDEs that occur concurrent with clinical death. Though NDEs can occur outside of this situation, the WPRPAQ was designed only to capture this specific type. It should also be noted that item #9 (past-life memories) has been changed from the version used during the data collection described

here. It originally read, "Some people (usually children) experience memories, preferences, behaviors, and other characteristics that are associated with a different person who lived at an earlier time and died before they were born." Because of the notable percentage of people reporting this experience ("I have had specific memories from a previous life") it is likely that participants were including in their responses past-life, regression-associated memories of previous lives and/or other memories acquired during adulthood. As such, that item was changed to the following: "Some young children report experiencing memories, preferences, behaviors, and other characteristics that are associated with a different person who lived at an earlier time and died before they were born." The relevant response is now phrased: "As a young child, I experienced and reported to others my specific memories of a previous life."

Participants

Anonymous survey responses were collected from U.S. Internet users with a general interest in mediumship and related topics. Survey respondents were recruited via Windbridge Institute's website, email lists, and social media to include self-identified mediums and non-mediums. A request was made to other organizations with access to similar populations of interest (e.g., Rhine Research Center) to post the call for participation. The survey used disclosure information and no identifying participant information was collected.

Demographics. In the 8-section OCTO Study, Section 1 included items about the participants' basic demographic characteristics. Respondents listed their age in years.

For race, they were asked "How would you describe yourself? (Choose one or more from the following racial groups.)" The options listed were:

American Indian or Alaska Native [a person having origins in any of the original peoples of North and South America (including Central America), and who maintains a tribal affiliation or community attachment]

Asian (a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent)

including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam)

Black or African American (a person having origins in any of the Black racial groups of Africa—includes Caribbean Islanders and others of African origin)

Native Hawaiian or Other Pacific Islander (a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands)

White (a person having origins in any of the original peoples of Europe, the Middle East, or North Africa)

Prefer not to say

At the time of data collection, the U.S. government defined Hispanic as an ethnicity, not a race, so it was not an option on government forms and was not included in the OCTO Study. However, in the 2020 U.S. census, racial groups will be called "categories" and Hispanic will be included as an option (Cohn, 2015). For researchers wishing to collect this kind of demographic data with WPRPAQ data, we recommend using an updated race item based on what will be used in the U.S. 2020 Census: "Which category best describes you? Check all that apply." The possible options are

American Indian or Alaska Native (of, for example, Aztec, Navajo, Mayan, etc., descent)

Asian (of, for example, Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, etc., descent)

Black or African American (of, for example, African, Haitian, Jamaican, etc., descent)

Hispanic, Latino, or Spanish origin (of, for example, Cuban, Dominican, Mexican, Puerto Rican, Salvadoran, etc., descent)

Middle Eastern or North African (of, for example, Algerian, Egyptian, Lebanese, Moroccan, Persian, Syrian, etc., descent)

Native Hawaiian or Pacific Islander (of, for example, Fijian, Native Hawaiian, Samoan, Tongan, etc., descent)

White (of, for example, English, French, German, Italian, Irish, Polish, Russian, etc., descent)

Another race, ethnicity, or origin
Prefer not to say

In Section 1, the OCTO Study participants were also asked, "With what gender do you currently identify yourself?" Response options were:

Male
Female
Intersex
Transgender
Do not identify as female, male, intersex, or transgender
Prefer not to say

Identification as mediums. Two items in the OCTO Study were used to separate the respondents' data into medium and non-medium groups: a yes/no item and a checkbox item. In Section 2 of the survey, the single item read:

Please read the following description and then answer the item honestly. In our research, we use the word "medium" to describe a person who regularly experiences communication from the deceased and reports the information s/he receives to the living. According to this definition, are you a medium?

The possible choices were: 'Yes,' 'No,' and 'Prefer not to say.'

Section 8 of the OCTO Study survey included this introductory statement: "The following items ask about your individual perceptions, reactions, experiences, and feelings." One item asked, "Do any of the following statements apply to you? (Check all that apply)." One of the choices listed was "consider myself a medium."

For data analysis, in order to be considered a medium, a participant needed to answer 'Yes' to the yes/no item and also check the "consider myself a medium" box. In order to be considered a non-medium, a participant needed to do the opposite: answer 'No' to the yes/no item and also not check the box. Participants who preferred not to answer the first item were not included in the study.

Analyses

Online statistical calculators (www.socscistatistics.com, vassarstats.net) and Microsoft Excel (v. 2016) were used for statistical data analyses. Data are reported as mean \pm standard deviation (n.s. = not significant). Bonferroni correction for multiple comparisons [30: 10 awareness, 10 experience, 10 blanks (see below)] resulted in an α of 0.0017.

For each of the 10 WPRPAQ items, 1% or fewer of each sample left the item blank or chose B refer not to say. There were no significant differences between medium and non-medium samples for these proportions of these 'blanks' for any item (all $p \geq 0.02$).

WPRPAQ items were categorized as describing either *bidirectional* or *unidirectional* experiences. Bidirectional experiences involve two or more people and can be given and/or received by the experiencer/respondent (energy healing, mediumship, and telepathy; items 1–3). Unidirectional experiences generally involve only the experiencer/respondent (clairvoyance, microPK, macroPK, OBE, NDE, memories of previous lives, precognition; items 4–10).

Participant WPRPAQ responses were categorized according to *awareness* (yes or no) and *experience* (no, unsure, yes) for each of the 10 items. For example, item 1 describes the bidirectional phenomenon of energy healing and asks, 'Were you aware that this type of healing exists?' Possible responses were:

- a. No, I've never heard of this.
- b. Yes, I have heard of this but never experienced it myself.
- c. Yes, I have heard of this but I'm not sure if I've experienced it.
- d. Yes, I have heard of this and someone else has given this type of healing to me.
- e. Yes, I have heard of this and I have given this type of healing.
- f. Both (d) and (e) are true for me.

Awareness. Awareness of a phenomenon was assessed by tallying participants who chose the 'no' response (a: 'No, I've never heard of this') and participants who chose any of the 'Yes' responses (in the example above: b, c, d, e, or f: 'Yes, I have heard of this . . .').

For the awareness data, reported percentages are the proportions

out of the total number of participants in a sample who chose an option (blanks' removed). Comparisons of awareness for medium and non-medium samples were compared using z-score tests for two population proportions.

Experience. Experience with a bidirectional phenomenon (items 1ñ3) was assessed by tallying participants who had heard of a phenomenon and chose the 'none' response (b: 'never experienced it myself'), the 'unsure' response (c: 'I'm not sure if I've experienced it'), the 'received' response (d: 'someone else has done this for me'), the 'given' response (e: 'I have done this for someone else'), or the 'both' response (f: 'Both (d) and (e) are true for me').

Experience with a unidirectional phenomenon (items 4ñ10) was assessed by tallying participants who had heard of a phenomenon and chose the 'no' response (b: 'never experienced it myself'), the 'unsure' response (c: 'I'm not sure if I've experienced it'), or the 'yes' response (d: 'I have experienced it').

Our research question involved comparing the experiences of participants in each group who were aware of the phenomena; thus, 'no' awareness responses were not included in the experience data analysis. For research questions involving the overall proportion of participants who never had an experience, tallying all the participants who chose either the 'no' awareness response (a) or the 'none' experience response (b) together would be appropriate.

For the experience data, reported percentages are the proportions out of the total number of participants in a sample who were aware of a phenomenon and who chose an experience option (blanks' removed). Comparisons of experiences for medium and non-medium samples were compared using chi-squared contingency tables.

RESULTS

After all incomplete surveys, duplicates, and respondents who preferred not to answer the yes/no item were removed and the checkbox criteria were deployed (see **METHODS: Participants: Identification as mediums**), the remaining WPRPAQ data collected from 316 mediums and 1,030 non-mediums were analyzed.

Demographics

Overall, the medium and non-medium participants showed no statistically significant differences in demographic characteristics: age (53.2 ± 10.1 and 53.9 ± 11.9 , respectively; t -test: n.s.), race (both roughly 95% white; z -score: n.s.), and gender (89.5% and 85.5% female, respectively; z -score: n.s.).

Awareness of Phenomena

Table 1 conveys the proportion of medium and non-medium samples who reported being aware of each of the 10 WPRPAQ phenomena; that is, the percentage of participants in each group who chose responses including the phrase, "Yes, I have heard of this" out of the total number of participants once blanks and "I refer not to say" responses were removed. More than four-fifths of each participant sample in this study reported having heard of all 10 phenomena.

Considering all 10 phenomena, the fewest number of participants in either group (but still more than 80%) had heard of microPK or macroPK. However, the portion of mediums who reported having heard of microPK and macroPK was significantly larger than the portion of non-mediums reporting the same for those phenomena (each $p < .00001$). No differences between samples existed for awareness of any of the other eight phenomena.

Experience of Phenomena

Participants reported all levels of experience with each phenomenon (i.e. no, unsure, and yes, including given, received, and both).

Though the portions of participants in each group who were aware of 8 of the 10 phenomena were not statistically significantly different (Table 1), their levels of experiences with each of the 10 showed significant differences (Table 2). There were significant associations between the types of experiences examined and whether participants self-identified as mediums or non-mediums [energy healing: $\chi^2(4) = 269.07$; mediumship: $\chi^2(4) = 720.71$; $\chi^2(4) =$ telepathy: $\chi^2(4) = 325.00$; clairvoyance/RV: $\chi^2(2) = 278.97$; microPK: $\chi^2(2) = 101.55$; macroPK: $\chi^2(2) = 85.30$; OBE: $\chi^2(2) = 258.75$; NDE: $\chi^2(2) = 119.24$; past-

TABLE 1
Portion of Participants Who Reported
Being Aware of Each Phenomenon

	Energy Healing	Mediumship	Telepathy	Clairvoyance/ RV	MicroPK	MacroPK	Out-of-Body Exp. (OBE)	Near-death Exp. (NDE)	Past-life memories	Precognition
MED	100.0%	100.0%	100.0%	100.0%	92.6%	96.2%	99.7%	100.0%	99.7%	99.7%
NON	97.3%	99.9%	99.3%	98.4%	82.4%	87.7%	98.7%	99.7%	98.1%	99.3%
z	2.9645	0.5554	1.4661	2.2194	4.4188	4.3367	1.4530	0.9608	1.9608	0.7364
p	n.s.	n.s.	n.s.	n.s.	p<.00001	p<.00001	n.s.	n.s.	n.s.	n.s.

MED = Mediums. NON = Non-mediums. RV = Remote Viewing. PK = Psychokinesis. n.s. = not significant. Bonferroni corrected $\alpha = 0.0017$.

life memories: $\chi^2(2) = 204.75$; precognition: $\chi^2(2) = 257.87$; all $p < .0001$]. That is, a significantly larger portion of mediums than non-mediums had each of the 10 experiences. Effect sizes (Cramer's V ; e.g., Kim, 2017) for the differences in experience between mediums and non-mediums were considered large for all three bidirectional phenomena (energy healing, mediumship, and telepathy; $df = 4$; $V > 0.25$) and for the unidirectional phenomena of clairvoyance/RV, OBEs, past-life memories, and precognition ($df = 2$; $V > 0.35$). Effect sizes were medium for the unidirectional phenomena of NDEs and microPK and macroPK ($df = 2$; $V > 0.21$).

Bidirectional phenomena. For experiences with the bidirectional phenomena of energy healing, mediumship, and telepathy (Figure 1), more than 60% of mediums had both given and received each experience (63.2%, 78.4%, and 76.8%, respectively). More than 20% of non-mediums reported never having experienced each of these bidirectional phenomena (35.5%, 20.2%, and 22.0%, respectively). Roughly one-fifth of non-mediums were unsure if they had experienced each of these three (20.2%, 19.5%, and 22.5%, respectively).

More than half of non-mediums in this study reported experience with acting as sitters: 56.8% reported that [someone else has described accurate information about a deceased person to me] (received + both).

Unidirectional phenomena. For the unidirectional basic psi phenomena of clairvoyance/RV (#4), precognition (#10), microPK (#5),

TABLE 2
Results of χ^2 Tests Comparing Experiences
of Medium and Non-Medium Participants

	χ^2	<i>df</i>	<i>p</i>	Cramer's <i>V</i>
Energy Healing	269.07	4	<.0001	0.4529
Mediumship	720.71	4	<.0001	0.7345
Telepathy	325.00	4	<.0001	0.4934
Clairvoyance/RV	278.97	2	<.0001	0.4587
MicroPK	101.55	2	<.0001	0.2992
MacroPK	85.30	2	<.0001	0.2665
OBE	258.75	2	<.0001	0.4412
NDE	119.24	2	<.0001	0.2985
Past-life memories	204.75	2	<.0001	0.3938
Precognition	257.87	2	<.0001	0.4400

RV = Remote viewing. PK = Psychokinesis. OBE = Out-of-body experience.
NDE = Near-death experience. Bonferroni corrected $\alpha = 0.0017$.

and macroPK (#6) (Figure 2), 40% or more of non-mediums had no such experiences (never experienced it myself; 42.5%, 46.9%, 66.7%, and 72.2%, respectively). Roughly 80% of mediums reported experiencing clairvoyance/RV or precognition (81.8% and 79.6%, respectively). Fewer than 30% of non-mediums reported having these two types of psi experiences (29.6% and 29.5%, respectively).

Many participants in both samples reported either that they had never experienced microPK or macroPK phenomena or that they were unsure if they had or not (no + unsure—mediums: 79.6% for microPK and 81.8% for macroPK; non-mediums: 93.4% for microPK and 93.2% for macroPK).

Two of the unidirectional phenomena assessed by the WPRPAQ are related to the concept of the continuation of consciousness after death (*survival*): NDEs (#8) and past-life memories (#9). The majority of mediums and non-mediums reported never having experienced an NDE (62.9% and 88.7%, respectively); 17.5% of mediums and 3.6%

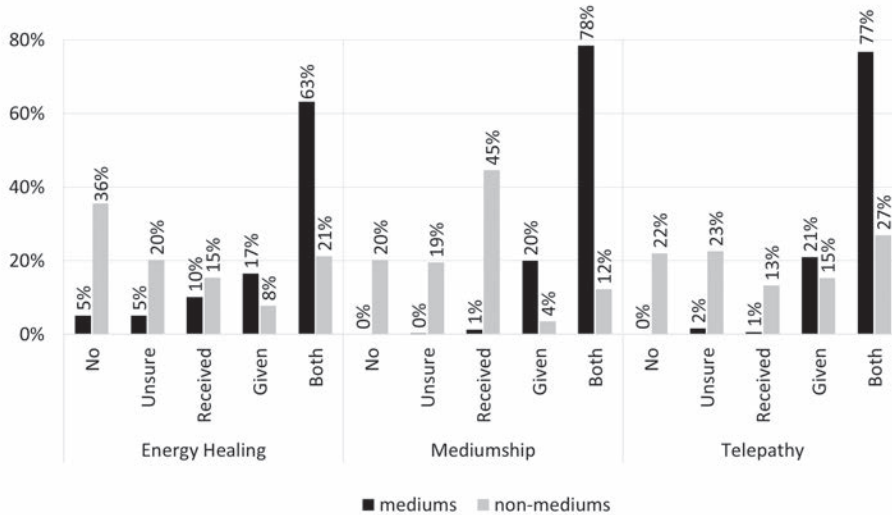


Figure 1. Levels of experience with bidirectional psi-related phenomena in self-identified mediums and non-mediums.

χ^2 tests: all $p < .0001$; $df = 4$; Cramer's $V > 0.25$; Bonferroni corrected $\alpha = 0.0017$ (see Table 2). No = "never experienced it myself." Unsure = "I'm not sure if I've experienced it." Both = received and given. Energy Healing: Received = "someone else has given this type of healing to me." Given = "I have given this type of healing." Mediumship: Received = "Someone else has described accurate information about a deceased person to me." Given = "I have described accurate information about deceased people I didn't know." Telepathy: Received: "Someone else has acquired accurate information about me like this." Given = "I have acquired accurate information about someone else like this." For ease of viewing the graph, portions are rounded to the nearest whole number.

of non-mediums reported NDEs: having conscious experiences of themselves in a plane of existence different from the physical world they are used to when I was clinically dead or close to it (Figure 3).

The majority of mediums (53.7%) and 15.7% of non-mediums reported having experienced past-life memories (Figure 3). However, these proportions may include memories experienced during adulthood and the item was rephrased after data collection to include only the phenomenon of children who remember past lives (e.g., Tucker, 2008; see METHODS: WPRPAQ Instrument: Phenomena). Twenty-three percent of mediums and 60.6% of non-mediums chose the option,

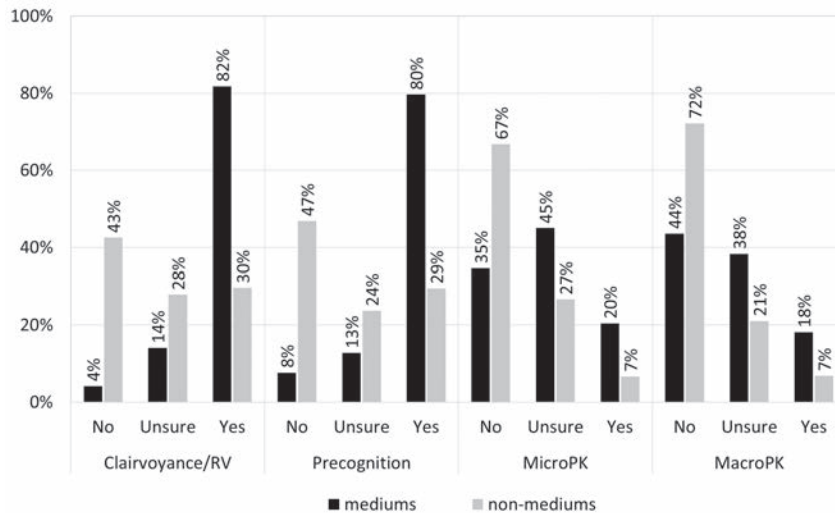


Figure 2. Levels of experience with unidirectional basic psi phenomena in self-identified mediums and non-mediums.

χ^2 tests: all $p < .0001$; Bonferroni-corrected $\alpha = 0.0017$ (see Table 2). No = I've never experienced it myself. Unsure = I'm not sure if I've experienced it. Clairvoyance: Yes = I have acquired accurate information about a distant or concealed object or event like this. Precognition: Yes = I have acquired accurate information about a future event that I couldn't have logically predicted. MicroPK: Yes = I have affected a quantum-sized system using only my mind. MacroPK: Yes = I have affected a larger-than-quantum-sized system using only my mind. For ease of viewing the graph, portions are rounded to the nearest whole number.

I've never experienced it myself related to past-life memories.

For the unidirectional phenomenon of OBEs (#7), which is tangentially associated with survival, 78.4% of mediums and 28.3% of non-mediums reported I have had experiences during which I felt that I was separate from my body. The proportions of mediums and non-mediums who reported never having had an OBE were 10.8% and 53.1%, respectively (Figure 3).

DISCUSSION

It was expected that the majority of survey respondents in this study would be aware of most of the psi and related phenomena described, as these are the research interests of the organizations that recruited the participants. Similarly, Kohr (1980) found that, "Since ARE members

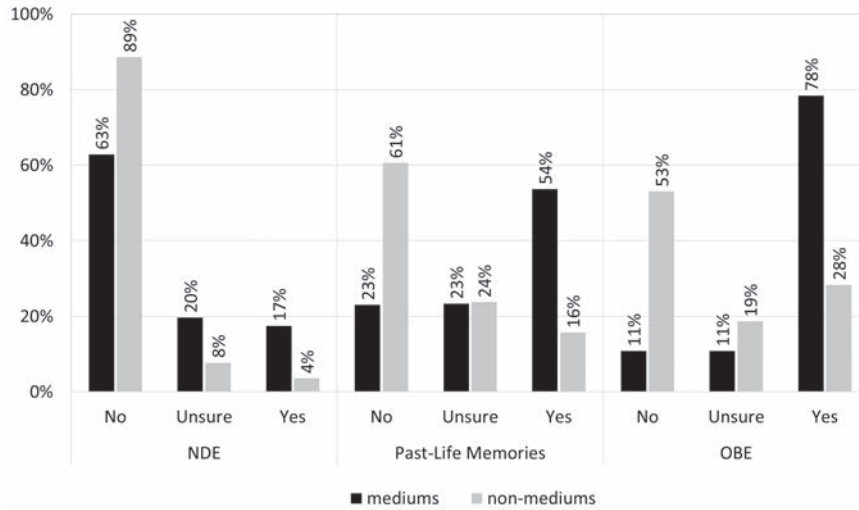


Figure 3. Levels of experience with unidirectional survival-related phenomena in self-identified mediums and non-mediums.

χ^2 tests: all $p < .0001$; Bonferroni corrected $\alpha = 0.0017$ (see Table 2). No = I've never experienced it myself. Unsure = I'm not sure if I've experienced it. Out-of-Body Experience: Yes = I have had experiences during which I felt that I was separate from my body. Near-Death Experience: Yes = I have had a conscious experience like this when I was clinically dead or close to it. Past-Life Memories*: Yes = I have had specific memories from a previous life. For ease of viewing the graph, portions are rounded to the nearest whole number. *See Methods for a discussion regarding the wording of this item.

represent a special population of individuals attracted to such an organization because of their personal interest in psi, the high incidence of claimed psi experiences in the poll was not surprising (p. 395). These types of results should not be expected when using the WPRPAQ with general populations.

MicroPK was the least known and the least experienced of any of the phenomena. This may be because these effects require specialized equipment (e.g., random number generators) and are observable only through statistical analysis. That the participants in this study (92.6% of mediums and 82.4% of non-mediums) reported being aware of microPK speaks to the participants' association with science-based

organizations and the success of these organizations in normalizing these types of phenomena and educating their audiences about them.

The differences in the levels of experiences for mediums and non-mediums when no differences in awareness existed is interesting. Significantly more mediums reported experiencing each of the 10 phenomena than did the non-mediums (all $p < .0001$). This suggests that the experience of mediumistic phenomena may be related to experiences of other psi phenomena or may make one more open to having and reporting those experiences.

It is unclear why the 1.6% of participants ($n = 5$) who reported identifying as mediums in the yes/no OCTO Study item ("In our research, we use the word 'medium' to describe a person who regularly experiences communication from the deceased and reports the information s/he receives to the living. According to this definition, are you a medium?") chose the 'unsure' option or only the 'received' option when asked about their experience in the WPRPAQ item describing mediumship (#2). This does not appear to be a critical portion of the sample in this study, but researchers may wish to use this WPRPAQ item to assess the consistency of participants' reports and remove participants with conflicting responses. As this is an interesting subset that we wanted to discuss, these data were included in this study. Because many people have spontaneous experiences related to the deceased, it is understandable that 15.6% ($n = 161$) of participants identifying as non-mediums chose options involving "I have described accurate information about deceased people I didn't know" for this item; most likely, they do not have this experience regularly or reliably.

The validity of our findings may have limitations. As stated above, the convenience sample used here to explore the usefulness of the WPRPAQ provided a skewed set of responses from participants who were expected to be aware of the phenomena of interest. The differences in captured levels of experience for each of the 10 phenomena between mediums and non-mediums in this highly aware, demographically uniform population, however, demonstrates the usefulness of this instrument in assessing differences. As stated above, though web and mobile surveys are becoming increasingly common, random sampling is not possible online, nonresponse rates cannot be assessed, and gaps exist between online and offline populations. In addition, a limitation

exists for this study that plagues all self-report surveys: Researchers have no assurance that participants' responses reflect reality. The predominantly homogenous sample of white females over 40 in this study also prevents its findings from easily being extrapolated to other populations.

CONCLUSIONS

The WPRPAQ appears to be a useful survey instrument for collecting data from an experience-centered perspective. It assesses respondents' awareness of and experience with psi and related phenomena without overburdening participants, including interdependent items, relying on ideology or assumptions about the nature of the experiences or those who have them, using leading or other problematic terminology or language, or referring to phenomena not related to psi. Ideally, the WPRPAQ can be used by other researchers to assess awareness of psi and related phenomena and the prevalence of those experiences in other populations.

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APPENDIX

WPRPAQ Instrument

The following items describe different phenomena that people have reported. For each item, read the statement and choose the option that best represents your personal experience.

1. Some people report the ability to—without the use of medications, surgery, or other physical treatments—**send/receive healing to/from another person** for the purpose of treating illness, injury, or other ailment or condition through the use of focused intention or other specific practice.

Were you aware that this type of healing exists?

- a. No, I've never heard of this.
 - b. Yes, I have heard of this but never experienced it myself.
 - c. Yes, I have heard of this but I'm not sure if I've experienced it.
 - d. Yes, I have heard of this and someone else has given this type of healing to me.
 - e. Yes, I have heard of this and I have given this type of healing.
 - f. Both (d) and (e) are true for me.
- Prefer not to say.

2. Some people experience and report to others **communication from a deceased person** that contains accurate and specific information and can occur without any prior knowledge about the deceased, without the use of any visual, verbal, or other feedback, and without using fraud.

Were you aware that people could provide information about the dead like this?

- a. No, I've never heard of this.
- b. Yes, I have heard of this but never experienced it myself.
- c. Yes, I have heard of this but I'm not sure if I've experienced it.
- d. Yes, I have heard of this and someone else has described accurate

- information about a deceased person to me.
- e. Yes, I have heard of this and I have described accurate information about deceased people I didn't know.
 - f. Both (d) and (e) are true for me.
- Prefer not to say.

3. Some people report knowing—without using any sensory cues (physically seeing, hearing, etc.)—accurate **information about another person's thoughts or feelings**.

Were you aware that this mind-to-mind transfer of information exists?

- a. No, I've never heard of this.
 - b. Yes, I have heard of this but never experienced it myself.
 - c. Yes, I have heard of this but I'm not sure if I've experienced it.
 - d. Yes, I have heard of this and someone else has acquired accurate information about me like this.
 - e. Yes, I have heard of this and I have acquired accurate information about someone else like this.
 - f. Both (d) and (e) are true for me.
- Prefer not to say.

4. Some people report knowing—without using any sensory cues (physically seeing, hearing, etc.)—accurate **information about an object or event** that is at a distance or otherwise concealed from him/her.

Were you aware that this acquisition of information at a distance exists?

- a. No, I've never heard of this.
 - b. Yes, I have heard of this but never experienced it myself.
 - c. Yes, I have heard of this but I'm not sure if I've experienced it.
 - d. Yes, I have heard of this and I have acquired accurate information about a distant or concealed object or event like this.
- Prefer not to say.

5. Some people report being able to have an objective effect **on tiny, quantum-sized physical systems** (such as random number generators) using only their minds.

Were you aware that this quantum effect of mind on matter exists?

- a. No, I've never heard of this.
 - b. Yes, I have heard of this but never experienced it myself.
 - c. Yes, I have heard of this but I'm not sure if I've experienced it.
 - d. Yes, I have heard of this and I have affected a quantum-sized system using only my mind.
- Prefer not to say.

6. Some people report being able to have an observable effect **on larger-than-quantum-sized physical systems** (such as dice or other small objects) using only their minds.

Were you aware that this larger-than-quantum effect of mind on matter exists?

- a. No, I've never heard of this.
 - b. Yes, I have heard of this but never experienced it myself.
 - c. Yes, I have heard of this but I'm not sure if I've experienced it.
 - d. Yes, I have heard of this and I have affected a larger-than-quantum-sized system using only my mind.
- Prefer not to say.

7. Some people report having experienced themselves (that is, their minds, awareness, or consciousness) as temporarily **located separate from their physical bodies** and able to observe their bodies and the surrounding environments.

Were you aware of this experience of being outside of the body?

- a. No, I've never heard of this.
 - b. Yes, I have heard of this but never experienced it myself.
 - c. Yes, I have heard of this but I'm not sure if I've experienced it.
 - d. Yes, I have heard of this and I have had experiences during which I felt that I was separate from my body.
- Prefer not to say.

8. Some people, on being revived after **being clinically dead**, report having had conscious experiences during the time that they were dead of themselves in a plane of existence different from the physical world they are used to.

Were you aware of the existence of these types of experiences?

- a. No, I've never heard of this.
 - b. Yes, I have heard of this but never experienced it myself.
 - c. Yes, I have heard of this but I'm not sure if I've experienced it.
 - d. Yes, I have heard of this and I have had a conscious experience like this when I was clinically dead or close to it.
- Prefer not to say.

9. Some young children report experiencing memories, preferences, behaviors, and other characteristics that are associated with a different person **who lived at an earlier time** and died before they were born.

Were you aware of the existence of these types of memories, etc., in young children?

- a. No, I've never heard of this.
- b. Yes, I have heard of this but, as a child, did not experience it myself.
- c. Yes, I have heard of this but I'm not sure if I experienced it as a child.

- d. Yes, I have heard of this and as a young child I experienced and reported to others my specific memories of a previous life.
Prefer not to say.

10. Some people report knowing accurate information about an event **that will happen in the future** and that could not be logically predicted from current information.

Were you aware that this acquisition of information from the future exists?

- a. No, I've never heard of this.
- b. Yes, I have heard of this but never experienced it myself.
- c. Yes, I have heard of this but I'm not sure if I've experienced it.
- d. Yes, I have heard of this and I have acquired accurate information about a future event that I couldn't have logically predicted.
Prefer not to say.

RESEARCH ARTICLE

The Discovery of an American Brig: Fieldwork Involving Applied Remote Viewing Including a Comparison with Electronic Remote Sensing

STEPHAN A. SCHWARTZ

RANDALL J. DE MATTEI

The Mobius Society

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1988 *Parapsychological Association Conference presentation, "The Discovery of an American Brig: Fieldwork Involving Applied Archaeological Remote Viewing."*

1989 *Conference on Underwater Archaeology/Society of Historic Archaeology Annual Meetings presentation, "The Discovery of an American Brig: Fieldwork Involving Applied Archaeological Remote Viewing, Including a Comparison with Electronic Remote Sensing."*

Abstract In the fall of 1987, Mobius, under a license from the Bahamian Government, carried out an archaeological survey of an area of the Grand Bahama Banks encompassing some 579.15 square miles (1500 sq. km). This was done with a 125-foot research vessel, *Seaview*, and its tenders. This was the continuation of a line of research utilizing nonlocal consciousness to locate and describe archaeological sites, both marine and terrestrial, in countries all over the world, using a Mobius-designed consensus and concept analysis protocol. Part of the protocol calls for a parallel electronic remote sensing survey, as well as historical research, to see whether the location of a site had been previously recorded. This is a line of research dating back over a decade and published in a series of papers. And this was carried out. This report compares the results of that Bahama Bank survey employing the Mobius consensus concept analysis remote viewing protocol, comparing it with electronic remote sensing, visual search, and historical survey. To illustrate the protocol, this report focuses specifically on the most significant of several sites located, the wreck of a previously undiscovered armed American merchantman believed to be the brig *Leander*. Under the Command of Captain William Johnson, she sank for unknown reasons near Beaks Cay on April 6, 1834,

while returning from Manzanilla, Cuba, to her homeport in Boston, Massachusetts. This report describes how she was consensually located and found in a subsection of the License Area known as Consensus Zone C; an area of 11.81 sq. miles (30.59 sq. km) of water. The data show that the nonlocally sourced information using remote viewing led to the site's location, and that electronic remote sensing was not useful. It should be noted that this is consistent with all prior Mobius expeditionary projects. In every instance nonlocally sourced information accomplished what electronic remote sensing could not. In addition to location information, a total of 193 descriptive concepts describing what would be found at the site were proffered by twelve remote viewers. Of these, 148 concepts, or 75% of the total, could be evaluated through direct field observations, or historical research. An evaluation of this material reveals 84% correct, 12% partially correct but usable, and 4% incorrect. There is little accuracy variation across the sequence of material from the Los Angeles interviews (84% correct, 13% partially correct but useable, and 3% incorrect), to the data proffered during interviews in Florida where *Seaview* was moored, or on-site nonlocally derived data acquired once *Seaview* was on the Bahamas Banks (81% correct, 11% partially correct but useable, and 8% incorrect). Approximately 300 notable wrecks went down, not just in the License Area but across the entire Banks, from 1500 to 1876 CE as determined by a thorough search of historical records and archival material in the U.S., the U.K., Spain, and the Bahamas. To make a conservative assessment of this location occurring by chance, assume the wrecks are evenly distributed not throughout the Banks, but only within the License Area. That said, we should expect to see 6.12 boats in Consensus Zone C ($11.81/579.15 \times 300 = 6.12$). The brig site is 5,000 square ft. (464.5 sq. m), equaling 0.00018 of a square mile. Within Consensus Zone C, 65,849 sites of this size could be placed, thus yielding a grid of 65,849 cells. If the probability of selecting this particular cell in the grid by chance exceeds $p \geq 0.05$, then remote viewing can be considered a determinative factor. The probability of finding this one 5,000-sq.-ft. area is then $6.12/65,849 = p 0.00009$, which strongly suggests that chance is not an explanation for the locating of the *Leander*.

Keywords: remote viewing; electronic remote sensing; Grand Bahama Banks; *Leander*; Beaks Cay; remote viewers; shipwreck

BACKGROUND AND OVERVIEW

In the fall of 1987, Mobius, under a license from the Bahamian Government, carried out an archaeological survey of an area of the Grand Bahama Banks encompassing some 579.15 square miles (1,500



Figure 1. The Research Vessel *Seaview*.

sq. km). This was done with the 125-foot research vessel *Seaview* (Figure 1) and its tenders. This expedition was the continuation of a line of research utilizing nonlocal consciousness to locate and describe archaeological sites, both marine and terrestrial in countries all over the world, using a Mobius-designed consensus and concept analysis protocol (Schwartz, 1980a, 1980b, 1980c, 1985; Schwartz et al., 1984; Schwartz & De Mattei, 1987). Part of the protocol calls for a parallel electronic remote sensing survey, as well as historical research, to see whether the location of a site had been previously recorded, and this is reported as well.

This is a line of research begun in 1968 which shows that even though we may not possess a universally accepted explanatory model for remote viewing (Jahn, 1982), the accumulation of research argues that this approach offers an efficient, cost-effective procedure for locating and finding sites, both marine and terrestrial, particularly those deeply buried and obscure to visual inspection.

This paper covers the location and excavation of an unusually intact shipwreck, believed to be the American brig *Leander*, which was

located through remote viewing, and excavated during the course of three voyages of the research vessel *Seaview* (Figure 1).

The work in this report was carried out by a team of parapsychologists, archaeologists, geophysicists, and historians under the auspices of the Mobius Society, in conjunction with Seaview Exploration Associates, under license from the Bahamian Government. It describes a total of four weeks of field time devoted to this site, involving 443 hours of dive time by an archaeological dive team composed of 18 men and women working from *Seaview*, as well as a team of historical and archival researchers working in the U.S., Spain, Great Britain, and the Bahamas. Several sites were found in the Beaks Cay area using this approach; this site was selected for this report based on five considerations: 1) The site most clearly illustrates the relative strengths and weaknesses of various search techniques; 2) It contains the most well-preserved ship remains in the area; 3) We have been able to locate the historical documentation concerning the probable identity of this wreck, thus allowing the most comprehensive evaluation of the remote viewing data; 4) This area has been covered by an unusually clear Landsat 4 computer image with very minimal cloud coverage; and, 5) A comprehensive magnetometer survey for this site was carried out.

HISTORICAL CONTEXT

THE GULF STREAM AND THE GRAND BAHAMA BANKS

The Gulf Stream was discovered by the Spanish in the mid-1500s. For three and a half centuries, until steam replaced sail and emancipation brought about the collapse of the slave-powered, sugarcane economies of the Caribbean Islands, it remained the best way back to Europe from much of the New World (Figure 2).

This extraordinary oceanographic phenomenon, which Matthew Fontaine Maury called "the River in the Ocean" (1855), passes between Florida and the Bahamas, channeled on the west by the Florida Keys and on the east by the vast shallows of the Bahama Banks. The Banks back to historical times have been described as the Grand Bahama Banks to the south and the Little Bahama Banks to the north. Both are composed of calcareous limestone thousands of feet deep, formed



Figure 2. The Gulf Stream.

from the action of organic matter on the light sand. This rocky plateau is covered with 5 to 15 feet (1.52–4.57 m) of sand fringed on its western side by a long series of reefs, rocks, and cays. The average water depth over the Banks is about 15 feet (4.57 m) until it reaches its western edge, whereupon there is a precipitous dropoff to more than 800 feet (244 m). Visually from a ship, however, this difference is not readily perceptible, which accounts for the large numbers of ships that have been lost on the Banks.

Vessels blown eastward out of the deep Gulf Stream by storms, particularly hurricanes, were driven across the flats until they either struck a sandy area shallow enough to ground them or a submerged reef knocked out their bottoms. Added to the hurricanes and storms was piracy.

The new governments that grew up as the Spanish empire fell apart at the end of the Napoleonic Wars were corrupt, poor, and rebellious. For them piracy of ships from more developed nations was an attractive activity, and by 1821 a good part of the United States Navy was in the Caribbean suppressing pirates (Tuchman, 1987). Before the struggle against piracy was over, more than 500 American vessels were captured by pirates in the Caribbean (Goldenberg, 1976). In the years 1812 to 1815 alone, more than 3,000 assaults occurred (Goldenberg,

1976). England and France helped, but even in 1829, the year before the death of Simon De Bolivar, the *Maine Enquirer* advised: "All vessels bound to the Spanish Islands to be armed at least with one or two guns, a dozen muskets and boarding pikes or harpoons . . ." (*Maine Enquirer*, 1829). In the time period of particular interest for this report, issues of weather may have been further complicated by the piracy that plagued the Caribbean. Both are possible critical factors explaining why the *Leander* was found where she was.

There are no absolute figures on the number of vessels of all sizes lost on the Banks, but the best approximation is to be found in the database compiled by Mobius' archival research team. It suggests that, from the 15th century onward, approximately 300 notable, i.e. mentioned in historical sources, vessels met such a fate, with the loss of ships, cargo, lives, or all three (Schwartz et al., 1988).

The north coast of Cuba was a particularly rank nest of semi-legal and illegal pirates and privateers. If one wanted to avoid the notorious Cuban coast, it was possible to go north across the Bahama Banks in order to come out in the north-flowing Gulf Stream somewhere due east of what is now Miami. The passage between Beaks Cay and Browns Rock is one of the last safe exits from the Banks, through the barrier reefs into the northward-flowing Gulf Stream. It was here that an armed American brig sank. Ship measurements, analysis of wood, pottery, and metal objects recovered from the wreckage, as well as historical research, make a compelling case that the wreck is the *Leander* (Baker, 1973; Edey, 1832). She was under the Command of Captain William Johnson when she sank for unknown reasons near Beaks Cay on April 6, 1834, while returning from Manzanilla, Cuba, to her homeport in Boston, Massachusetts (Baker, 1973).

PERSONNEL

There were six categories of personnel, organized as teams, involved in this project:

- 1. The Parapsychology & Management Team.** Mobius Chairman and Research Director Stephan A. Schwartz was the Project Director of the research covered in this report. Mobius Executive Director Randall J. De Mattei was Deputy Project Director.

2. The Remote Viewers. Twelve men and women acted as remote viewers in this experiment. The viewers were blind to everything except their own interview session. Eight of the viewers took part in the project through direct in-person interviews. Four responded to mailed questionnaires. For eight of them, through earlier research, we have profiles from the Personality Assessment System (PAS) (Winne & Gittinger, 1973).

a. In-person interview remote viewers:

Andre Vaillancourt, R-1: a man, 36, musician and film producer. He is defined by PAS as an IRU6. R-1 had never been to the Grand Bahama Banks.

John Oigny, R-2: a man, 37, staff photographer for a major Western daily newspaper. He is defined by PAS as an IFA8. R-2 had never been to the Grand Bahama Banks.

Ben Moses, R-3: a man, 40, feature film producer and documentarian. He is defined by PAS as an EFU6. R-3 had never been to the Grand Bahama Banks.

Hella Hammid, R-4: a woman, 64, fine arts photographer, defined under PAS as an ERA8. R-4 had never been to the Grand Bahama Banks.

Judith Orloff, R-5: a woman, 36, board-certified psychiatrist. She is defined under PAS as an IFU3. R-5 had never been to the Grand Bahama Banks.

Alan Vaughan, R-6: a man, 48, author, psychic, lecturer, and parapsychological researcher. R-6's research work has primarily been in dreams and precognition. As a respondent, he has participated in studies for many research groups. He is defined by PAS as an IRU2. R-6 had never been to the Grand Bahama Banks.

Rosalyn Bruyere, R-8: a woman, 36, director of a healing outreach clinic. She is defined by PAS as an ERU6. R-8 had never been to the Grand Bahama Banks.

Michael Crichton, R-15: a man, 44, author, feature film director. He is defined by PAS as IRU6. R-15 had been to Nassau in the Bahamas, but never to the Banks.

b. Remote viewers by mail:

Keith Harary, R-7: a man, psychologist, parapsychologist. PAS profile not available. R-7 had never been to the Grand Bahama Banks.

Umberto Di Grazia, R-9: Italian television consultant. R-9 had never been to the Grand Bahama Banks.

Terry Ross, R-10: a man, retired investment broker. PAS profile not available. R-10 had never been the Grand Bahama Banks.

Roger Nelson, R-17: a man, psychologist and parapsychologist. PAS profile not available. R-17 has never been the Grand Bahama Banks.

The R- numbers 11, 12, 13, 14, and 16 were assigned, but for a variety of reasons the individuals to whom these numbers were assigned did not end up being interviewed.

The 12 individuals who did participate were selected on the basis of their past performance in other archaeological remote viewing experiments. They volunteered approximately two hours of their time for the interviews, for which they received no fee. Five of them—R-1, R-3, R-4, R-5, R-6, were brought on-site and contributed location material on the site that is included in this paper.

3. The Archaeology & Archivist Team. Peter Throckmorton of Nova University, one of the founders of modern nautical archaeology, was the Archaeological Director, and he oversaw all archaeological aspects of the project. A recognized authority on wooden sailing ships, Throckmorton is a member of the Society of Professional Archaeologists and the author of numerous scholarly papers, books, and articles on nautical archaeology. In addition to his role in interpreting what was brought up during the fieldwork phase of the project, Throckmorton coordinated the archivists and historians who carried out the historical archival research and did the archival work in the Bahamas himself. The other members of this team were: Catherine Throckmorton in Maine, working on colonial newspaper searches with a particular emphasis on Massachusetts shipping; Richard Swete, at the Mariners' Museum in Newport News, Virginia, working in colonial newspaper and academic literature searches with a particular emphasis on southeastern colonial and U.S. shipping; Stephen Rogers in London and Greenwich, working in the British Admiralty records, and

searching period European papers; and Michel Parret in Seville, working in Spanish commercial and shipping records. The database that was developed as the fruit of this work is the first comprehensive survey of these waters (Schwartz et al., 1988).

4. The Geophysical & Electronic Remote Sensing Team. Saul Friedman, formerly of Lamont Geological Laboratories, and Robert Bisson, Chief Executive Officer and Senior Researcher for BCI Geonetics, carried out the electronic remote sensing aspect of the project. Friedman did the on-site proton precession magnetometer survey, while Bisson coordinated an aerial survey and satellite surveillance analysis of the site.

5. The Divers & Ships Personnel. Fieldwork was carried out by teams of certified divers who also were part of the crew of the *Seaview*.

6. Photography, Audio Recording, & Videotape Team. A photographic record was made by a number of divers as events unfolded. Additionally, a professional videotape crew came out to *Seaview* to make a real-time video record of the remote viewers at work.

ELECTRONIC REMOTE SENSING

Aerial Survey. Prior to the *Seaview* arriving on station, three overflights were made at an altitude of 100ñ200 feet above the ocean surface. Flight speed on all three occasions was approximately 50 miles per hour. By flying spaced, parallel, northñsouth patterns, a thorough coverage of the entire license zone was possible. Photographs were taken on each flight.

Satellite. A Landsat 4 image, commissioned under a National Science Foundation Grant, taken on May 3, 1983, was obtained. The image covered the northern part of the license area, bounded by Latitude 25ñ30'00" and by Longitudes 79ñ20'00" and 78ñ38'00"

Magnetometer. A Barringer SM-123 Shallow Marine Proton Precession Magnetometer System, Console S/N 750, Sensor S/N 8046, was obtained from the Barringer Corporation. The instrument was checked by the manufacturer prior to shipping and again upon receipt aboard the *Seaview*. The instrument was run at 1.0-second interval pulse cycles from a diesel-powered small craft. The sensor was towed 140 feet from the craft and performed within manufacturer's tolerances in the

daily test runs that were carried out before actual survey procedures were implemented. Magnetometers principally locate ferrous mass (no signal is produced by wood or non-ferrous metals).

The *Seaview* magnetometer procedure was to conduct parallel runs approximately 30 feet apart. Lanes were usually run north-south, with perpendicular east-west lanes run across the same area when anomalies were recorded.

Navigation. The great challenge in nautical search procedures is fixing a location in such a way that it can be reliably relocated. The *Seaview* was equipped with a Furuno Satellite Communications navigation downlink, model FSN50, linked to a Furun LC-90 Loran-C.

Because the Loran-C signal is weak on the Banks, electronic navigation is notoriously unreliable over long periods. Variations as much as 0.3 of a mile (.48 km) can occur over several days. For this reason, we established, through repeated readings off the SatCom, a fixed known point. The Loran was corrected daily by the SatCom relative to this point, thus assuring reasonable accuracy standards. A Raytheon Model R41 raster scan radar equipped with range and bearing capability provided the ability to fix small boat locations. Sextant fixes were also shot, as needed, from the magnetometer craft on land masses (Beaks Cay, Brown's Cay) in the northernmost consensus zone. Most important, however, was the use of simple styrofoam buoys. These were dropped with 8-16 pounds of lead at the end of the line at every significant magnetometer fix.

Metal Detectors. Dive teams making a visual inspection of a site were equipped with metal detectors, Whites model P1-1000. Unlike the magnetometer, these metal detectors are non-discriminating; that is, they detect the presence of any type of metal within their range. Tests were run to establish an efficacy parameter: Under optimal conditions, a metal object the size of a dinner spoon could be detected under three feet of sand. As expected, larger objects produced stronger signals.

Visual Inspection. Two divers at a time were slowly towed over significant portions of the license area in water 8-18 feet (2.44-5.49 m) deep. They were visually inspecting the bottom, which was typically sand with eelgrass.

ARCHIVAL RESEARCH

Maps

In August 1985, we began our research, seeking to define, on the basis of historical research, an area where there was some likelihood that shipwrecks existed, representing the maritime history of the Caribbean. This archival work produced an area

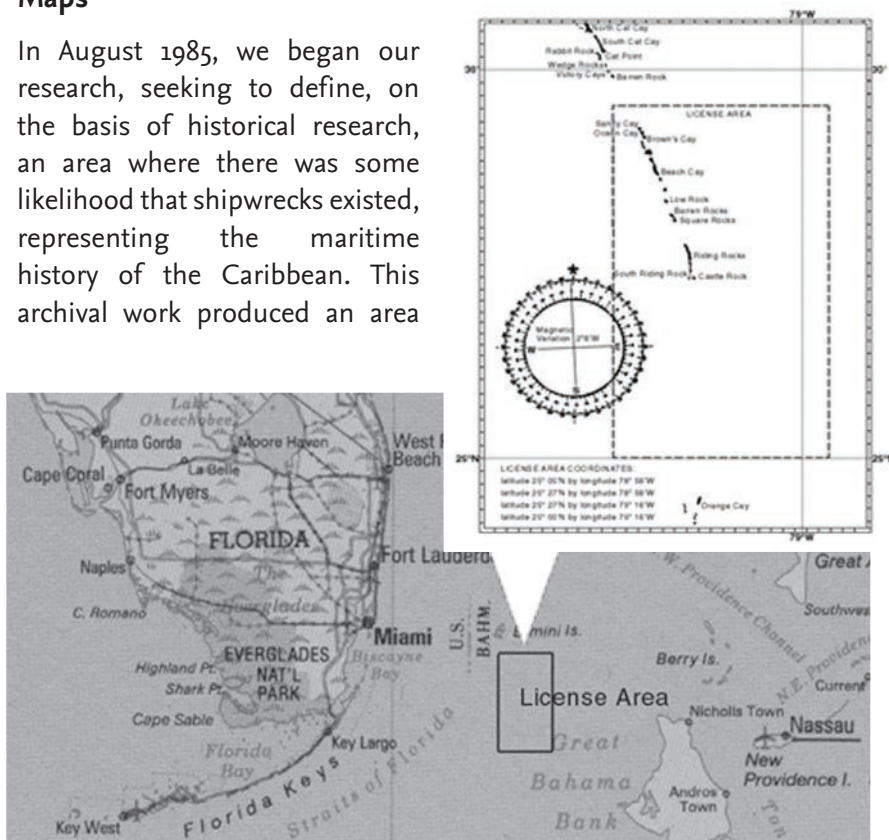


Chart 1. The License Area.

approximately 579.15 square miles (1,500 sq. km) in size. Once we had defined this general area we applied for and received an exclusive license from the Bahamian Government to search it (see Chart 1). The next task of the Archival Team was to produce the first compendium of all known shipwrecks from 1500 to 1876 known to have gone down on the Banks—an area much larger than the License Area. 1876 was established as the cutoff date for this database because ships after that date usually have little or no historical significance. The database had a second function. It allowed us to develop a baseline with which to develop a statistical analysis.

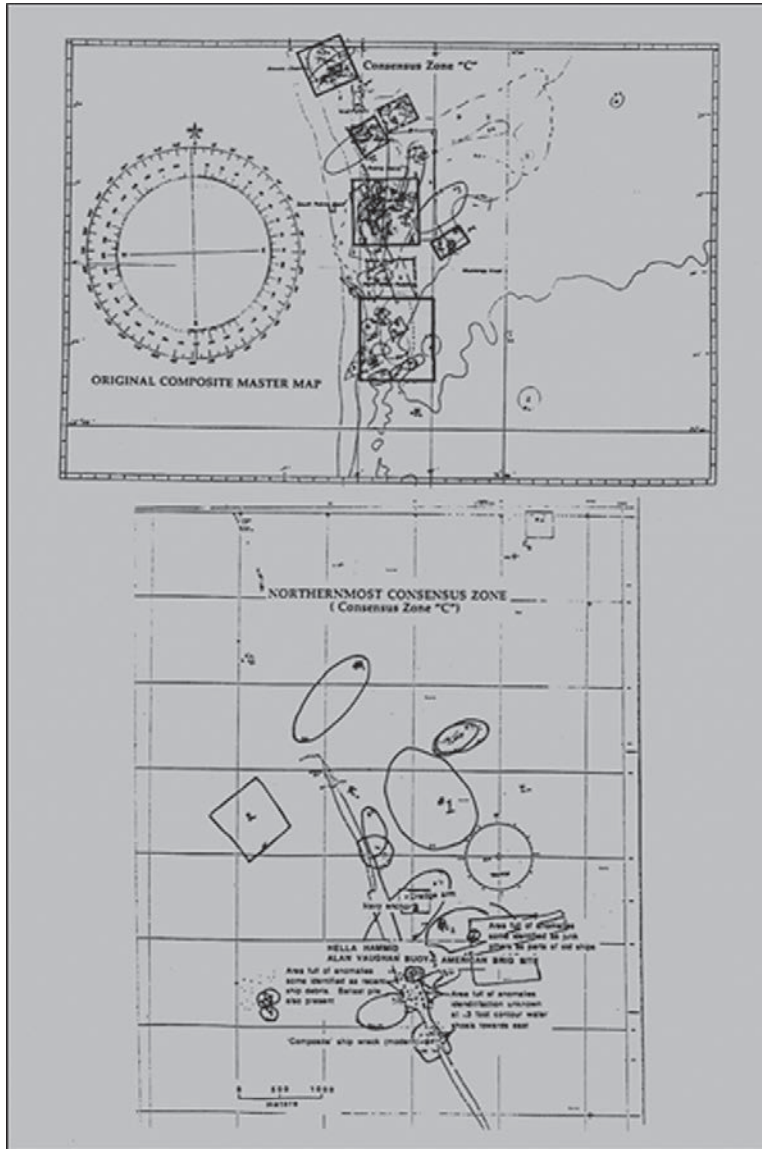
REMOTE VIEWING

While the License Area was only a small portion of the Bahamian national waters, it was still an area so large that it was obvious from the beginning that the remote viewing portion of the project would have to be carried out in stages. We started with a map of sufficient scale to encompass the License Area, and used the Bahamian Government Hydrographic Chart (BLSH702, scale 1:300,000). This work began in December 1985 (see Chart 1). Consistent with the protocol and our earlier work, a new remote viewing session map was used with each viewer. To prepare the map, significant place names and other geographic data were removed, a compass rose was added, and the map was transferred to a Mylar[®] master. Identical blueprint copies were run off, thus eliminating colors that might cause unconscious cueing. These blueprint charts were then used one at a time in a series of individual interview sessions with the twelve remote viewers.

Consensus Zones

When all sessions from the first cycle of one-to-one interviews were completed, the maps were then one-by-one put on a light table covered by another blank copy of the map, and the location data were transferred to what became the Composite Master (see Chart 2). This process revealed locations that were consensually selected. Where more than one remote viewer selected the same area, the aggregate area encompassed by their collective marks was designated a Consensus Zone (see Chart 2). In this way, the entire search area was reduced to three major and several secondary Consensus Zones. It was this composite with its Consensus Zones which laid the foundation of the location hypotheses, and that led to the second cycle of remote viewing sessions that would direct the fieldwork.

More detailed charts of the three major Consensus Areas were then obtained. The Northernmost Consensus Zone, which is the subject of this report, was covered by a Bahamian Government Chart (Bimini Sheet 8, Ref: PU822070, scale 1:10,000) (see Chart 3). Note the difference in scale. The maps used in this second set of interviews were prepared in the same way as those used in the first sessions. Then, following the same protocol, a second set of interviews was carried out.



Charts 2 & 3. The Composite Master, at the top, was produced by transferring the data from individual remote viewers' charts to a single master. Each square encompasses areas where multiple selections of the same area have been made. Note Consensus Zone C. The lower map is just Consensus Area C, the site addressed by this report. Other wrecks and debris were found in the Consensus Zone and in other areas, too.

Remote Viewing Sessions

Via Mail Sessions. Remote viewers were blind to all but their own session. As already noted, some of the individual sessions in both the first and second cycles of the map probe phrase were done via mail. These viewers received the map and a series of questions, each in its own sealed, numbered envelope. The questions they contained were answered sequentially, with each envelope remaining sealed until the viewer felt the previous question had been responded to as fully as possible. Responses included audio tapes, drawings of things to be found at the sites marked on the map, and the map itself with the viewer's locations. Each sheet of paper, signed and dated, as well as the audio tape, were then returned by mail.

In Person Sessions. Where interviews were conducted in person, the interviews were split between the authors to eliminate any subtle biases that might develop in the researchers and lead them to unintentionally cue the viewers. It was not a question of cueing a correct answer, since that was unknown to all, but of creating a kind of "blind" a favored outcome, that would override the nonlocal awareness perceptions. There was no discussion between interviewers; thus, each interviewer was blind to the interviews he did not conduct until all sessions had been completed.

Everyone throughout the experiment, of course, was blind as to whether the information proffered by either electronic remote sensing or remote viewing was accurate until the answer was revealed through fieldwork.

Interview Room. A room was equipped with a table on which were an audio taperecorder, a lavolier microphone, and the specially prepared map; pencils and pens; a file folder containing the initial charge or direction; and blank 8.5 x 11 inch paper for drawing RV images.

Interview Steps. Following are the steps in a standard interview:

- 1) Remote viewer enters. On the table, face down, is the map.
- 2) The tape-recorder is turned on and the tape is initialized with the names of the interviewer, the names of the remote viewers, the time and date of the interview, and the interview location.
- 3) The initial task instruction for the session is given. With slight variations, the task charge was: ~~W~~he n you feel comfortable doing

so, please turn over the map. Would you please go over it however you like and locate any shipwrecks you discern? Please make a circle or shape around the location site on the map, making it as small as you can.□ Some people just move their hand slowly over the map, some use a pendulum, some just stare carefully across the map.

- 4) After the locations are made and sometimes while they are being made, a spontaneous conversation goes on. The interviewer will point at a location asking, "You are at the site, you are life-size, what do you perceive?" The role of the interviewer is to elicit, without cueing, further impressions concerning that location.
- 5) In the course of the session a remote viewer may be asked to or may want to make drawings to illustrate perceived images. These drawings, when completed, are signed and dated by the viewer. They are numbered sequentially beginning from #1.
- 6) When the remote viewer feels he or she has exhausted the sense impressions available, the session ends (a time ranging from 20 minutes to an hour). The map is signed and dated by the viewer and the interviewer. Map, tape(s), and drawings are all coded with the date and remote viewer's number and filed for subsequent analysis. The session is concluded.

We go into some detail about this procedure because it is our view that what is going on in all remote viewing is a transaction involving everyone defined by intention and agreement as being part of the experiment. We are in essence faced with an engineering problem in which a nonlocal circuit made up of all participants is created by intention. Studies in the life sciences suggest, to us at least, that levels of interaction whose mechanisms are unknown at present—although well-observed—(Grad et al., 1961; Nash, 1982; Kreiger, 1974; Justa Smith, 1971)—have to be considered in designing these experiments. Practically, this means that what everyone feels, thinks, and holds focused intention on is a factor in the protocol.

REMOTE VIEWING ANALYSIS: LABORATORY & APPLIED

In laboratory remote viewing experiments, it is possible to establish a fixed number of variables in the form of a descriptor list, in which descriptive detail is reduced to a binary "Yes/No" format. "Hits" can be

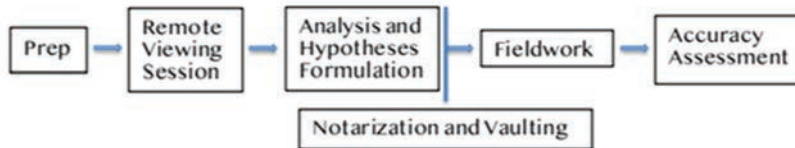


Figure 3. Creating an unimpeachable chronology.

described in terms of whether or not a given descriptor is turned on or off, and the descriptions provided by remote viewing can be measured against a previously encoded correct answer form created by visually examining the target (Jahn et al., 1980). In this way statistical analyses can be developed.

In an archaeological project such as this one, the circumstances of the experiment are very different. The target is a large geographical area in which viewers first select specific locations and then describe in detail what will be found at that location. After multiple viewers have gone through this sequence, choosing the locations and a concept-by-concept analysis are carried out. Thus, remote viewing creates the hypotheses that guide the fieldwork.

Unimpeachable Chronology

From a research perspective, the key to an experiment like this is that it must have an unimpeachable chronology. The sequence of events has to be absolutely clear and documented for any unassailable assessment of nonlocally derived information to be achieved. In this way an unimpeachable chronology is established.

All of these pre-fieldwork data, and their analysis, are then notarized and turned over to an independent third party, thus creating an unimpeachable chronology (see Figure 3).

Archival Research

The archival research was important because through that research it could be established what was and was not known about the nonlocally sourced location and description data at a site. Only fieldwork can say whether a given bit of nonlocal data is correct or not. The experiments are truly triple-blind. Also thanks to the exhaustive survey by the Archival Team,

we have a baseline against which to measure the probability of a given location; it is one in which we can repose with reasonable confidence.

The central difference between a laboratory experiment and an applied experiment is that in the laboratory experiment the point of the study is a statistical probability outcome. In an applied experiment, the sourcing of nonlocal information through the remote viewing protocol is only a midway point, useful, as with all remote sensing input, in making decisions as to how to conduct fieldwork. Only fieldwork and post-fieldwork concept-by-concept expert assessment can establish accuracy.

To do this assessment requires the considered expertise of several disciplines. It is a far more granular process than the coarse "screen" of a descriptor list, typically limited to 20 or 30 discrete concepts. The process is described in detail below.

FIELDWORK PROCEDURE

Fieldwork begins by determining whether there were any historical records of sites within the Consensus Zones. This is followed by studying the satellite imagery for each Consensus Zone to determine whether the locations in the Consensus Zone could have been established through aerial surveillance. This is followed by a two-step process:

Electronic Remote Sensing

The magnetometer (mag) survey team goes first, carrying out its electric remote sensing search within a Consensus Zone. In addition to its search gear, the tender is equipped with a radar reflector, a two-way radio, and a number of buoys (Figure 4). The tender is manned by a geologist specializing in electronic remote sensing and a tender operator (who occasionally performed both roles). After this independent survey is completed and the data are logged, the remote viewer phase begins. If a remote viewing "hit" is reported, the mag tender follows behind the viewer-directed tender, and re-mags the area selected by the viewer to see if the location could be picked up now that the remote viewers had pinpointed it. In this way it is possible to know with certainty whether a site had been located by magnetometer or by remote viewing, or both.



Figure 4. The electronic remote survey tender preparing to launch. To protect it from the sea, the magnetometer is in the white chest. Note also the buoys.



Figure 5. A tender with a remote reviewer launches from the *Seaview* to locate the site.

Remote Viewing

In the open ocean, in the license area, remote viewers come out to the *Seaview* one or two at a time (see Figure 5). When they are aboard, the ship moves to a selected Consensus Zone. The viewers are individually taken in one of *Seaview*'s tenders carrying a diver operator, a researcher/diver, and the viewer. Each boat is equipped with a VHF two-way radio and a radar reflector. The reflector allows the position of the tender to be fixed relative to the known location of the *Seaview*. The tenders go to different outer boundaries of one of the Consensus Zones developed during the pre-fieldwork phase. Once at the boundary the viewers are given a numbered styrofoam buoy and asked to guide the tender to the location of the wreck they had previously located during the Map Phase. The remote viewer moves the tender across the sea to a location of their choice. The numbered buoy is dropped. The *Seaview* is contacted, and the tender's location is fixed and logged on the 1:10,000 chart for that area (see Chart 3).

RESULTS: ELECTRONIC SENSING & VISUAL SURVEYS

Satellite. The Landsat image for this location is unusually fine. There was virtually no cloud cover, and penetration to the bottom was clear and unequivocal. In these waters, however, resolution of unclassified satellite imagery was not adequate to locate or identify sites as small as the wreck site reported here, so this form of electronic remote sensing was not useful.

Magnetometer. The magnetometer survey over this site (see Figure 6) never produced readings greater than 60 gammas, insufficient to justify archaeological excavation. Subsequent excavation explained why magnetometers did not detect the ship. The target ship was an unusually fine one built with the leading technology of its age. The ship's fastenings were brass, bronze, or Muntz metal (a patented brass-based amalgam introduced in the early part of the 19th century). The mass of ferrous metal, which is the magnetometer's target, was far smaller than would have been found on a ship of less expensive or earlier construction. It should be noted that this failure of electronic remote sensing to locate the site has been previously reported in every applied



Figure 6. The magnetometer both on the *Seaview* and from the tender were unable to locate the wreck site.

archaeological project done before this one. The data have repeatedly shown that the nonlocally sourced information using remote viewing led to a site's location, and that electronic remote sensing was not useful. In every instance nonlocally sourced information accomplished what electronic remote sensing could not.

Aerial. Three flights were carried out, at different times of day, and with different cloud covers, to assure complete visual aerial surveillance. No shipwrecks, not already on the charts, were visible. There was no sign of the wreck site that is the focus of this report.

Visual. Salvagers from the 16th century onward have been searching this area particularly because it is immediately adjacent to Brown's channel. There are no reports of such a discovery. This is also a favored area for sport divers, and at least two sport dive operations regularly bring out clients for dives working the Beaks Cay area. Interviews with their staffs established they had no previous knowledge of the site (*Bottom Time*, no date).

RESULTS: REMOTE VIEWING

Location. As the Master Composite Map for Consensus Zone C (see Chart 3) shows, this wreck was found by remote viewing at the location predicted. On September 29, 1987, Hammid and Vaughan were taken out in one of the tenders and within an hour had agreed on a site and dropped a buoy. Through this step-down process, a search area that began with 579.15 square miles (1,500 sq. km) depicted on a map thousands of miles away was reduced to an exact location from a tender at sea, as is required if such information is to be really useful.

When we found the site on September 29, 1987, we were unequipped to do excavation, and after fixing the location we left the buoys and went into dry dock where alterations and additions were made to the *Seaview*. When we returned to the area some three weeks later, no remote viewer was aboard. Steering on the previously logged Loran readings, we sought the buoys for fine-tuning the location. The buoys left on the earlier voyage had been blown away by storms or stolen by fishermen.

We could not be sure about the Loran beyond saying that we were within 500 yards (457 m) of where we had found the shipwreck. No remote viewers were present. Three days of towing divers and redoing the magnetometer survey of the Consensus Zone within those 500 yards failed to relocate the site, demonstrating how difficult it is to locate a site using traditional visual and electronic remote sensing even when you know its location down to a few hundred yards.

Three weeks later we returned to the Consensus Zone for a third time, this time with a remote viewer on board. Using the nonlocally sourced data the viewer provided, we positioned ourselves. By then it was too dark to make a visual inspection. The next morning divers went down to look at what at first appeared to be a typical low rise of white sand covered with eel grass (Figure 7).

Even with the remote viewing guidance, the divers could find nothing, until as the dive was ending one of them saw a particular coral that seemed unnaturally symmetrical (see Figure 8). He tagged it and drew it to the attention of the other divers who agreed it seemed odd. On a flourish the diver struck the coral with his dive knife, and a piece gave way. The chip revealed what was later determined to be a bronze keel bolt. This led to a reexamination of some small rocks, later



Figure 7. The site as it appeared on the first dive. Nothing to see. No magnetometer hit that would suggest anything was there to be found.



Figure 8. To a diver, this slightly symmetrical coral stood out, and he tagged it, brought it to the attention of the other divers, who agreed, and stuck in his dive knife revealing a bronze keel bolt.



Figure 9. The site was staked and a buoy line was tied to it to guide the tenders, while divers explored the site.

determined to be ballast stones. This entire process took perhaps five hours.

After a second failure of mag and visual survey in an area of only a few hundred yards, the site had been relocated by remote viewing (see Figure 9), and excavation began immediately. It revealed an unusually intact wreck buried three to five feet beneath the eel grass and sand. Nothing was visible except the fire coral-covered keel bolt and some ballast stones mixed in with the indigenous rocks. Only excavation revealed that hidden beneath the sand, coral, and rocks was the remains of a collapsed American armed merchant brig which sank within the early decades of the 19th century. It also showed that the buoy dropped by Vaughan and Hammid was less than 35 feet from the keel bolt, and directly on top of the wreck, as excavation would reveal.

Descriptive Concepts. The transcripts of the interview sessions show there were 193 conceptual concepts put forward about this site by the remote viewers. This material covered surface geography, sub-surface geology, ship location, the position and identity of the ship, and detailed descriptions of its component parts and contents. Based

TABLE 1
Concept Accuracy Evaluation

	Correct	Partially Correct	Incorrect	Non-Evaluable (NE)	Total
Pre-fieldwork					
Total number of concepts	91	14	3	38	146/108
Percentages including N-e	62%	10%	2%	26%	
Percentages minus N-e	84%	13%	3%	-	
On-site					
Total number of concepts	30	4	3	10	47/37
Percentages including N-e	64%	9%	6%	21%	
Percentages minus N-e	81%	11%	8%	-	
Combined					
Total number of concepts	121	18	6	48	193/145
Percentages including N-e	63%	9%	3%	25%	
Percentages minus N-e	83%	12%	4%	-	

on archaeological fieldwork and archival research, the accuracy of the concepts was determined (see Table 1).

A Piori Evaluation. The reconstructive material is subject to what might be called The Generic Criticism. That is: When a remote viewer is asked to describe something in or under the sea, there is a generic sort of description that many presume will cover many, if not most, wrecks. In the sense of naming or drawing certain nautical universals, for instance an anchor, this is true. But in most respects, as we have learned by more than a decade of direct field experience and study of the literature, this criticism is true in only the broadest terms. Shipwrecks present themselves in many ways. There are thousands of boat types. The reality is that beyond a few generalities, sunken wrecks, the condition they are in, and the things in the wreck all are specific to that wreck.

In this case the remote viewers described a ship that was intact. Several said it sank in place. This sounds generic, but, in fact, the brig



Figure 10. The timbers of the brig *Leander* represent a rare case on the Bahamas Banks of a shipwreck that is still intact. This is because the *Leander* probably sank while at anchor. The remote viewing description of timber stacked like “railroad ties” was completely validated by the fieldwork.

is the only wooden sailing shipwreck ever found in the area this intact. Sailing ships driven or mis-sailed onto the Banks did not often stay completely together like this one when they sank. Typically, one finds a debris trail along which, over some distance, a ship breaks up, spilling its contents and losing parts of its structure. So the description of an intact ship was quite meaningful, and one of the reasons we chose to do an extensive excavation. Here, at an even smaller scale, are several other examples of remote viewing, with a low a priori probability of being correct, that excavation later demonstrated were, in fact, correct. R-15 described the site by saying: “feel wood, big pieces of wood, like railroad ties . . .” (see Figure 10). This may sound generic. It is not. The massive timbers of the *Leander* present the rare case of a ship that sank intact. *There is no other ship recovery on record in the License Area that matches this site. Expanding the scale, there does not seem to have been*

another equivalent reported excavation like this on the entire Banks.

Similarly reported was "and small glass bottles." Small glass bottles rarely survive the constant movement of sand and currents on the Bank. The probability of discovering one intact is very small. Yet two were found as described in the wreckage of this site (see Figure 11).

Or, " . . . pewter . . . I don't know what it is, but some kind of corroded metal" (see Figure 12); and, "Everyday artifacts. . ." Again, these observations only seem commonplace. Based on other excavation reports, the site is notable for the number

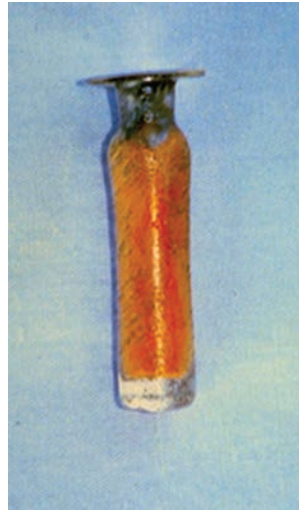


Figure 11. Remote viewing predicted that "small glass bottles" would be found, and they were.



Figure 12. Remnants of containers. Of particular interest is the pewter cruet in the center; it had been predicted through remote viewing.

of such items that have survived. Among the artifacts recovered: the Captain's pearl-handled razor, parts of a drafting set, and a silver or pewter cruet.

Experience taught us that arguments proposing that most wrecks can be described by predictable, interchangeable cliché images simply do not hold up. Similarly, the criticism that anywhere one looks one is likely to turn up a wreck is ludicrous in the face of the immensity of the ocean, the uniqueness of each site, and the academic and historical search literature.

Statistical Analysis. There are three ways to determine the statistical probability that this discovery was a chance occurrence: 1) The location of the site only in reference to Consensus Zone C; 2) The location of the site in reference to the entire License Area; 3) the location of the site in reference to the entire Grand Bahama Banks. Let us select only the first two, since it must follow that if these two analyses are above chance, then the third, involving the entire Banks, must be even more improbable.

No matter which case is selected, one begins by recognizing that *approximately 300 notable wrecks went down, not just in the License Area but across the entire Banks, from 1500 to 1876*, as determined by a thorough search of historical records and archival material.

Let us take the most conservative (and obviously artificial) position: Assume all 300 of those wrecks were within Consensus Zone C. The search area of Consensus Zone C is 30.59 square km (11.81 sq. miles, 12 sq. miles of sea minus 0.19 sq. miles of land mass). The brig site is 5,000 square feet, equaling 0.000179 of a square mile. Within Consensus Zone C, 65,849 sites of this size could be placed. In essence, then, we have a grid with 65,849 cells. If the probability of selecting that particular cell in the grid by chance exceeds $p > 0.05$, then remote viewing can be considered a determinative factor. In fact, it is $300/65,849$ or $p > 0.005$; a very significant result.

Let us next take the less conservative, and more realistic (although still artificially conservative), case: Assume the wrecks are evenly distributed throughout the entire License Area. That said, we should expect to see $11.81/579.15 \times 300 = 6.12$ boats in Consensus Zone C. The probability of finding one in a 5,000 square feet area is then $6.12/65,849 = p > 0.00009$, which strongly suggests that chance is not an explanation for the location of the *Leander*.

DISCUSSION

Remote viewing was the one location methodology that produced accurate, useful location data about this site. That conclusion, however, should not overshadow another, which is also notable: the efficiency of remote viewing. From the time we arrived at the edge of Consensus Zone C, a total of approximately five hours of operation time was required to initially make the location.

If the site had been found by the magnetometer, how long would it have taken? The site is 100 feet (30.5 m) long by 50 feet (15.3 m) wide. At that time the traditional approach would have been to use a magnetometer to search the overall area. The ship follows Loran-C, or some locally set up navigation system, such as Del Norte, with the magnetometer sensor trailing from a ship operating at no more than 6 knots. Parallel lanes no more than 30 feet (9.14m) from one another are run, much like a tractor making corn rows. Thus it is possible to compute with considerable accuracy exactly how long a magnetometer survey will require if one first knows the size of the area to be searched.

The total area of the chart given to the remote viewers to search is 12 square nautical miles [a nautical mile \approx 6000 feet (1,829 m)]; it measures 3 miles by 4 miles. At 6 knots, a standard magging speed, a run 30 feet (9.14 m) wide and one mile long is optimally covered in ten minutes. To cover one square mile in 30-foot (9.14-m) swaths, then, would require 200 passes.

Thus, in a perfect plan, the fastest possible survey time for the chart area can be calculated as $10 \times 200 \times 12 = 24,000$ minutes/60 = 400 hours. Adding just the most conservative turnaround and setup time between each of these perfect, one-mile runs, say five minutes, would bring the total up to 600 hours. This perfect plan, of course, fails to take into account any of the realities of navigation, weather, site obstructions, equipment setup and breakdown, currents, or the other myriad factors that actually would have to be considered while working aboard a ship on the open ocean.

A post hoc reexamination of the two magnetometer surveys of the Consensus Zone reaffirmed that over this site the *Seaview* did not get anything like the pattern associated with a ship; in fact there were but two spikes, both below 60 gammas, nothing that suggested

a ship to either the archaeological or electronic remote sensing teams. Understanding why this is so takes some sense of field realities; the question of why the magnetometer did not identify the site on not one but two occasions is an important one.

Removing sand under water is a major logistical operation. It forces any field project to establish a threshold beneath which magnetometer hits are discarded as not worth following up. It is simply not practically possible to follow up on every magnetometer hit particularly in an area like the Banks where, during the 1940s and 1950s, pilots training for strafing and bombing runs littered the sea with thousands of pounds of expended 50 caliber, machine-gun bullets and unexploded bombs. The second of the two low-level hits at this site came from a large, several-foot-long, steel-clad, unexploded U.S. Navy bomb.

Low-level individual hits when isolated, are also of less interest than a pattern consisting of a number of small 10-15 gamma responses with 30-60 gamma spikes. Such patterns suggest that a ship, as compared with a single ferrous object, lies beneath the seafloor overburden. Each expedition must, of course, set its own threshold and pattern requirements, but an informal survey of individuals who have worked the Banks suggests that 30 gammas is about the lowest practical limit, and that these really become meaningful only in the context of a pattern. The ship was expensively built of the latest materials for its time. Thus, it used relatively little ferrous metal, and this made a small target for the magnetometer.

It seems to us that it is reasonable to conclude that the involvement of archaeological remote viewing made the search procedure more efficient, cost effective, and faster than would otherwise have been the case. It is hard to explain away sailing up to the site, dropping a buoy within a few feet of a site, and accurately and uniquely describing the wreck's disposition and contents prior to excavation.

The fact that the site was previously unknown is not hard to explain, given the depth at which the wreck was buried, the paucity of visible signs on the seafloor, and the low iron content because of the use of bronze and Muntz metal. Thus, while one cannot absolutely say that the site would never have been found using electronic remote sensing, but the fact that it lay undisturbed for 154 years in one of the most intensely searched areas of the Banks, supports this improbability. Our

own unsuccessful attempt to relocate the site, even though we knew it was present, until remote viewing relocated it, further suggests this was the critical variable in bringing about our success.

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ESSAY

Loch Ness Monsters as Cryptid (Presently Unknown) Sea Turtles

HENRY H. BAUER

207 Woods Edge Court, Blacksburg, VA, USA 24060-4015
hhbauer@vt.edu

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Abstract—The most popular attribution of identity for Loch Ness Monsters is a relationship with the extinct plesiosaurs, but this is difficult to square with the rarity of surface sightings let alone occasional sightings on land. On the other hand, everything described for Loch Ness Monsters is known among the many species of living as well as thought-to-be extinct turtles: air-breathing but spending very long periods in deep water; ventures onto land; very fast movement in water; ability to be active in very cold water; relatively long necks. It is suggested that Loch Ness Monsters, Nessies, are a yet-to-be-properly discovered and described variety of large sea turtle that is most likely also still extant in some specific niches in the oceans.

Keywords: Loch Ness Monsters as sea turtles—Nessies as sea turtles

INTRODUCTION

The claim that the fabled Loch Ness Monster (☐Nessie☐) is real arouses well-founded skepticism, which in some quarters is vigorously expressed and promulgated as sheer disbelief. That is understandable since the various pieces of evidence about these creatures seem incongruous, sometimes mutually incompatible. Thus all the eyewitness reports as well as some photographs seem to describe air-breathers. On the other hand, they are seen at the surface with extraordinary rarity. Several dedicated Nessie hunters have spent a couple of decades without repeating their sole sighting of a Nessie. As Adrian Shine once

remarked, surface watching for Nessies amounts to waging a war of attrition against the laws of chance.

And yet the cumulative record of eyewitness reports over the centuries can hardly be dismissed; see for example the descriptions gathered by Rupert Gould (1934) in the first systematic modern survey, or the testimony by Constance Whyte (1957) on first-hand acquaintance with dozens of eyewitnesses.

But then again, insisting that so many eyewitnesses could not all be mistaken might well bring a cynically skeptical response asking whether the same deference to eyewitnesses should be granted to those individuals who have claimed—at least three dozen times over the years (Watson, 2018)—to have seen one of these creatures on land.

The iconic representation of a Nessie is the rather graceful long neck and small head of the 1934 “Surgeon’s” photograph. That, and Rupert Gould’s conclusion long ago that Nessie is a trapped sea-serpent, made it popular to regard Nessies as related to the long-necked plesiosaurs. Here it will be argued, to the contrary, that much of the apparent self-contradictions or impossible conundrums in the claimed evidence resolve when Nessies are viewed as related to sea turtles rather than to plesiosaurs.

USUALLY BELOW THE SURFACE

Nessies seem to spend much time at considerable depths. As far back as 1968, a team from Birmingham University had recorded sonar echoes from objects *rising from and returning toward the bottom of the Loch* (Braithwaite, 1968). Again, most sonar contacts with large single targets (not fish shoals) made by the Loch Ness & Morar Project (2003) were deeper than about 60 m, including a dive at appreciable speed from 69 m to below 100 m.

Many species of turtle are able to spend considerable time at considerable depths, whereas plesiosaurs were active at the surface. Leatherback turtles can dive to 4,000 feet and more, comparable to whales (Spotila, 2004, p. 197). Loggerheads sometimes feed at ocean bottoms at depths of 650 feet or so (Spotila, 2004, p. 172). Physiological adaptations protect sea turtles against “the bends” that endanger deep-diving humans (Spotila, 2004, p. 43).

YET AIRBR EATHING

Sea turtles cannot breathe underwater, but they can hold their breath for long periods of time—between 4 to 7 hours when resting. While holding their breath, their heart rate slows significantly to conserve oxygen—up to nine minutes can pass between heartbeats. Because of this, sea turtles can stay underwater for an extended period of time when not stressed. . . . Unlike the other species of sea turtles, leatherbacks have a flexible shell that absorbs nitrogen and collapsible lungs that allow them to compress themselves while diving to cope with the pressure change. The turtles have large stores of oxygen in their blood and muscles and a drastically slowed heart rate to conserve oxygen while diving. (Bennett, 2018)

Turtles breathe air; they need to come to the surface to breathe oxygen. But they have adaptations that allow them to stay underwater for long periods of time. They even have an adaptation to absorb small amounts of oxygen without breathing. . . . Some species of turtles can absorb oxygen from the water, allowing them to stay underwater for long periods of time without coming up for air. The length of time they can stay underwater depends on species and temperature. Sea turtles, for example, can remain underwater for four to seven hours at rest. Hibernating turtles can stay underwater for several months. . . . The cloaca is an opening in a turtle's rear end where the rectum and urinary systems empty. Expanding and contracting muscles forces water in and out of the cloaca. In some turtle species, such as the eastern painted turtle, the cloaca has a high density of blood vessels, allowing the turtle to absorb oxygen from the water through the skin. Some species, such as the musk turtle, can absorb oxygen into the blood vessels in the throat cavity. . . . While in hibernation, they don't move and their heart rates slow. They breathe anaerobically, using fats stored during the summer months. This process maintains the turtles' low metabolism and cell function but results in buildup of lactic acid. The turtles' shells

release carbonates into their systems, neutralizing the acid and preventing it from becoming deadly. (Malone, 2016)

When turtles hibernate, they rely on stored energy and uptake oxygen from the . . . water by moving it across body surfaces that are flush with blood vessels. In this way, they can get enough oxygen to support their minimal needs without using their lungs. Turtles have one area that is especially well-vascularized—their butts. . . . turtles really can breathe through their butts. (The technical term is cloacal respiration.) (Litzgus, 2017)

In winter they can even hibernate in the mud off Florida and Mexico (Spotila, 2004, p. 42). In the depths of Loch Ness (~700 feet), the oxygen level is 80% of saturation,⁽¹⁾ evidently a welcoming environment for inactive or hibernating turtles.

FAST MOVING AT TIMES

The hump filmed by Dinsdale² moved at 710 mph. Leatherback turtles typically swim at up to 67 mph, but a leatherback turtle was seen to move at 22 mph when chased.³

LOCH NESS IS TOO COLD FOR REPTILES

Leatherback turtles generate heat through muscular activity, and a high ratio of mass-to-surface area allows them to retain heat even in cold water. Mackal (1976, pp. 312–313) reports experiments in which a leatherback turtle kept a body temperature of 78 °F in water at 46 °F. Similarly, Spotila (2004, pp. 205–206) notes that leatherbacks maintained body temperatures of 60–78 °F off Nova Scotia and Newfoundland in water at 40 °F.

THERE ISN'T ENOUGH FOOD FOR A MINIMUM VIABLE POPULATION

Roland Watson (2012) has discussed the food problem in elaborate detail. There is no precise actual knowledge about the sizes of the populations of potential prey for Nessies:

- arctic char, estimated in 2 studies as totaling 17–24 tonnes of biomass
- eels, present in huge numbers, say 50 tonnes
- salmon, perhaps 80 tonnes at any given time, estimated from river counts and several other sources
- sea trout, estimated along similar lines at about 20 tonnes

Watson discusses a variety of pertinent points, and concludes that there is enough food in Loch Ness to viably sustain a number of large and unknown creatures.

That raises the question, exactly what number? What is the smallest number of Nessies that could have sustained a viable continuing population since Loch Ness was cut off from the ocean as the land rose after the last Ice Age, i.e. for something like 10,000–12,000 years?

What constitutes a minimum viable population (MVP) is of contemporary concern to ecologists and conservationists, and there is no agreement on any general formula applicable to different species (Brook et al., 2011). One factor is the desirability of maintaining genetic diversity as a safeguard against catastrophic losses of population, but the Florida panther survived after only 6 had remained at one point in time (Brahic, 2008); the African cheetah shows very low genetic diversity owing, presumably, to a population bottleneck perhaps 10,000 years ago (Menotti-Raymond & O'Brien, 1993); the northern elephant seal recovered to about 30,000 from only about 20 individuals at the end of the 19th century.⁴ There are many other examples, but the point is that parameters that determine the MVP are specific to each species. For Nessies, it is surely pertinent that the environment has been fairly stable since the Loch was cut off from the seas, and that Nessies are in no danger from other aquatic predators; they rule the roost.

NESSIE ON LAND

Considerably embarrassing for Nessie fans are a variety of reports from people who have seen an unidentified creature *on land* in the vicinity of Loch Ness. One of these reports, from Mr. and Mrs. George Spicer, has been a prominent part of the story from the very beginning, in the 1930s, of global fascination with the Loch Ness Monster. The Spicers

described a massive creature with a long neck crossing the road ahead of their car. Estimated distances and sizes vary in different published accounts of what they reported, but none seem to describe any known creature. The same problem applies to another well-known sighting reported at that time, of a creature taking two great leaps across the road and into the loch in front of the veterinary student Arthur Grant as he was riding a motorcycle on a bright moonlit night.

Roland Watson (2018) has discussed these reports in great detail as well as listing another 30 or so claimed land sightings from the late 19th century up to the present. One can only hope that the majority of these are misidentifications of deer, cows, otters, or other known creatures, because what the eyewitnesses described in most cases is too far-out incredible, for instance shaggy creatures, several times compared to camels, in at least one case encountered at a considerable distance from the waters of Loch Ness.

One reported land sighting, however, cannot be readily dismissed as a misidentification. Torquil McLeod observed through binoculars a creature with a large body, four flipper-like appendages, and a fairly long neck or tail, as it moved on the slope of a rock scree (the Horseshoe scree) on the opposite side of the Loch from McLeod. That sighting is entirely commensurate with innumerable sightings in the water that describe hump-shaped bodies, long necks, and flipper-like appendages, as also shown in the underwater photographs obtained by teams organized by Robert Rines.

Sea turtles, of course, leave the water for land to make nests in which to deposit their eggs.

SIZE AND APPEARANCE

Nessies have usually been described as large, often as much as 20 or 30 feet long or even more. Torquil McLeod estimated 45 feet using the graticule scale on his binoculars and knowing his distance from the creature, namely the width of the Loch.

The reconnaissance experts of the Royal Air Force estimated that the hump filmed by Dinsdale showed about eight feet of length above the water and likely had a cross section (including the underwater portion) of about 5 feet by 6 feet.

Most contemporaneously extant sea turtles are not that large. Most leatherbacks, which are the biggest, tend to be between four and six feet long including the tail and the head, but there is a report of a leatherback that reached 10 feet in length. Leatherbacks are the closest living relatives of the long extinct *Archelon*, whose largest fossil remains measure 15 feet in length and 13 feet sideways from flipper to flipper.

In overall appearance, sea turtles are quite a good match for Nessies. However, no sea turtle has been described as having a neck as long as the four feet or more attributed to Nessies. Still, the Australian snake-necked turtle does have a neck that can extend to more than half the length of its shell; but that shell itself is only a foot or shorter in length.⁵

Another apparent mismatch between Nessies and turtles is the underwater photograph described as the "gargoyle head." Eyewitnesses describe Nessie's head as rather like a horse. The heads of known living turtles vary a great deal in shape, from rather snake-like to more compact as on the western pond turtle or the fairly reptilian appearance of the common snapping turtle, not to mention the really bizarre snout of the pig-nosed turtle or the Mary River turtle which sports brushes of hair on top of the head as well as a pig-like snout.

NESSIES AS TURTLES

As Constance Whyte (1957) pointed out, the only conceivable provenance of a population of Nessies is a marine species that used to visit Loch Ness when it was an arm of the sea for a time after the last Ice Age. As the land rose gradually when freed from the weight of ice, some of the animals will have been eventually trapped, and will have later adapted to the increasingly freshwater environment. Nessies are too large to be able to enter or leave the Loch through either the rivers or the canals with locks north and south.

Sea turtles inhabit every part of the Earth's waters. They vary enormously in size and head shape, and their feeding, growth, and nesting can involve entirely different habitats in different parts of the globe (Spotila, 2004). They have a physiological adaptation that excretes the excess salt they take in through living in the oceans; losing such an adaptation in fresh water seems quite plausible.

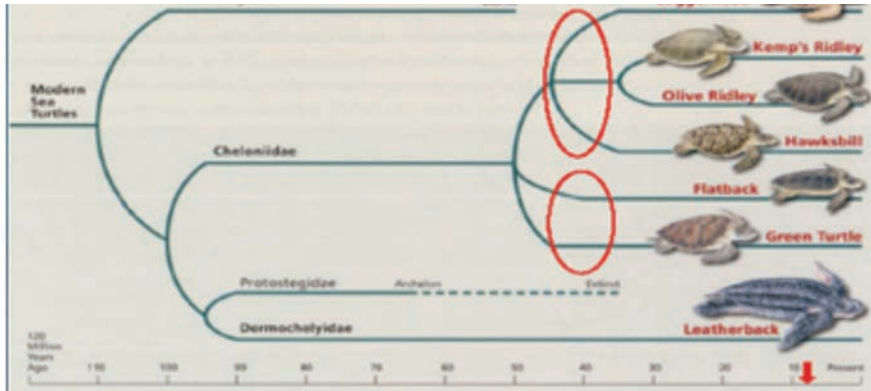


Figure 1. From *The Evolution of Sea Turtles* by Mike Salmon.
<http://savetheseaturtle.org/The-Evolution-of-Sea-Turtles.html>

But Nessies are also larger than any known living turtles, so one has to postulate a presently unknown marine species of large sea turtle; something akin to the thought-to-be extinct *Archelon* or some entirely unknown relative akin to *Archelon* and leatherbacks (Figure 1).

TOWARD TESTING THE TURTLE HYPOTHESIS

The turtle hypothesis is suggested as an attempt to circumvent difficulties faced by the popular plesiosaur hypothesis, specifically with respect to the rarity of surface sightings, the evidence of considerable time spent by Nessies at considerable depths, and reports of land sightings. Might there be ways to gather direct support for the hypothesis that Nessies are related to sea turtles?

The postulated lineage of the Cryptid Nessie Turtle was shared some 90–100 million years ago with that of the extinct *Archelon* and the ancestors of the still-extant leatherbacks. A major complication in seeking ways to test the hypothesis is that subsequent evolution over tens of millions of years quite likely endowed the Cryptid Nessie Turtle with behavioral characteristics not found in any now-living sea turtles. For example, a species that spends most of its time at considerable

depths might well have evolved to deposit eggs in places of opportunity and not necessarily at sandy beaches; perhaps even directly into shallow waters; or perhaps there even evolved ovoviviparity or actual viviparity as in some snakes. Nowadays, sea turtles produce very large numbers of eggs because so many eggs and hatchlings and young turtles are lost to a host of air-, land-, and water-borne predators; perhaps the postulated Cryptid Turtle evolved a less wasteful reproductive protocol.

This is to say is that one obviously conceivable test of the turtle hypothesis, a land-based search for the remains of egg nests, could not be decisively conclusive, even apart from the general rule that absence of evidence is not evidence of absence. Nevertheless, the fact of several dozen reported land sightings (Watson, 2018) certainly makes desirable a determined, meticulous search for any signs on the shores of Loch Ness of trails or impressions of something large moving from land to water and back; there are quite a number of quite gently sloping sandy beaches on the shores of Loch Ness.

If Loch Ness was colonized not long after the last Ice Age, something like a mere 10,000–12,000 years ago, then relatives of Nessies have surely also survived to the present time in the oceans, and perhaps in other lakes as well that were formerly fjords open to the seas. Indeed, there are quite good reasons to believe that Loch Morar, very close to the West Coast of Scotland, also harbors such creatures (Campbell & Sullivan, 1972; Magin, 2017). So one obvious test of the present hypothesis would be a sonar search for Nessies' now-living marine relatives in environments similar to what the Loch-Ness "fjord" was just after the Ice Age, in other words deep fjords (perhaps on the order of ~700 feet to be comparable to Loch Ness). A bonus would be to find promising sonar contacts in fjords that also have some shallower bays or inlets or even beach-type shores. One might speculate about the periodic reports that Sweden has detected via sonar contacts in some of its fjords what it presumed were Russian submarines or mini-sub^s,⁶ contacts that could not be followed to conclusive evidence and which might therefore have been sonar echoes from one of Nessie's relatives rather than a Russian submersible. Systematic sonar searches at Loch Morar also await sufficiently interested researchers with access to the considerable needed resources of equipment and expertise.

The only indisputable proof of identity, of course—indeed the only

indisputable proof of the very existence of Nessies—is the obtaining of a living or dead specimen. Robert Rines in fact had devoted several expeditions to searching the depths of Loch Ness for the possible presence of carcasses. Such searching cries out to be continued, for there seems to be no other possible depository for dead Nessies than the floor of Loch Ness. Unfortunately, the known vast population of eels might damage carcasses to an extent that could make them exceedingly difficult to locate and identify.

During the systematic searching by the Loch Ness Investigation (LNI) in the 1960s and 1970s, some researchers hoped to obtain some Nessie tissue by means of hollow sampling darts fired from crossbows if a sufficiently close sighting ever occurred; but it did not. In 2018, however, a technique was introduced that seems potentially capable of providing similar information as would a tissue sample, namely the relatively recent methodology described as environmental DNA (eDNA). A recent documentary on the Travel Channel (USA television) describes how Professor Neil Gemmill of the University of Otago in New Zealand sampled the waters of Loch Ness in order to identify the species present there by means of the DNA in the cells that are continuously shed by all living creatures (Bauer, 2019).

Unfortunately, even this new technique cannot, at least in its present form, yield indisputably conclusive information. The gathered DNA is identified by means of the standard PCR technique, which necessitates choosing specific primers that are thought to be present, in this case primers suited to the genetic characteristics of the particular species being looked for. Gemmill was able to identify DNA from many residents of Loch Ness, in particular the large population of eels and the well-known species of fish (arctic char, trout, salmon) as well as the surprising presence of DNA from such land-based animals as deer. Insofar as possibly identifying Nessies, Gemmill was guided by the conventional wisdom as to likely candidates, and he was able to conclude that Nessies are *not* sturgeons or Wels catfish. The plesiosaur hypothesis was also ruled out, admittedly with less certainty owing to the need for assumptions as to what plesiosaur DNA would have been, since no authentic source of plesiosaur DNA is available. However, of the 500 million DNA samples gathered by Gemmill's team, 25% remain unidentified. The pertinent data are being made publicly available so

that additional identifications may come in the future, and perhaps the best present hope for testing the Cryptid Turtle hypothesis is that a search will be made among the eDNA samples for genetic markers likely to be present in relatives of ancient sea turtles. Pending such specific research, this author is encouraged that the present results do not exclude that possibility (N. Gemmill, personal communication, September 29, 2019).

ACKNOWLEDGMENTS

Scott Mardis has kept me steadily au courant about plesiosaurs and other pertinent matters.

NOTES

- ¹ According to work by Adrian Shine, cited by Roland Watson (2019).
- ² The Dinsdale film can be viewed at <https://www.themanwhofilmednessie.com/tims-nessie-film.html>
- ³ http://www.euroturtle.org/suzys_faq.htm#24
- ⁴ Bottlenecks and founder effects https://evolution.berkeley.edu/evolibrary/article/bottlenecks_01
- ⁵ <https://nationalzoo.si.edu/animals/australian-snake-necked-turtle>
- ⁶ Sweden releases mystery submarine evidence, <https://www.telegraph.co.uk/news/worldnews/europe/sweden/11232820/Sweden-releases-mystery-submarine-evidence.html>

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LETTER TO THE EDITOR

Time to Celebrate!

MICHAEL NAHM

Institute for Frontier Areas of Psychology and Mental Health, Freiburg, Germany

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I've read the comments on Arthur Reber and James Alcock's (2019) criticism of Etzel Cardé's (2018) publication in the recent issue of this Journal with great interest (Braude, 2019; Cardé, 2019; Carr, 2019; Westcombe, 2019; B. J. Williams, 2019; G. R. Williams, 2019), and also another recent comment on the same matter (Roe, 2019). The authors of these articles convincingly highlight numerous weaknesses, inconsistencies, and untenable claims in the publication of Reber and Alcock, the most outrageous being the latter's postulate that (even huge amounts of) data must be regarded irrelevant and be ignored by scientists if they question subjective preconceptions about what is possible and impossible in nature. Clearly, if mankind would have behaved in accordance with Reber and Alcock's proposition, we would still be living on a flat earth and believe that the sun and planets circle around us. Science as we know it wouldn't exist. It goes without saying that rationally minded people cannot endorse Reber and Alcock's paradoxical and downright anti-scientific stance.

Consequently and righteously, Chris Roe depicted current skepticism as being in an "egregious state" (Roe, 2019). Whereas Roe regrets this situation because the poverty of modern skeptical criticism would prevent constructive discussions to improve the reliability and validity of parapsychological research, and would ultimately do a disservice to parapsychology, there is also an alternative, or perhaps complementary, perspective that entails seeing things more positively: When the best move that high-profile skeptics like Alcock can make in response to Cardé's (2018) publication is seeking refuge in

advocating desperate anti-scientific propaganda, the small community of parapsychologists has apparently done a truly great job already! And so it seems that experimental parapsychological research in recent decades has reached a state in which the only option left for year-long skeptics is proclaiming a position that signifies intellectual bankruptcy. This highlights an important and so far neglected aspect of Reber and Alcock's paper, but which should nevertheless be stressed:

Parapsychologists need to be deeply grateful to Reber and Alcock for their unexpected support. If serious parapsychological research is to gain increased acceptance among scientists, this will best be achieved through a process in which neutral and open-minded people will increasingly recognize that even prominent skeptics' arguments are simply unsound. Hence, I not only agree with Bernard Carr (2019) that Reber and Alcock's publication should be compulsory reading for all students of parapsychology, but I'd love to see it being carefully studied by students of all branches of empirical and theoretical science along with Cardeña's (2018, 2019) publications (and ideally, along with some of the other comments). This comparison exemplifies astonishingly different levels of scientific accountability in leading parapsychologists and leading skeptics, and, thus, Reber and Alcock's paper is quite uplifting for parapsychology—notwithstanding that typical proponents of mainstream thinking remain at present hardly affected by the paper's stumpiness and that the journal *American Psychologist* even denied Cardeña a right to respond (Cardeña, 2019). The bottom line, however, is that the Reber-Alcock incident is a triumph for experimental parapsychologists. It illustrates two things:

1. Even renowned skeptics provide written proof that they have run out of scientific and rational arguments by now.
2. Parapsychologists are clearly on the right track.

If I include myself here, this means: We can continue our work with renewed motivation, verve, rigor, and pride. Well then, let the corks pop!

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ESSAY REVIEW

Disappointing Documentary about Loch Ness Monsters (Essays) (Can Good Documentaries Be Made about Such Subjects?)

Loch Ness Monster: New Evidence. Travel Channel (USA), 15 September 2019; (in UK, Discovery Channel, also 15 September 2019). Credits: 1895 Films for Travel Channel; Scripps Network; Tom Jennings, Executive Producer; Julie Meisner Eagle, VP for Production & Development; Matthew Butler, General Manager.

Reviewed by Henry H. Bauer

Virginia Polytechnic Institute & State University
hhbauer@vt.edu; www.henryhbauer.homestead.com

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“About the show: Professor Neil Gemmell uses cutting edge environmental DNA science to unravel the mystery of the Loch Ness monster. Neil’s high tech monster hunt opens a new chapter in the search for Nessie as he puts the leading theories to the ultimate scientific test.”

This description misleads in every important respect. The mystery is not unraveled; the leading theory is not even mentioned, and Gemmell’s reason for embarking on this project—namely, to spread awareness of the potential benefits that can accrue from research on environmental DNA (eDNA)—is not well-served, because there is no useful explanation of what eDNA science does, what it can and cannot accomplish, and why.² That lack is all the sadder because the results in this case with respect to Nessies are not only incomplete, they are inconclusive and probably even wrong in an important respect.

The significance of the 'new evidence' claimed in the title of this film could surely be appreciated only in the context of the earlier evidence. That has been described in full detail in at least a dozen respectably sourced and documented books by both believers and disbelievers that Nessies are real animals.³ Of central importance is Constance Whyte's (1957) *More Than a Legend*, which brought renewed attention to Nessies after a dozen-or-so years in which the media and the public had been preoccupied with World War II and its aftermath. An article by Whyte had led to a foray to Loch Ness by Tim Dinsdale, who was able to obtain in 1960 what remains the clearest objective evidence for the presence of a large animal in Loch Ness. Whyte also developed the explanation that has become accepted by almost all serious researchers: that Nessies are a population of originally marine creatures that used to visit the fjord, the arm of the North Sea that Loch Ness was for a time after the last Ice Age, before the land rose when freed from the heavy weight of mile-high ice and the erstwhile fjord became cut off from the ocean as Loch Ness. Ancestors of Nessies were trapped and led eventually to a population adapted to fresh water, as rain and run-offs from the surrounding hills slowly morphed a salt-water fjord into a fresh-water loch. That the Loch had indeed been part of the North Sea for a time after that Ice Age was proven much later by the fortuitous discovery of marine deposits on the floor of Loch Ness (Rines & Dougherty, 2003).

The producers of the Travel Channel piece⁴ appear to have been ignorant of these central and crucial facts. Thus the film declares as essentially disproved the 'Jurassic hypothesis' of a lone plesiosaur resident in the Loch for a long time, a hypothesis not held by any serious Nessie fan or believer for half a century or more, if ever. The film displays further ignorance by calling plesiosaurs 'scaly' reptiles; and by describing as 'popular' explanations that Nessies might be catfish or sturgeons, each of which has been suggested by only a single individual without finding general support among believers or disbelievers alike. Smaller errors and deficiencies are so innumerable as to preclude individual mention. Still images, including some known fakes and mistakes, are flashed on and off without explanation, together with creative film-clips of plesiosaur-like images cruising in imagined waters.

The allegation is properly repudiated that the most famous, iconic photo of a Nessie, [the Surgeon's photo] was a hoax; but it was not Loren Coleman who repudiated it [for the first time] for this film, but most comprehensively Karl Shuker (1995, p. 87), who is as prominent a cryptozoologist as Loren Coleman.

Grossly misleading is the assertion that in the 1980s Adrian Shine [led the charge] to employ sonar. Mackal (1976, pp. 296–308) lists 16 pertinent sonar observations at Loch Ness between 1954 and 1972 and describes in detail the highly informative ones by the Birmingham University team in 1968 and by Love in 1969. The underwater photos, obtained by a team led by Robert Rines that included renowned flash photographer and Medal-of-Freedom recipient Harold Edgerton and which had been analyzed by the computer experts at the Jet Propulsion Lab, are described absurdly as [subjectively] interpretable by contrast to the objective evidence of DNA.

One of the witnesses given considerable prominence is Gordon Holmes, and serious attention is given to the video he obtained, which any experienced observer at Loch Ness recognizes as not a wake but a puff of wind (or two puffs). Even more film-time is wasted on noting that some people offer supernatural [explanations] for Nessies, with much about the occultist Aleister Crowley who resided for some years at Boleskine House on the southern hillside above Loch Ness—all irrelevant to Nessies and to eDNA.

Throughout the film, the expected, indeed predicted outcome of Gemmell's research is described in hyperbolic terms that nothing could possibly live up to, for instance that Nessie would not escape detection this time even though she remains [the world's greatest mystery]. It is also absurdly wrong to claim that [scientists] have been searching for Nessie since the first reported sighting 1,500 years ago, or that people have been bringing [the best science of the day] to the hunt for Nessie for some 50 or 60 years.

After all the hype, in the last few minutes the film offers some actual results. Some 500 million DNA sequences were garnered from 250 samples of Loch Ness water. It is no disappointment, no surprise, that none of the DNA could be ascribed to what one would expect from a [Jurassic reptile] since no serious fan considers Nessie to be a long-surviving plesiosaur: At most, a quite popular theory is that Nessies

are the result of tens of millions of years of evolutionary change from marine-living ancestors related in some way to the long-extinct plesiosaurs. What is intensely disappointing is to be told at the very end of the film that 25% of the DNA samples remain unidentified. Gemmell quite properly promises, as a scientist should, that these data will be made fully available and that other additional identifications may eventually follow.

Owing to the earlier-mentioned lack of even rudimentary background research by the film's producers, Gemmell had been badly let down as to the possible identity of Nessie: The copious prevalence of eel DNA is allowed to suggest that Nessies might in fact be very large eels. As Steve Feltham notes at the very end of the film, anyone who suggests that interpretation to an eyewitness would be simply laughed out of the room. No one has ever reported the sinuously side-to-side body-flexing motion by which eels move; moreover, the 5-foot-wide hump in the Dinsdale film is certainly not an eel; the underwater photographs of Robert Rines, of a long-necked creature with paddle-shaped fins, cannot be construed as showing an eel. That the bottom of Loch Ness harbors many eels has been known for a very long time, without any serious argument being offered for Nessies being eels.

Concerning new information about what Nessies might be, the silver lining (for this reviewer and Nessie fan at least) is the absence of catfish or sturgeon DNA, the latter being Adrian Shine's most recent attempt to pooh-pooh the possible reality of any kind of monster.□

CAN GOOD DOCUMENTARIES BE MADE ABOUT SUCH SUBJECTS?

Perhaps not. The judgment of what is good depends inevitably on the conscious beliefs and unconscious biases of those who judge; and on any controversial topic, it is rare to find truly uncommitted, open-minded individuals; and even if such rarities were to make a documentary, it would find no favor with the great majority of people, who are committed, wittingly or unwittingly, to one side or the other. On matters of knowledge just as in politics or religion, the open-minded moderate few are appreciated by neither of the opposing sides.

The inescapable trouble is that evidence does not speak for itself.



Figure 1. Neil Gemmell at Loch Ness.

As philosophers have long pointed out, “facts are theory-laden” We are interested not in unadorned facts but in *meaningful* facts. The plain facts may be black lines and shaded areas on a white background, but our interest is in what those depict: facial silhouettes facing one another, or a flower vase? A pretty young girl or an old crone? (Bauer, 2017, p. 128, figure 3). Such ambiguity has been illustrated for Nessies by how the very same pieces of evidence are interpretable quite plausibly as “The monster is a myth” (Bauer, 1986, chapter 1) or “The monster exists” (Bauer, 1986, chapter 2).

Nevertheless, documentaries useful to a wide range of interested parties as well as to the general public could be produced even by somewhat biased or previously ignorant production teams provided that they supported their script writers with reasonably accurate information about relevant written sources and appropriate contacts with contemporary individuals who might have pertinent expertise. The present film does mention such properly knowledgeable and relatively unbiased individuals as Loren Coleman, Steve Feltham, and Gary Campbell. Unfortunately, the production was also heavily influenced by Adrian Shine; quite understandably so, since he runs the prominent

Loch Ness Centre in the village of Drumnadrochit which is the traditional center of Nessie seeking. But for most people, "Loch Ness" means "Loch Ness Monster" and they expect a "Loch Ness Centre" to inform fairly neutrally about Nessies. Shine and the Centre, however, discount anything that cannot be explained in terms of what is already known. Over the years, Shine morphed from courageous and innovative monster-hunting researcher at Loch Morar into a dogmatic denier of anything like a "monster" and he has converted Tony Harmsworth's highly informative early-1980s exhibition about Nessie matters into a case for disbelief.

What led to Shine's change of heart is hard to fathom, since in 1982 he wrote that "Having established that there is nothing impossible about 'Loch Ness Monsters' from a scientific point of view" and he reported that his team had "made no less than 40 [sonar] contacts of interest . . . stronger and deeper than the known fish" (Loch Ness & Morar Project, 1983), thereby confirming earlier work by others.

In earlier days, Shine had displayed considerable insight with the accurate as well as pretty observation that conducting a surface watch for Nessies amounted to "a war of attrition against the laws of chance"; and he had also made an important point that should inform all eyewitnesses, that any phenomenon at Loch Ness that exhibits periodicity, somewhat regular recurrence, most likely is owing in some way to wave or wake disturbances. Yet nowadays Shine dismisses sonar observations as artefacts, and insists that the Surgeon's photo was hoaxed, that Rines's underwater photos were of rocks and debris and shadows on the Loch's bottom, and that the 5-foot-wide hump filmed by Dinsdale could only be a boat disguised by unusual circumstances of lighting and weather—no matter that the hump produced a broad wake with no sign of the propeller wash that would inevitably have been made by any of the fishermen's boats on the Loch. I'm reminded of the Christian who claimed to have been converted because the arguments offered against Christianity were so self-evidently absurd: If the best way that debunkers can find to discount the Dinsdale film is to say that the hump was a boat,⁵ then Nessies most certainly are large, unidentified animals.

NOTES

- ¹ <https://www.travelchannel.com/shows/loch-ness-monster-new-evidence>
- ² That eDNA work is not easy or infallible is pointed out in a comment on Roland Watson's informative and reliable blog:

□ . . . as with any tests that involve biologicals, there are error rates. And eDNA is not immune to these errors. . . . eDNA testing is also affected by seasonal changes—of how creatures operate in their environment, as well as the quality of the effluent at different times of the year, and so on. . . . [F]or eDNA testing to detect creatures properly there would have to be such testing throughout Loch Ness on a quarterly basis over probably at least two years, and probably have close to 350 to 450 sampling points—and doing this at least at five or six different consistent depths. □ <http://lochnessmystery.blogspot.com/2019/10/looking-back-on-edna-results.html?showComment=1571098925729#c7083682203925655134>

I think that Roland correctly pointed out that nothing was taken way down deep, and there probably should have been. Also, eDNA actually lasts much, much longer in soils than in water. So taking samples off the Loch bottom might be a fruitful endeavor. Indeed, there are several clues indicating that Nessies spend most of their time down deep, possibly in the two basins known to be deeper than 200 m (Shine & Martin, 1988).

- ³ See the bibliography, comprehensive up to the early 1980s, of books, chapters, articles, and news media reports in Bauer (1986, 2017, 2023). Significant books tending to imply belief that Nessies are real include those by Dinsdale (1961, 1966, 1975), Rupert Gould (1934), Roy Mackal (1976), and Constance Whyte (1957); the disbelieving viewpoint is expounded for instance by Binns (1983), Burton (1961), and Steuart Campbell (1986).
- ⁴ I much prefer not to call it a documentary.
- ⁵ The Dinsdale film, with extract stills comparing hump and reference boat, can be viewed at <https://www.themanwhofilmednessie.com/tims-nessie-film.html>

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ESSAY REVIEW

Phone Calls from the Dead? Exploring the Role of the Trickster

Des coups de fil de l'AUDEL ? Enquête sur un phénomène paranormal incroyable: Sa folie, ses caractéristiques et son explication by Laurent Kasprowicz. 2018. 136 pp. € 20 (paperback). ISBN 978-2954406237. Available from the author's website. <https://www.descoupsdefil.fr/>

REVIEWED BY SHARON HEWITT RAWLETTE

sharon.rawlette@gmail.com

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Even parapsychologists have boggle thresholds. Even those of us who accept the reality of apparitions of the dead and various psychokinetic phenomena such as raps and abnormally blinking lights can have a harder time believing in the reality of phone calls from the dead: that is, cases in which a deceased person speaks with the living via telephone. For one thing, these conversations just seem too straightforward. Typically, in these cases, the voice of the deceased manifests and speaks a message of a few words to several sentences, and in rare cases the voice carries on an extended conversation with a living interlocutor. Those who have experimented with electronic voice phenomena (EVP) know how difficult it is to clearly discern in these communications single words, let alone phrases or the identity of the speaker. And yet, in many cases of supposed phone calls from the dead, the dead seem to speak as clearly as if they were in a living human body at the other end of the telephone line. Is this phenomenon real? And if so, are the dead truly behind it?

Unfortunately, even a century after reports of this phenomenon

first began, the literature on it remains scant and difficult to come by. There have been two notable English-language books on the topic—D. Scott Rogo and Raymond Bayless's *Phone Calls from the Dead* (1979) and Callum Cooper's *Telephone Calls from the Dead* (2012)—but even used copies of these volumes cost upward of \$50. Nevertheless, interest in this phenomenon does seem to be increasing, as just last year (only six years after the publication of Cooper's book) in March 2018 French sociologist Laurent Kasprowicz published his volume *Des coups de fil de l'AU-D EL*? The title translates to *Phone Calls from the BEYOND?* Note the question mark. This book seriously considers what is behind these apparent phone calls from the dead and is not willing to settle for easy answers. While Kasprowicz's book is currently available only in French, I hope it will not be long before it is translated into English, as it is an excellent addition to the postmortem phone call literature. It not only presents 17 new cases collected by Kasprowicz but also offers some new, thought-provoking theoretical considerations as well.

Since there is no translation of this book currently available, I will provide here a fairly detailed account of the book's contents, as an aid to English-speaking researchers who may be wondering whether it is worth their while to attempt to read the book in French. I hope they will conclude that it is.

Kasprowicz's book begins with the case that drew him into his study of postmortem telephone communication, an experience that happened to him personally several years ago. While this particular case has aspects that are highly unusual within this genre of experiences, these unusual characteristics are extremely important in that they serve as some of the clues that have led Kasprowicz to his innovative theoretical understanding of the phenomenon.

Kasprowicz's acquaintance with the phenomenon of postmortem telephone communications began four or five days after the death of a beloved dog of his. He was in the car with his mother and brother when he said to them, out loud, *«Au paradis, j'espère qu'on y retrouve nos chiens. J'aimerais bien recevoir un signe.»* (In heaven, I hope we meet our dogs again. I really wish I could get a sign.) One minute later, he received a text message from someone he didn't know. The message read, *«SALUT J'AI BIEN REUSSI MON INTEGRATION, TOUT SE PASSE BIEN, JULIE.»* This translates approximately to, *«HI MY ARRIVAL WENT*

GREAT, EVERYTHING'S GOING WELL, JULIE.□

The French word *'arrivage'*, which I've translated here as *'arrival,'* is used to refer specifically to one's arrival within a new institution or group, like a school or a business enterprise. Kasprovicz received this text at the time of year when school was starting for the fall, so no doubt someone named Julie had been texting someone to let them know that her arrival at her new school was going well. However, Kasprovicz did not know anyone named Julie—somehow her text had been misdirected. And, what was more, the message in the text made complete sense as a response to Kasprovicz's request for a sign that his dog was okay. His dog, first of all, was female (though not named Julie), and it would make perfect sense for a soul who had just reached the *'other side'* to respond to an inquiry about how they were faring by using the same phrases that Julie used: *'Hi my arrival went great, everything's going well.'*□

But that text was only the beginning. The very next day, the Kasprovicz family's landline telephone began to ring—over and over, day and night. When they picked up, however, no one was there. And the information hotline they consulted reported, every time, that no one had called their phone. Other events also suggested that something was acting directly on their telephone and not through the telephone lines. For instance, sometimes their apartment intercom would sound at the same time that the telephone rang. And, on two occasions, the answering machine spontaneously began recording sometime *after* they had picked up the phone (which it did not normally do). The message the machine recorded in both cases was the sound of jovial laughter, like a family having a good time together around the dinner table.

The following day, something even stranger happened. When the phone rang for the umpteenth time, the family answered it, and after at first hearing only silence, they then heard a knocking or rapping sound, which had a Morse code-like flavor. Kasprovicz says he quickly figured out that one rap stood for no and two raps stood for yes, though he was apparently unacquainted at the time with the prevalence of this code in poltergeist cases. He was then able to ask questions and received the correct responses—even when, to verify that no one was playing a prank on him, he asked *'rick'* questions: questions that no one except the people in the room should have been able to answer correctly.

At one point, Kasprowicz posed the question, *«Ma chienne était trop vieille?»* (Was my dog too old?) A single rap responded *«Oo .»* This, apparently, was the correct response, as Kasprowicz's dog had not died of old age but of cancer. And then, suddenly, over the telephone came the sound of a dog breathing heavily. This unnerved Kasprowicz, because his dog had specifically died of lung cancer. One hour later, the phone rang again, and again there was a *«conversation»* with the raps, accompanied by the sound of the heavy breathing of a dog. Then it cut off, and that was the end of the phenomena.

This experience sparked a strong desire in Kasprowicz to understand what had taken place. In addition to reading the existing books on the topic of phone calls from the dead, Kasprowicz began questioning people in the region where he lived—in northeast France close to the Belgian border—and quickly discovered that apparent telephone communications from the dead were far from uncommon, though all of the other cases Kasprowicz collected involve deceased humans, not animals.

Kasprowicz ended up collecting 17 new cases, including two of his own, and all but two of the cases are from France or neighboring Belgium. Most of them involve spoken messages, either during a *«ve»* call or in a voice message, but his collection also includes some cases in which the phone simply rings anomalously or in which it is answered but no one is on the other end of the line. Two of his cases involve communication through text message, and one involves an apparent two-way conversation with the deceased via computer-based



instant messaging (the only case that is not technically a *telephone* communication).

Kasprowicz's book carefully details each of these 17 cases, noting similarities among them as well as unique features. It is important to note that none of the individuals Kasprowicz interviewed were aware of this phenomenon before they themselves experienced it. They certainly were not expecting it to happen and would appear to have had no preconceptions about *how* it should happen. Nevertheless, Kasprowicz points out several important continuities between these cases and those reported by Rogo and Bayless, and by Cooper, many of which Kasprowicz also describes in detail in his book. Kasprowicz notes the recurrence of the following features:

the association of the phone call with some sort of coincidence or synchronicity (for instance, receiving the phone call on the anniversary and/or at the exact clock time of the death),

hearing breathing or static on the line and/or a metallic or distant voice,

the call occurring on the phone of a friend or relative rather than on one's own phone,

the call apparently coming from a cell phone that is turned off and/or out of battery,

the inability of a telephone operator to trace the call,

the leaving of voice messages directly, without a call having been made,

the offering of reassurances or the delivery of warnings,

the use of certain phrases or some other feature making a clear identification with the deceased, and

the presence of some aspect of the call that seems not quite right—this feature being one that ultimately came to have great theoretical importance for Kasprowicz.

I would add that, in the cases of seemingly paranormal phone calls that I came across in researching my book *The Source and Significance of Coincidences* (2019), I found many of these same patterns, though at the time I collected them I had not yet read Kasprovicz's book, nor Rogo and Bayless's or Cooper's.

However, if the similarities across cases are impressive, equally intriguing are the cases collected by Kasprovicz bearing features that are rare or even unique. For instance, there's the case of Nicolas, who got a call from a man who said he was in a coma in a hospital in Warsaw, Poland, and asked Nicolas to say good-bye to his daughter Manue for him. Manue was Nicolas's neighbor and was currently away in Poland with her family. When Manue returned a week later, without knowing anything about the phone call Nicolas had received, she informed Nicolas that her father had been in a coma and died while she was in Poland.

Then there's the case of a woman whose son had recently survived a tragic car accident in which a friend of his died. Two weeks after the death, the mother got a phone call from someone she recognized as her son's deceased friend. The friend seemed panicky and was asking to speak to her son. He said something to the effect of, "Bu rry, put him on, please, I don't understand what's going on. It's like the world is turning bizarre. . ."

Also odd is the case of S verine, who, three months after the death of her mother, was told by her "belle m re" (either mother-in-law or stepmother) that there was a message for her on the *belle m re's* answering machine. She went to listen to it, and it said, "S verine, S verine, the Sarah is with me, I'm fine, don't worry. S verine, S verine. I'm here. We're doing fine here" (my translation). Sarah was S verine's family's deceased dog. This would seem to confirm that the caller was S verine's deceased mother. The strange bit, however, is that S verine *didn't recognize her mother's voice*. The sound quality of the recording was good, she said, but it just didn't sound like her mother. This is one of those cases where there's an aspect of the call that is just not quite right—*le d tail qui cloche*, as Kasprovicz calls it.

I would venture to say, however, that the strangest of the 17 cases Kasprovicz has collected is his own experience after the death of his dog, which I described above. It is strange, first of all, because the

primary deceased is an animal rather than a human being, and the animal seems to manifest its "ice" in the heavy canine breathing heard over the phone line. But it is also very different from the other cases in Kasprovicz's book because of the way it involves communication by way of yes/no questions answered by raps heard through the phone.

In fact, at the time I read Kasprovicz's book, I thought Kasprovicz's case was unique in its combination of an ostensibly postmortem phone call with "coded" psychokinetic answers to yes or no questions. However, oddly enough, while I was writing this review, I decided to take a break and go read for pleasure a book that had just come out a few days before: Mary Helen Hensley's *Understanding Is the New Healing* (2019). To my surprise, while blithely reading this book, I encountered *another* such case: that is, another ostensibly postmortem phone call with coded psychokinetic answers to yes or no questions (p. 127). This case began when a friend of Hensley's, Tanya, mentioned that she still had a hard time believing that her father, Sean, was gone, even many years after his death. Tanya and Hensley were together at the time, and they both saw the light in the room start flickering. They also saw both of Tanya's two cell phones begin to light up and flash on and off, though without ringing. Then a mechanical voice emerged from one of the phones, saying, "I am here . . . Proud of you. . ." Hensley reports that the women then decided to use a pendulum in an attempt to prolong the communication. They asked to be shown which direction of swing would stand for yes and which for no, and they then proceeded to ask questions. "Sean . . . is that you?" asked Tanya, and the pendulum began to swing emphatically in the yes direction. Hensley indicates that the conversation continued for at least a little while, and that the lights continued to flicker throughout.¹

But let's get back to Kasprovicz's case. What does he himself make of his experience, and those of the other people whose accounts he's collected? For obvious reasons, he is intrigued by parallels between postmortem phone communications and poltergeist phenomena. Specifically, he is intrigued by a hypothesis often used to explain poltergeist phenomena: that they are created by the psychokinetic action of a living individual or individuals. In support of this as an explanation for ostensibly postmortem phone calls, Kasprovicz cites three cases (one taken from Rogo and Bayless and two from Cooper)

in which people received telephone calls from *living persons* who had apparently had the intention or at least the strong motivation to place the calls in question but *did not physically or consciously do so*.

Along these same lines, I would add another case where a phone call apparently originated in a paranormal way from a living person but the primary motive for the communication nevertheless seemed to be on the side of the recipient, not the ostensible “caller.” The ostensible caller in this case was author and anesthesiologist Jean-Jacques Charbonier, whose original account of the case is included in his book *Les 7 bonnes raisons de croire* “*Il faut en*” (Charbonier, 2012, pp. 164–166). I also describe this case in some detail in *The Source and Significance of Coincidences* (Rawlette, 2019, pp. 309–310). Charbonier’s case suggests even more strongly than the cases from Rogo and Bayless and from Cooper that people may be capable of psychokinetically creating phone calls from those they have a strong desire to hear from. It clearly raises the possibility that living persons could use PK to create phone calls that have the appearance of coming from deceased individuals (though I should note that this is my own conclusion and not necessarily that of Charbonier).

Kasprowicz explores as well other phenomena often cited as providing evidence of communication from deceased persons: apparitions and electrical effects, for example, as well as mediumship. In each area, however, he finds that the evidence is ambiguous. Some cases seem to point toward the involvement of a deceased personality, especially when information unknown to the recipient of the ostensible communication is conveyed or when similar phenomena connected to the same deceased individual occur independently to multiple people in multiple locations at around the same time. And yet Kasprowicz finds that, as with telephone calls from the “dead,” there is often some detail that tells *against* the phenomenon as the straightforward production of a deceased individual. For instance, he cites a reading he had with a medium. The reading was dazzlingly accurate at first, but the curious thing was that, though the medium seemed to be delivering communications from Kasprowicz’s deceased grandmother, the “grandmother” communicating through the medium didn’t do the one thing that Kasprowicz would have most expected her to do: wish him a happy birthday, since it was indeed his birthday, and she had

never missed wishing him a happy birthday while she'd been alive.

Kasprowicz emphasizes two things that we must keep in mind as we seek to puzzle out the origins of ostensibly postmortem telephone calls. The first is that living people are able to create paranormal phenomena without the help of the dead. The second is that the mere fact that living people do *sometimes* create paranormal phenomena doesn't mean that they create *all* such phenomena; the dead could nevertheless create them as well.

In the final section of his book, Kasprowicz pursues his most theoretically interesting reflections. He considers that the bafflingly elusive quality of these phenomena may in fact be one of their defining characteristics and that the Trickster archetype may have a large role to play in their explanation. He discusses Carl Jung's appeal to the Trickster archetype as an explanation for poltergeist phenomena, as well as mentioning George Hansen's sociological exploration of the relationship between the Trickster and psi phenomena (Hansen, 2001).

The Trickster through the millennia and through many different cultures has been understood as both a messenger and a practical joker. The Trickster conveys the truth but always with some measure of play, humor, or absurdity—perhaps to take the edge off? Kasprowicz mentions that the Trickster may use the absurd as protection, a way of covering his tracks. Some people who have encountered the Trickster have experiences so crazy that no one else will take them seriously. Their predicament is worsened by the tendency of these phenomena to flee scrutiny, disappearing when skeptics put them under the microscope. As Kasprowicz points out, more than one voice recording of a message from the dead has spontaneously erased itself, greatly contributing to the skepticism surrounding this phenomenon. But he suggests this may be precisely the Trickster's goal: to elude public investigation and systematization while nevertheless conveying important, private truths to those who come into contact with him. Kasprowicz notes that hiding and joking around are not the same as deception. He writes, "it could be that even when the Trickster is at work for example, the phenomenon is telling the truth" (p. 118)—that is, telling us that our deceased loved ones do live on.

It is also very interesting that Kasprowicz was first prompted to consider the role of the Trickster in postmortem phone communications

because of a very specific experience he had involving one of the Trickster's most common representations in Western culture: the jester of the medieval and Renaissance royal courts. A few months after Kasprowicz experienced the strange phone calls featuring the hard breathing of a dog and rapped responses to his questions, Kasprowicz was driving on the highway when he fell asleep at the wheel. While asleep, he had a dream in which a court jester stepped out from behind a red curtain on a theater stage and, after looking at Kasprowicz for a moment, made a gesture with his hands indicating that Kasprowicz needed to turn the steering wheel to the right. Kasprowicz immediately opened his eyes and did so, and in this manner only barely avoided hitting the barrier in the median of the highway.

Kasprowicz notes that he hadn't had any recent contact with images of jesters before this experience; the image seemed to come to him out of nowhere. And, what was more, he says that the colors and sounds of the dream were unlike almost any other dream he has ever had in how very *real* they seemed. Kasprowicz considers the possibility that this dream—which quite plausibly saved his life—was also designed to give him a brief peek behind the curtain of the stage of life, revealing that the true actor at work in his paranormal experiences was the Trickster.

As for who—or what—the Trickster is exactly, Kasprowicz is clear that this archetypal being has strong links to the human unconscious. "Above all," he says, "it's a mechanism, an extraordinary mode of functioning of an autonomous part of our unconscious" (p. 107, my translation). That is, the Trickster is paradoxically both part of us and autonomous from us at the same time. Kasprowicz also seems to be attracted to the conclusion that philosopher Philippe Solal expresses in his Afterword to Kasprowicz's book, which is that it's the Soul or the Higher Self that is behind ostensible messages from the dead. Solal writes:

As the soul is the interface between oneself and the invisible world of the dead, it is the soul that addresses these messages to us, even if it's not impossible that it is sometimes serving as a messenger for the dead themselves, acting as their spokesperson. (p. 129, my translation)

However, it is precisely because Kasprowicz's book *Des coups de fil de l'AU D'ELA?* doesn't expound any firm thesis that I highly recommend it to anyone interested in ostensible postmortem communication or indeed in any sort of psychokinetic phenomenon. Kasprowicz does not shy away from the difficult questions and offers no easy answers. His goal is to explore the phenomenon of telephone communication with the dead in its full puzzling variety, and he does this methodically and with elegance, while also offering us, in his discussions of the Trickster, an important lead that I believe all future theorizing on the subject would be wise to consider.

NOTE

¹ I have also discovered, since beginning to write this review, that the first iteration of the SoulPhone™ technology being developed by Gary E. Schwartz and the SoulPhone Foundation employs coded psychokinetic responses to yes or no questions. However, since the technology does not appear at this point to involve the use of ordinary telephones, I would not consider instances of its use examples of postmortem telephone calls so much as a technological variation on the more familiar techniques of physical mediumship. For more information, see <https://www.thesoulphonefoundation.org/the-soul-phone-project>

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BOOK REVIEW

The Star Gate Archives : Reports of the United States Government Sponsored Psi Program, 1972-1995. Volume 3: Psychokinesis compiled and edited by Edwin C. May and Sonali Bhatt Marwaha. McFarland, 2019. 467 pp. \$95.00 (paperback). ISBN 9781476667546.

REVIEWED BY NEMO C. MÖRCK

nemomorck@hotmail.com

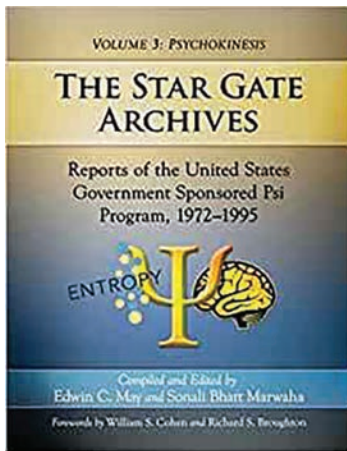
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The remote viewing research conducted at Stanford Research Institute (SRI) and later at Science Applications International Corporation (SAIC) was covered in *The Star Gate Archives Volumes 1* and *2*, both reviewed in this journal (see Mörck, 2018, 2019). Less well-known is the fact that much psychokinesis (PK) research was also carried out. This research . . . was never intended to be an academic exercise typical of most laboratories. Rather, the only interest was to determine the degree to which PK might be used as part of a defensive or even offensive weapon system (p. 12). This sounds dramatic. To U.S. intelligence agencies, a proper threat assessment was deemed necessary due to research conducted in the Soviet Union. The research in America, at SRI, was initially directed by Harold Puthoff from 1972 on, and later, for about ten years, by one of the volume's editors, Edwin May. In addition to research reports and reviews, Volume 3, like its predecessor volumes, includes nine appendixes, a list of abbreviations, an extensive glossary, an author index, and a subject index. The papers are arranged chronologically, but it is not necessarily a good idea to read them in that order.

THE BACKSTORY

After World War II, the U.S. and the Soviet Union engaged in the Cold War: "The era was marked by deep suspicion, espionage being the tool at hand . . ." (p. 7). In the U.S., the Central Intelligence Agency (CIA)



channeled money for research through the Society for the Investigation of Human Ecology (also known as the Human Ecology Fund). Unwittingly, the American Psychological Association, in 1960, accepted money from the government to send psychologists to the Soviet Union (APA, 1977). The psychologists, including Gardner Murphy, later wrote about what they had seen (Bauer, 1962).

In 1960 there were already rumors that parapsychological research was ongoing in the Soviet Union after a long hiatus (Krippner, 1971). A reason for the renewed interest was the so-called Nautilus hoax. The USS Nautilus was the world's first nuclear-propelled submarine and could remain submerged far longer than diesel-electric submarines. It was also the first submarine to travel beneath the North Pole, in 1958. The next year a story appeared, and it claimed that the Nautilus had been involved in a successful telepathy experiment. This has never been confirmed. Eventually, it turned out that the original story derived from Jacques Bergier (Ebon, 1983). The Soviets could not ignore the story due to its implications. At the time, radio communication with a submarine was not possible unless the submarine surfaced, hence the Nautilus story suggested that the U.S. had an advantage.

As a result of the increased interest in parapsychology, psychics such as Boris Ermolayev, Nina Kulagina, Rosa Kuleshova, Julius Krmessky, and Alla Vinogradava emerged in the Soviet Union. In addition, Kirlian photography and psychotronic generators were developed. Allegedly, the latter, popularly known as psychotronic weapons, could store and direct psychic energy. Robert Pavlita was perhaps the best-known inventor of these devices. Reports about experiments in the Soviet Union appeared in the *Journal of Paraphysics*, but many accounts about experiments were published in newspapers and popular magazines. When a clip of Kulagina moving objects with PK was shown to members of the Society of American Magicians, it evoked laughter (Christopher, 1975), but to U.S. intelligence agencies

this was no laughing matter. Lack of information, alarmist claims, and uncertainty about the possibilities forced U.S. intelligence agencies to pay attention.

During the 1970s U.S. intelligence agencies such as the CIA and the Defense Intelligence Agency (DIA) requested several reports about parapsychological research in the Soviet Union and Eastern Europe (e.g., Khokhlov, 1975). In 1978 the psychic Ingo Swann was invited to the 17th Annual U.S. Army Operations Research Symposium where he delivered a talk, "The threat of possible psychic techniques in future conflicts." Later, a few articles about parapsychology appeared in journals such as *Military Review* (Alexander, 1980) and *Military Intelligence* (Groller, 1986). During the 1980s Jack Houck popularized PK parties. Readers must have paused when they saw the heading "Metal-bending parties draw government brass" in *Science and Governmental Report*, 1 October, 1983.

In America, parapsychology had gained a foothold in the 1970s, and Willis Harman, futurist at SRI International, was quoted:

It is hazardous to make predictions in this field, but I believe we are on the verge of discoveries at the outer fringes of scientific knowledge that may completely alter our notions of the mind's capabilities. (*U.S. News & World Report*, 1978)

INTRODUCTION

Former Senator William Cohen and the parapsychologist Richard Broughton have contributed Forewords. Broughton puts the research in context. In addition, May has written a brief Preface. These texts are the same as in Volumes 1 and 2. However, the Editors have written a new Introduction, in which they draw from two reports requested by the DIA (Maire & LaMothe, 1975; LaMothe, 1972). These reports have long been available. The one by LaMothe, in particular, is curious. One cannot help but be surprised by the sources he naively relied on. The Editors have included a section from his report. LaMothe thought that the intelligence agencies had to pay attention to the research in the Soviet Union due to "its military implications especially in mind manipulation and controlled offensive behavior" (LaMothe, 1972, p. 358) and claimed that the U.S. had lagged behind.

Among other strange claims, LaMothe noted that Soviet researchers had (allegedly) tried to "apply telepathy to indoctrinate and re-educate antisocial elements. It was hoped that suggestion at a distance could induce individuals, without their being aware of it, to adopt the officially desired political and social attitudes" (p. 361). This sounds like science fiction. One comes across this claim in an earlier report by Milan Ryzl (1967). Ryzl claimed that the secret service in Czechoslovakia had pressured him to "supply information for it about parapsychological research in abroad" (Ryzl, 1967, p. 7). This contributed to his decision to move to America. In contrast to LaMothe (1972), Khokhlov (1975) emphasized the possibility that the Soviet Union had engaged in a disinformation campaign. The Editors briefly touch on this possibility. U.S. intelligence agencies must have been bemused by the situation.

In some circumstances electrostatic effects can produce phenomena that are erroneously interpreted as evidence for PK. The Editors write about this and stress how difficult it is to rule out normal explanations in PK research. They also comment on a clip with Felicia Parise (Honorton, 1993/2015; Pilkington, 2015), but miss a better opportunity to discuss electrostatic effects. Many of the effects produced by Vinogradava in the Soviet Union were most likely due to electrostatics; although, according to Adamenko (1979), she could perform even when grounded.

The Editors note:

One of the most important conclusions to be drawn from the reports in this volume is that conducting proper PK research requires substantial engineering skill and insight into the many things that may mimic PK but are not PK. (p. 18)

THE RESEARCH

The focus in Volume 3 is on PK research. PK, according to the Glossary, "refers to the direct influence of mind on a physical system that cannot be entirely accounted for by the mediation of any known physical energy" (p. 460). The researchers at SRI International defined it as "a man-centered production of physical effects not mediated by

any obvious mechanism" (p. 82). A number of terms have been used in place of PK, including anomalous perturbation, causal psi, remote action, and remote perturbation. The researchers noted that PK "offers the potential for remote man/machine interactions with computers, locks, switches, codes, and other sensitive or delicate mechanical or electronic apparatus" (p. 35).

Early on the reader comes across brief accounts of an informal test, in 1972 with Swann, involving a magnetometer. (Puthoff described this in a letter to the CIA; the people there were, however, more intrigued by the remote viewing also displayed at the time than by the PK effect). A PK study, involving a gradiometer, with Pat Price, better known for his remote viewing, also is described. The researchers noted that the passage of a truck in the parking lot adjacent to the lab could cause an artifact, hence it had to be monitored.

In the late 1960s, Helmut Schmidt, at Boeing Science Research Laboratories, developed quantum-based random number generators (RNGs) which he used in a number of studies. The participants were asked to either predict or influence the output of the RNGs. In the wake of his early studies, other parapsychologists also used RNGs in a number of studies. Early on, Schmidt let the beta decay of strontium 90 function as the source of randomness, but the sources of randomness have varied. Just as strange as the fact that some participants seem to be able to predict or influence the output of true RNGs is that some perform as well when pseudo-RNGs are used; their random numbers derive from a computer-based algorithm rather than from hardware. Schmidt thought that psychological factors were important for the success of his participants, and when possible he went out of his way to make them feel comfortable. The researchers at SRI International were clearly aware of this, during an initial pilot study, in 1979, with RNGs:

. . . each subject was allowed to select his favorite time of day, his preferred experimenter, the source [of randomness] that seemed to work best for him, and the number of trials he would do at a single sitting. (p. 65)

The participants in the pilot study were 17 employees at SRI International. Seven subjects were selected for participation in a formal

study. During the pilot study the number of trials they undertook varied widely (42, 115, 14, 29, 74, 45, and 228). Two of the participants who contributed most trials scored significantly above chance in the pilot study. In the formal followup, each participant undertook about 100 trials. The researchers wrote that β recaptions and controls exceeded any former experiments (p. 67). One of the two who scored significantly above chance in the pilot study did so again. That subject went on to participate in further studies. In addition, another participant scored significantly above chance. However, a later study, in 1986, was conducted with 20 subjects who were expected to undertake 100 trials; four dropped out, and no new high-scoring subject was identified. Unfortunately, one of the high-scoring subjects was unavailable for research in 1987, and another dropped out during an RNG study the same year.

The researchers noted the possibility that:

. . . the subject scans the unperturbed binary sequence ahead in time and selects the proper time to initiate the trial. This strategy enables him to take advantage of an unperturbed, yet significantly deviant subsequence and achieve a success for that trial. (p. 67)

Schmidt (1970) briefly noted this possibility, but this way of thinking is at the core of the intuitive data sorting (earlier referred to as psychoenergetic data selection or intuitive data selection) model developed by researchers at SRI International. This was later further developed into Decision Augmentation Theory (DAT) which the Editors describe as "a heuristic mathematical model that determines whether the data . . . are a result of a force-like causal effect or an informational effect" (p. 20). In simple terms, PK or precognition. The anthology includes papers about this, including two from the *Journal of Parapsychology* (May et al., 1995a, 1995b).

In 1983 parapsychologists were given an opportunity to present at the *Symposium on Applications of Anomalous Phenomena* (Jones, 1984) to which only government scientists and intelligence personnel had been invited. Among others, May, Puthoff, and Russell Targ gave talks. May spoke about the PK research that had been conducted at SRI International. His talk has been included in the anthology. Puthoff

spoke about the remote viewing research, and Targ spoke about what he had seen during a visit to the Soviet Union. Someone later wrote an article for the National Security Agency's journal about Targ's observations (*Cryptolog*, 1983).

While reviewing the literature, the scientists at SRI International became intrigued by the research conducted by Julian Isaacs (1984) in the UK. Isaacs (1989) once shared his thoughts and misgivings about studies involving RNGs. His own approach was rather different. Participants in his studies were expected to influence piezoelectric strain gauges. He also held so-called PK parties during which the attendees bent spoons. By the time the researchers became interested in his work, Isaacs had moved to the U.S. and was teaching at John F. Kennedy University. Isaacs accepted a subcontract; his task was to "screen, assess, train, and make available to SRI International" (p. 148) participants whose performance was deemed promising. Meanwhile the scientists at SRI International "retained the task of designing and constructing all experimental hardware" (p. 148).

May once noted: "In human-oriented sciences, replication usually implies conceptual replication, since exact replication of experiments is impossible and probably undesirable" (p. 80). The papers concerning the replication attempts with subjects selected by Isaacs are (like others) technical and show how much care the researchers paid to potential artifacts. Three events during the first study at SRI International were "sufficiently interesting to warrant further investigation . . ." (p. 174). However, later a likely artifact was identified. In addition, after a second, "the most elaborate and exhaustive" (p. 178), PK study, the researchers had to acknowledge that they had found no evidence of a PK effect.

William Braud at the Mind Science Foundation was also a recipient of subcontracts. Braud had participants "attempt to retard the rate of hemolysis (destruction) of red blood cells which had been placed into a tube of distilled water and saline in a distant room" (p. 300). He reported the results in the *Journal of the American Society for Psychological Research* (Braud, 1990). The researchers at SRI International were not only interested in the results, they also wanted to know whether intuitive data sorting was the cause. They were unable to determine this (but see May, 2015). Palmer (2007) suggests that an experimenter psi effect was at play. Thanks to another subcontract, Stephen LaBerge

and Marilyn Schlitz were also able to follow up on earlier research on the effect of remote staring. Many people report having felt when they were being stared at. This is not surprising given that the results of much research suggests that the observed person's physiology does react. LaBerge and Schlitz noted:

This work, in the context of previous research by independent researchers, has significant implications for our understanding of human communication processes and for a reevaluation of a worldview in which humans are seen as isolated beings. (p. 331)

SUMMARY

The conclusion Edwin May drew from the results of the research was that there is insufficient evidence for PK; it remains unproven, and the results of much research can be better explained by Decision Augmentation Theory (DAT). The Editors do however acknowledge that "there are a few documented cases of macro-PK that are most intriguing such as poltergeist phenomena . . ." (p. 18). May has been in Russia several times, and together with Larissa Vilenskaya (also known as Laura Faith) he wrote two reports about the PK research conducted there (May & Vilenskaya, 1992; Vilenskaya & May 1994); which are included. The Editors think that the Russian research efforts "are not very promising" (p. 18). Some papers about research carried out in China also have been included. What comes across most clearly in the anthology is actually how hard it is to conduct much PK research and to determine the true cause of effects. Nevertheless, many researchers are up for a challenge.

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BOOK REVIEW

The UFO Encyclopedia: The Phenomena from the Beginning (3rd ed.), Vol. 1: AM , Vol. 2: NZ , by Jerome Clark. Omnigraphics, 2018. 1,520 pp. \$155 (hardcover). ISBN: 978-0780816596.

REVIEWED BY JOHN B. ALEXANDER

<https://doi.org/10.31275/2019/1717>

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With more than 1500 pages, this is a massive undertaking by SSE Dinsdale Award winner Jerry Clark. A two-volume, 3rd edition, it is buttressed by his decades of research in the field of UFOs. For this encyclopedic effort, he is supported by several competent researchers with international reputations. Typically, reviewers of the written works by other SSE members tend to be quite favorable as we recognize the difficulty of getting our research into print. This work definitely left me conflicted in an attempt to be both fair to the authors and to the potential readers.

In general, the material that is included does provide considerable depth to the cases selected for presentation. As this is the third edition, much of that material has been previously published. Clark and his colleagues have in-depth knowledge of many of the earlier cases and these are well-represented. What I found most troubling were some glaring omissions that are hard to reconcile with an encyclopedia that suggests it is comprehensive in nature as opposed to a representation of cases as selected by the chief editor. Absent are the more recent incidences and evidence that have dramatically altered the entire field of UFOlogy. Given the rapid pace of advancement of knowledge, especially since December 2017, it would be nearly impossible for any print medium to keep pace. Here I am addressing the remarkable revelations by the U.S. Department of Defense concerning interactions between military aircraft and unknown objects. Internally these were so significant as to cause the U.S. Navy to publicly publish a policy

position acknowledging these events were occurring (frequently).

However, it is more than the events of just the past two years that are omitted or downplayed. As a prime example, Phil Corso is not mentioned. In 1997 U.S. Army Lt. Col. Corso's book, *The Day After Roswell*, became an international phenomenon. It dominated much of the conversation in the field. Whether one agrees with Corso or not is irrelevant. His book sold more than any other UFO publication by a great margin and he had significant impact on the field. Thus, both Corso and his book should deserve serious consideration.

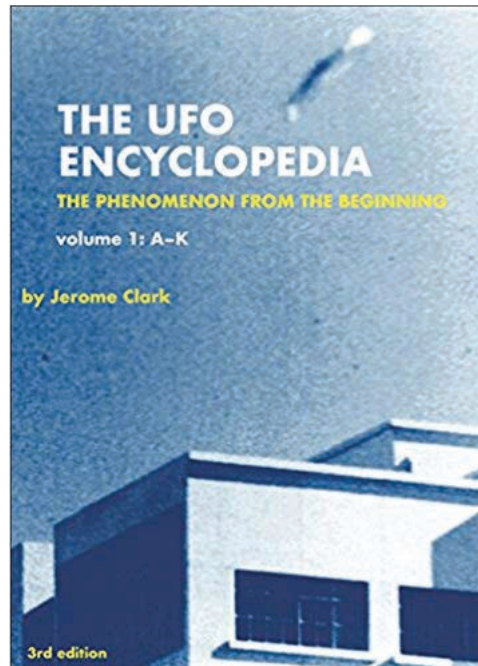
The Bentwaters case (also known as Rendlesham Forest) is relegated to a single paragraph in a segment concerning radiation. It is my belief that this case, with more than 60 credible witnesses, many from the U.S. Air Force and in the Personnel Reliability Program (PRP), is one of the best on record. In addition to high-quality eyewitness reports, there was substantial physical evidence recovered including casts of the landing prints and radiation measurements well above background for that area. In addition, radar records have recently been found substantiating some of the claims made by Air Force personnel. Notably, while several incidents occurred near the Bentwaters base in December 1980, on one of those nights the CashñLandrum exposure took place thousands of miles away in Texas. Appropriately, the Cashñ Landrum case is covered in fair detail in the book but the USAF/RAF case is not. Interestingly, both cases involved exposure to radiation.

Also conspicuously missing is Steven Greer. While I totally abhor his work in the field and find his egocentric, while personally financially lucrative, efforts a significant detriment, nonetheless he has had a substantial impact. It should be noted that Clark did choose to take on a number of such negative enterprises, including the infamous Billie Meier episode. There are nearly 17 pages devoted to the topic of hoaxes. To his credit, many of them are called out.

Surprisingly, the bibliography and index, though extensive (about 170 pages) are hit-and-miss. Some people who are annotated in a single reference are included. Others, including me, are in the text but not listed in the index. How people and topics were chosen to be included is unclear. As an example, there is an article about David Jacobs who is well-known for his abduction conspiracy theories and the alleged presence of evil aliens. In that segment there is a single reference

to Ron Westrum who is a highly respected researcher who has studied these topics for decades.

Other well-known researchers are either not mentioned or relegated to minor footnotes. As an example, Lee Spiegel has been associated with the field for decades. Of historic importance, it was Spiegel who organized the well-documented meeting that took place at the United Nations in July 1978. It was Allen Hynek who sent him to North Carolina where he had his own significant



experience while accompanied by local law enforcement. Not only was that case not covered, but Spiegel was the principal *Huffington Post* reporter covering the field for several years and was instrumental in dissemination of UFO information to a very large audience. Filmmaker James Fox who produced groundbreaking movies including *I Know What I Saw*, and *Out of the Blue* is neither mentioned nor referenced. The International UFO Congress, which for more than the past decade has hosted most of the largest UFO conferences in the United States, is missing, as is Alejandro Rojas, the current coordinator and owner. That, despite the fact that Rojas has been publishing UFO information online in *Open Minds* almost daily for the past decade.

Strangely, the very significant Phoenix Lights case is represented by Brazilian Thiago Luiz Ticchetti and American folklorist Thomas Bullard. Both are competent researchers; however, the main person who has reported on the case with both books and a movie, Lynne Kitei, M.D., is relegated to a single reference. Another missing topic is that of large, triangular UFOs which have been publicly addressed in many fora. Dave Marler, who wrote the definitive book on the topic, *Triangular*

UFOs: An Estimate of the Situation, is never mentioned. This, despite the fact that these reports have been acknowledged since before the flight at Kitty Hawk. He is also the go-to expert on the infamous 1942 Battle for Los Angeles UFO incident, which is not covered. Those omitted or snubbed could go on for a long list. On the other hand, there are many relatively obscure names included in the references.

Amazon has the set listed at a hefty \$155, which is far beyond most books in the field. True, it is an encyclopedia and they are known to be expensive. As a hardbound edition, it lacks the ability for rapid cross-reference searches that most researchers have become accustomed to making. Unfortunately, the medium is anachronistic, as both technology and the UFO field have moved on. At best, history buffs may want to make the investment, but understand they are getting a biased sample.

BOOK REVIEW

Beyond Mechanism: Putting Life Back into Biology edited by Brian Henning and Adam Scarfe. Lexington Books, 2013. 484 pp. ISBN 978-0-7391-7436-4.

REVIEWED BY MICHAEL LEVIN

Tufts University

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Beyond Mechanism: Putting Life Back into Biology, edited by Brian Henning and Adam Scarfe, is a collection of essays on the foundations of biology and its connection to other sciences. Its lengthy and profound foreword by Stuart Kauffman, a major figure in the quantitative analysis of biological regulation at the system level, summarizes the intended main point:

we live not only in a world of webs of cause and effect, but webs of opportunities that enable, but do not cause, often in unforeseeable ways, the possibilities of becoming of the bio-sphere, let alone human life. But most importantly, I seek in this new worldview a re-enchantment of humanity. (p. 1)

To some extent, it's meant as a reaction to what some perceive as demoralizing aspects of the mechanistic paradigm that is driven by recent advances in the molecular bio-sciences: "I believe we are partially lost in modernity, seeking, half-articulated, a pathway forward. Re-enchantment may be an essential part of this transformation" (p. 1). I do not agree that the current situation is as bleak as many critics of the scientific mainstream suggest, but this book should appeal to anyone interested in the larger questions of biology no matter where they stand on this issue.

All in all, it is an extremely enjoyable and valuable tour of important

concepts and controversies. Roughly, the content (divided into sections) cover the following broad topics:

- recent mathematical approaches to biology, such as complexity, systems theory, and emergence
- biosemiotics (coding and communication)
- homeostasis and thermodynamics
- evolution and behavior
- teleology and mechanism
- epigenetics

The discussions cover many of the key questions facing the biosciences in the new century: questions of agency (e.g., decisionmaking) and how it can emerge from physical mechanisms, the origins of order and rise in complexity, information in its many guises, the relationship of physics and biology, organization and regulation, the nature of Life, and the place of reductionism (and alternatives to it) in a modern biological synthesis. It is grounded in mathematical approaches to life—not merely in the sense of quantification, but in the deeper sense of mathematics as the science of patterns, relationships, and logic. Some of the chapters are more focused on metaphysics, others are very practical and hew closely to experimental data. All are written in a way accessible to interested laypersons, and even in cases where something is beyond the reader's knowledge, a bit of reading within other sources should quickly get one to the point where the book becomes a valuable guide to deeper waters.

The chapters are very well-referenced, providing a lot of pointers for source material and deeper study. However, the illustrations/diagrams are uniformly scarce and minimal (and exhibit fairly rough production values when present). The book is excellent as-is, but perhaps could have been improved by additional graphical material to illustrate concepts throughout. The only other quibble is that the chapters generally do not contain abstracts. The exception is one chapter (by Brian Hall) that does provide an abstract: "It is not my aim to present epigenetic or genetic models for biological phenomena, to describe new phenomena, to derive predictions from models, or to offer tests of predictions from models. Thus, I do not aim to make an empirical contribution to epigenetics" (p. 348). This important list of what the subsequent chapter

does not do highlights the need for abstracts that would outline the major claims (main points) that each chapter does seek to make—it would have been helpful to readers to have those summaries of the main points and their logic up-front, before each contribution.

The book consists of pieces by a very good selection of authors—there are no dispensable chapters, and all of the authors are primary contributors to their respective fields. Although the book is certainly not thin, there were some important and relevant areas that were not covered. Readers whose interest is piqued by this volume will want to also read up on the recent advancements in artificial life, synthetic biology, machine learning, active inference, top-down causation, and geometric information—all of these are beginning to enrich our understanding of life. Readers should be especially mindful about gaps, such as the one on epigenetics. For the purposes of the included chapter, Epigenetics is a term and concept that embraces the regulation of gene activity during embryonic development, animal and plant ontogeny, organismal evolution, and some animal diseases and cancers (p. 360). But in fact the more general (and interesting) meaning of “epigenetics” subsumes all kinds of non-genetic influences over biological form and function, such as cytoskeletal inheritance and other aspects of biophysics that affect inheritance of information unrelated to the DNA modifications most often discussed in contexts of epigenetics (Fields & Levin, 2017; Jablonka & Lamb, 1995; Levin, 2014; Nelsen et al., 1989; Neuhof et al., 2016).

My own reactions to the overall perspective in the book are as follows. First, the positioning of “true agency” (real cognitive systems that make decisions, have memories, etc.) and “as-if agency” (systems that only seem as though they are making decisions but in reality are “mere physics”) as binary choices is a fundamental error. Like most



other biological traits, it evolved as a continuum from the simplest biophysical systems (with primitive homeostatic dynamics) to very complex ones with 2nd-order cognition and the ability not only to pursue counterfactual future goals but to actually re-specify those goals and reason in a meta-cognitive way. Viewed thusly, mechanism does not have to be disenchanting—many systems around us have varying degrees and types of agency, enabled by the laws of physics and computation. Understanding their structure and function is an important complement to the equally important top-down view of living systems as cybernetic or cognitive agents. Indeed, it is no longer tenable to view machines as predictable, boring, limited devices totally divorced from the plasticity and robustness of life. Quantum events, Turing limits, Gödel limits, deterministic chaos, and environmental (and swarm) interactions all suggest that beyond a minimal level, autonomous robotics will have just as much freedom, surprise, and evolutionary creativity as we see in the carbon-based world (Rahwan et al., 2019). Views of biological organisms as machines, computational devices, thermodynamic engines, cognitive selves, etc., are all metaphors; the ultimate judge of which metaphors are misleading and which are valuable is not a philosophical stance but empirical research: A metaphor is appropriate based on the extent to which it helps predict and control phenomena, and to drive novel research programs.

Second, any discussion of the origins of order and evolution have to focus significantly on developmental biology. Mutations occur in DNA, but selection judges function. Between DNA and the functional anatomy of the organism lies a critical layer of controls that still holds many mysteries about the relationship between the genome and anatomy. This book, like many other discussions, ranges from physics and genetics all the way to mind and evolutionary selection, but little emphasis is placed on the critical question of what actually determines specific complex anatomy and its ability to repair itself (in regenerative species) in light of unpredictable injuries. It is essential, for any discussions of what evolutionary mechanisms can and cannot do, to understand the software of life that is implemented by the physiology and signaling that lies between the genomic specification of hardware and the function of a living being in the environment.

All in all, a very enjoyable read and highly recommended, together

with the following additional reading for those who enjoy these topics:

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BOOK REVIEW

Anthropology and Cryptozoology: Exploring Encounters with Mysterious Creatures edited by Samantha Hurn and Chris Wilbert (in the series *Multispecies Encounters*). Routledge, 2017. 263 pp. £120. ISBN 978-1-4094-6675-8.

REVIEWED BY GERHARD MAYER

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Show me a Sasquatch body. (Michael Shermer, 2009, p. 35)

Anthropology and anatomy professor Jeff Meldrum gave a lecture at the 2016 PA/SSE conference entitled “Sasquatch and Other Wildmen: The Search for Relict Hominoids” (Meldrum, 2016). As one of the few established academics interested in cryptozoological topics, he spoke about footprints of different provenance, their evaluation and anatomical classification. He mentioned the reactions of his colleagues to this field of research and the placement of his books in bookstores for economic reasons—booksellers put them on the esoteric shelves, where sales are expected to be higher for such topics. With reference to the skeptic Michael Shermer, he says the attitude of his colleagues toward the subject area of cryptozoology can be characterized by the sentence “The science starts once you have a body.”

This aptly shows the problematic situation in which cryptozoology finds itself. The first sentence of the article “Cryptozoology” in the English *Wikipedia* asserts: “Cryptozoology is a pseudoscience and subculture that aims to prove the existence of entities from the folklore record, such as Bigfoot, the chupacabra, or Mokele-mbembe.” As is often the case with anomalies research, a general judgment is made about the field of research and the people who are actively interested in it. Without a discriminating perspective, critics equate the former with the latter (“pseudoscience and subculture”). The volume *Anthropology and Cryptozoology: Exploring Encounters with Mysterious Creatures* shows that there are other ways to look at this field.

This high-priced book, edited by anthropologist Samantha Hurn, was published in 2017 by the scientific publisher Routledge. The combination of anthropology and cryptozoology in its title shows a shift in academic approach to this topic from zoology and biological anthropology to ethnology and social sciences, evidenced in the book blurb:

Cryptozoology is best understood as the study of animals which, in the eyes of Western science, are extinct, unclassified, or unrecognised. In consequence, and in part because of its selective methods and lack of epistemological rigour, cryptozoology is often dismissed as a pseudo-science. However, there is a growing recognition that social science can benefit from engaging with it, for as social scientists are very well aware, 'scientific' categorisation and explanation represents just one of myriad systems used by humans to enable them to classify and make sense of the world around them.

This view characterizes many of the contributions in the volume and reflects a development of the so-called *ontological turn* in anthropology since the 1990s. The idea of a unified world as a basis of all people's experiences is abandoned. Differences in the views of the world are therefore not simply based on different representations of this world, but on the perception of different worlds. At first glance this may not have much to do with cryptozoology, but in the course of reading one is taught better. For the researcher, the essential aspect is that he takes the observations, stories, and myths of indigenous peoples seriously and does not consider his own view of the world to be the only true one. The editor writes in the Introduction:

Rather than prioritising 'science' as the arbiter of truth and the ultimate product of human social development, the accounts of the contributors to this volume reveal the currency and value of so-called 'indigenous ontologies' which do not necessarily lend themselves to scientific interpretation and analysis, but instead offer alternative ways of being in, engaging with, and understanding the world. (p. 7)

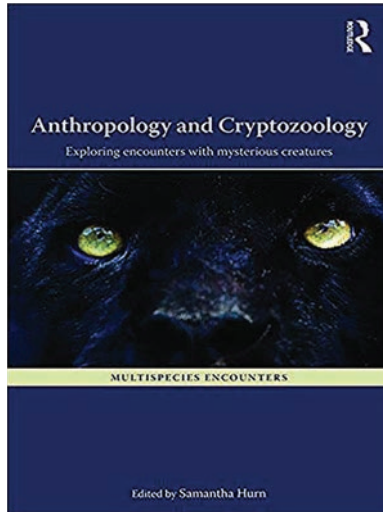
This expands the field of the possible and softens the (implicit or explicit) ethnocentric view.

In the Introduction by Samantha Hurn and the first chapter "The place of cryptids in taxonomic debates" by Stephanie Turner, historical questions and definitional problems of the research are presented. The outlined history of the subject—the International Society of Cryptozoology was founded in 1982, the term "cryptid" was introduced in 1983—shows an increased interest in cryptozoology in recent years. It became, for example, a subject of exhibitions in museums. Furthermore, the archive of Bernard Heuvelman, considered the founding father of cryptozoology, was taken over by the Musée de Zoologie in Lausanne (Switzerland). But questions of validity also are gaining in importance, for example when the astrobiological project Search for Extraterrestrial Intelligence (SETI) and NASA's mission to search for life on Mars are to be attributed to cryptozoological research (p. 19f.). Parallels are clearly visible, at least on a structural level. Turner points to a connection between the increased interest in cryptids and the rapid destruction of animal and plant species by modern civilizations:

The irony here is the post-extinction discovery and documentation of so many species that have been coexistent with humans all along. Despite all of this documented loss, the lack of knowledge of species remains considerable: Estimates for the number of unknown species range from 3 million to as many as 100 million [. . .]. What is more certain, though, is that a mass extinction of all kinds of species, both known and unknown, is currently under way [. . .]. This gap in our knowledge of life forms, along with the rapid rate of their extinction, indicates that an abundance of species may forever remain cryptids, known only to themselves and lost to human history and knowledge. (p. 20f.)

Chapter 2, "Cryptids, classification and categories of cats" by Gregory Forth, and Chapter 3, "Cryptids and credulity: The Zanzibar leopard and other imaginary beings" by Martin Walsh and Helle Goldman, cover comparatively "classical" i.e. zoology-related topics. The first article deals with the question of whether a predatory cat

species exists in an area in eastern Indonesia, which is reported by the indigenous population but whose existence has not been scientifically proven. The author emphasizes the importance of taking eyewitness accounts, including the sometimes very precise descriptions, seriously. The common assumptions of the academic discipline about what is possible and what is not possible should be suspended. He points out the need to consider the indigenous distinctions between the "natural" and the "supernatural" domain.



Walsh and Goldman's contribution explores whether the Zanzibar leopard is extinct or whether indigenous witness accounts of its occurrence should be taken seriously. But at the beginning the authors discuss the "boundary problem" and quote from a cryptozoological handbook by Eberhart (2002) that lists ten categories of "mystery animals" and gives a good impression of the range of "mystery animals" (p. 55). With regard to their own investigation, they stress the inadequacy of a one-dimensional cryptozoological approach ("Do they exist or not?") and note: "[...] we argue that only careful anthropological and ethnozoological research can unravel the complexity of cases like that of the Zanzibar leopard and other so-called cryptids" (p. 56). Using indigenous taxonomies and names as examples, they show how a naïve cryptozoological approach that adopts such concepts without a differentiated knowledge of culture must fail. Some designations do not relate to beings that can actually be observed in nature, but to imaginary beings and refer directly to ideas of witchcraft and supernatural characteristics of such animals.

The authors point to an important aspect that is directly related to the field of cryptozoology. By declaring that a species is considered extinct or does not form a species of its own, conservation programs are discontinued. This shows the ecological and political dimension of the research area, of which I became aware only after reading this book.

In a rather critical look at the community of cryptozoologists, Walsh and Goldman write in their conclusions:

Cryptozoologists form a community with a special interest in speculation about the reality of particular kinds of imaginary being, including species that mainstream zoologists consider extinct. They are notoriously selective, focusing on salient creatures like the Tasmanian tiger but ignoring the vast majority of species that remain to be discovered and/or described by science. Cryptozoologists also typically only make selective use of the methods and literature of anthropology and the specialized discipline of ethnozoology. (p. 80)

As in ufology, in cryptozoology it is necessary to distinguish between the subject and its representatives.

The next two chapters deal with topics that, from a Western point of view, are easily located within the field of magical thinking. The social anthropologist Michael Heneise describes the connection between human species and the tiger through a "soul transfer" in which a man is possessed by a "tiger spirit" or transforms into such an animal, in "The Naga tiger-man and the modern assemblage of a myth" Mette High, also a social anthropologist, reports on the "Wolf people" in Mongolia, who should not be confused with werewolves (Hu man predation and animal sociality: The transformational agency of 'Wolf people' in Mongolia). The chapter offers an ethnographic and historical analysis of the significance of the wolves in Mongolian cosmology, which play a special role in the founding myth of the Mongolian people. But many of the aspects addressed concern topics that are also relevant in other cultures, because the fascination for and ambivalence about the wolf predator are deeply rooted in other cultures (in the European psyche, for example, "Little Red Riding Hood and the Wolf").

Chapters 6 and 7 lead the reader to Benin and South Africa. They thematize mystical beings which, in contrast to the beings in previous chapters, are not based on known species or species that can be easily integrated into the zoological system of order, but are linked to the realm of fairytales and fantasy. Sharon Merz in "Enigmatic bush dwarfs of West Africa" writes about "dwarfs" (*siyawesi*) that can harm and help

humans and are indispensable for divination—“Without the *siyawesi*, the diviner knows nothing” (p. 128). She reports how certain children are selected by the *siyawesi*. They suddenly disappear into the bush, can no longer be found, and then return after a few days or sometimes weeks, well-fed and healthy, but with a different perception that enables them to divine. As part of her field research, Merz came across other events that, from a Western point of view, are understood as potentially paranormal, questioning her own understanding of reality. Referring to her experiences, she quotes Hill:

One limitation to the majority of the research [. . .] is that the scientists do not believe in the reality of the spiritual or psychic world. Discounting the supernatural, all is reduced to sociological or psychological causes. Their theories contain truth, but they are partial explanations. (Hill, 1996, p. 325)

And elsewhere: “Inconsistent responses lead me to doubt the logic of my questions rather than the logic of the African worldview” (Hill, 1996, p. 334).

Penelope Bernard also refers in her text “Suspending disbelief and experiencing the extraordinary” to the *ontological turn* in ethnology, which leads to a “more elastic understanding of reality” and takes indigenous concepts seriously. Her starting point was a series of extraordinary dreams of snakes and “mermaids” which also included concrete location information: “[. . .] what perplexed me was that the dreams offered details of the geographical location of where these aquatic deities were to be found, none of which I had ever known existed or had been to in physical reality” (p. 141). She was told by a Zulu healer that it was now her job to locate the pools, lakes, and springs seen in her dream and visit them. Her amazement was great when she found these places in the real world and heard legends about them. The cryptozoological aspect (“mermaids” and snakes with strange behavior) is rather in the background in this contribution, while the methodological questions of “radical participation” and the difficult objectifiability of working with dreams as data material come to the fore.

The next two contributions, “Mermaids in Brazil” by Bettina Schmidt and “Ganka: Trickster or endangered species?” by Tanya King

also are not decidedly cryptozoological. While the former is a classical contribution of religious studies describing the development and reception of water deities in Brazil, the latter investigates the myths about the sea monster Ganka, which is apparently part of the folklore of shark fishermen. It fulfills a specific social role, as King finds out in the course of her investigation. The author sees her task in preserving the secret of the Ganka myth. She closes: "Obviously [. . .], I see academic value in documenting the existence of the ganka. However, to undertake further research into the ganka may destroy its efficacy on the wharves, and thus the waves, of New Jersey" (p. 182).

Chapter 10, *Far from the madding crowd: Big cats on Dartmoor and in Dorset, UK*, and Chapter 11, *Land of beasts and dragons: Contemporary myth-making in rural Wales*, bring us closer to typical cryptozoological themes, namely the so-called "Alien Big Cats," which have been sighted in Great Britain. These are not about animal species whose existence is unclear or doubted, but which appear in places where they are not supposed to be. Sociologist Adrian Franklin carried out a field study of the sighting of dark, big cats in the south of England, in Dartmoor and in Dorset, in which he conducted 40 interviews with people. One of his goals was to examine the thesis of geographer Henry Buller. According to this thesis, the sighting reports of black panthers were primarily due to the fantasies of city dwellers who, due to the changed environmental conditions—"What we are left with is safe and sanitised nature" (Buller, cited by Franklin, p. 187)—have a need for ferocity from which they can distinguish themselves, "[. . .] we still need the wild" (ibid.). This thesis was mainly based on urban newspaper reports and is strongly questioned by Franklin's findings. The testimonies and opinions he received on-site provide a different, more lifelike picture. He also found plausible explanations for the existence of big cats in the respective areas. Furthermore, he can draw a methodical lesson from his research efforts: "Most of all it reaffirms the value of qualitative fieldwork and ethnography as a corrective to armchair theorizing" (p. 201).

Samantha Hurn, the editor of the volume, treats the "Alien Big Cats" topic from a broader perspective, namely that of the relationship between anthropology and relativism, science and imagination, as they are also the subject of the already-mentioned *ontological turn*

in anthropology. Among other things, her chapter emphasizes the social function of myths—in this case, the relationship between England and Wales. In Wales there were sightings of such alien big cats. In the author's view, the question of the "reality" of such animals is less important than their role as trope or archetypal figure in a politically charged narrative concerning the place of marginalized rural communities in a globalized world" (p. 204). What fascinated me more about her contribution, however, was the fact that her dog was a constant companion during her field study. It was an unusual methodological measure that was very beneficial for access to the rural population, although it was not deliberately used for that reason. She also addresses the problem of "protected communication" (Schmied-Knittel & Schetsche, 2015), which field researchers encounter in the field of anomalistics, i.e. caution and restraint in the reports on extraordinary experiences—many had kept their experiences to themselves precisely because of a fear of how their accounts would be received by others" (p. 206). The fact that the researcher had an uncanny encounter with such a big cat during a night stroll during the time of her field study helped her considerably with the data collection. Here, too, the value of field research is clearly evident, although perhaps not everyone wishes to have a close encounter with the researched object in every case, as happened here.

In the last chapter, "Digging 'cryptid' snakes," written by Luci Attala, the field of cryptozoology is, in my opinion, largely abandoned, because it deals above all with the symbolic and archetypal quality of the (giant) snake and the often-reported snake encounter after the intake of the psychotropic substance ayahuasca. This author also refers to the *ontological turn* in anthropology, according to which hallucinatory visions are regarded as real, comparable for instance with the "psychic reality" of Jungian archetypes.

I think the contents of this book and its different thematic emphases make clear the discomfort of some anthropologists with a scientific view, according to which "nature" is treated as *an objective reality*. It is almost obvious that one can find here a natural alliance to the field of cryptozoology. At least, if you take it in an expanded understanding that goes beyond the simple "Show me the Sasquatch corpse," as the editor of this book does:

Cryptozoology is not, therefore, just the search for animals that are unknown to science. It can and should be about the process through which cryptids come to be known, and they come to be known by the variety of means by which we come to know about any other being in the world. (p. 213)

Through this broad (and for many: extended) perspective on the subject, texts are presented that do not consistently meet the expectations of a hardcore cryptozoologist. However, they represent a collection of contributions that can also inspire readers with non-specific cryptozoological interests by addressing epistemological questions as well as fundamental problems of ethnocentrism.

NOTE

- ¹ <https://en.wikipedia.org/wiki/Cryptozoology> Even if more balanced positions are added, skeptical opinions repeatedly emphasize a pseudo-scientific status for this research field and equate the researchers with, for example, creationists, Holocaust deniers, and UFO kidnappees.

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BOOK REVIEW

Galileo's Error: Foundations for a New Science of Consciousness by Philip Goff. Pantheon, 2019. 256 pp. \$24.49 (hardcover). ISBN 978-1-5247-4796-1.

REVIEWED BY GEORGE R. WILLIAMS

Takoma Park, Maryland
grwilliams@gmail.com

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A new book by Philip Goff, *Galileo's Error: Foundations for a New Science of Consciousness*, accomplishes a number of notable things. Perhaps foremost, Goff provides an excellent overview of the debate on consciousness for a wide audience with little or no background in philosophy. He guides the reader through the various frameworks that include dualism, physicalism, and panpsychism. Goff's *Galileo's Error* thus provides an excellent introduction for anyone with interest in the growing science of consciousness. However, Goff does promote a particular angle. As a professor of philosophy at Durham University, Goff has followed the arguments of David Chalmers and others that materialistic explanations ultimately fail to explain consciousness. Like Chalmers, Professor Goff believes that in order to find a successful explanation, we will likely choose a direction that takes consciousness as fundamental in some sense. Toward this end, Goff has also become a leading advocate for panpsychism, the view that the ultimate particles that constitute our world have a mental aspect.

However, Goff's book also provides an important contribution regarding the philosophy of science. By examining science's development at an early stage, especially Galileo's role, Goff addresses an important aspect to the current debate on consciousness. And attention on the role of philosophy in science is also important, given the recent bashing philosophy has been handed by some scientists. To

make progress on consciousness, Goff argues we will likely need to do some hard thinking and reexamine some of our core assumptions. He provides many examples to demonstrate that often what is required is time spent thinking and rethinking the problem, perhaps in contrast to voices who emphasize just getting on with the lab or field work.

But what exactly is Galileo's error, you might be wondering? Most of us recognize that Galileo played a pivotal role in ushering in the scientific revolution through emphasizing testing theories by observation. But as Goff notes, central to Galileo's contribution was his emphasis on specific characteristics that could be quantified—size, shape, location, and motion. And this meant removing such qualities that we experience directly, such as taste and smell, out of the domain of inquiry. That is, Galileo pragmatically sought to remove inherently subjective matters that could not fit into a quantitative framework. This has brought mixed fruit. Science, as conceived by Galileo, is widely seen as one of the most successful developments in the history of thought. The focus on subjects that could be analyzed mathematically has led to true triumphs in understanding as well as abundant applications that have transformed the physical world.

But the problem of consciousness remains. This is a bigger deal than is often recognized. All meaning and value in our lives are intimately bound with consciousness. All the wonders of the universe have no value if no one experiences them. And Goff argues that Galileo's contribution has arguably made making progress on consciousness more difficult. That is, conventional assumptions and methods stemming from Galileo's influence are designed to tackle particular domains in our world where they are best-suited. Thus, science has been most successful in areas that fit within the constraints suggested by Galileo. And these are areas where the behavior of objects can be carefully tracked and characterized quantitatively. However, Goff argues that any optimism that conventional theories and methods will eventually resolve the problem of consciousness is entirely misplaced. This is not to say that materialism must be wrong (although Goff does make this case later in the book). But it is to say that success in areas such as physics, chemistry, and geology by no means guarantees success in other areas, such as consciousness, where the qualitative play a more important role.

Stanley Klein (2015) has recently made a similar argument. He notes that the field of psychology relies strongly on quantitative and objective methods that remove crucial information around the inherently subjective aspects of experience. Arguing for “experiential realism,” Klein makes the case for treating mental experience on its own terms.

After establishing this important context, Goff then examines the various classes of explanations for consciousness as they currently stand, which include dualism, physicalism (materialism), and panpsychism. As I’ve noted, Goff does an excellent job of making the material accessible to a wide audience. Although its intended audience is much wider than philosophers, there is more depth and subtlety to the reasoning than you might expect. Goff presents an excellent introduction to a wide range of topics, theories, and schools of thought that hope to shed light on consciousness. These include integrated information theory, the Turing test, Searle’s Chinese Room thought experiment, quantum mechanics, and much more. He also introduces the reader to a wide range of philosophers with strongly differing views. These include committed physicalists (Daniel Dennett and Patricia Churchland), panpsychists (Thomas Nagel and Galen Strawson), and dualists (David Chalmers and Martine Nida-Rümelin). As Goff shares some of his debates with the likes of Dennett and Churchland, he often guides the reader on the subtleties for both sides of the argument. But Goff also eventually brings some emotional weight to his views—that is, why it all matters. This is very far from a dry treatise built around solely abstract reasoning.

Of all the approaches to account for consciousness, dualism has perhaps been the most important historically.¹ As Goff puts it, “According to dualism, a human being is a kind of composite entity: a combination of a physical body and a immaterial mind” (p. 27). As he notes, it is a very natural way to think about ourselves. Our experience of the world seems to include both physical and mental (or spiritual) aspects. And dualism appears to fit well with most religions, which posit a spiritual reality beyond this physical world. One common argument against dualism is the problem of explaining how two fundamentally different substances—matter and mind—interact. That is, how to explain the causal connection between the mind and the

brain. However, Goff explores the subtleties here that extend beyond undergraduate philosophy classes. He notes that physics, typically silent on fundamental causal explanations, still escapes modern explanations for gravity and electromagnetism. As the philosopher David Hume argued, we remain ignorant of fundamental causal relationships of the world. Thus, the inability to discern causal relationships is not confined to dualism; this remains a problem for physicalism as well.

Nevertheless, as Goff discusses, most philosophers and scientists do not favor dualism because of the widely held belief that the physical world is causally closed. As Goff explains, dualism implies that some immaterial entity, perhaps a soul or immaterial mind, somehow influences the neurons in the brain. This suggests that some electrochemical processes in the brain would occur without physical causes. But evidence for such anomalous activity without causes has not been found. Another unappealing feature of dualism is its uneconomical ontology; positing two fundamental substances (instead of one) does not present a relatively parsimonious framework.

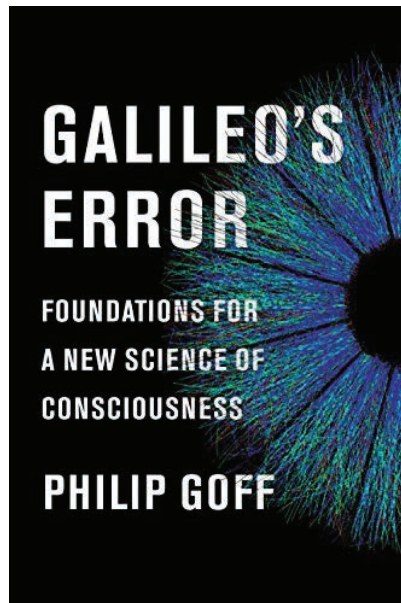
However, Goff does survey some scientists and philosophers sympathetic to dualism. As it happens, quantum mechanics remains poorly understood and suggests something of an opening for dualists. As Goff notes, the measurement postulate of the conventional (Copenhagen) framework is sufficiently vague that one might posit consciousness playing some role in the wave function's collapse. This theoretical possibility was first discussed in 1939 by Fritz London and Edmond Bauer, and later explored by Nobel Laureate Eugene Wigner in 1961. Later, in the 1990s, physicist Henry Stapp explored how the von Neumann split inside the brain triggers a wave function collapse. Most recently, David Chalmers and Kelvin McQueen presented an interpretation that posits some properties closely linked with consciousness never enter into quantum superposition. This section of Goff's book will likely be useful for those sympathetic to "consciousness collapses the wave function"-style explanations of quantum mechanics.

I suspect that those familiar with the literature on psi and near-death experiences will object to Goff's claim that we lack anomalous data that would support dualism. And of course, Goff doesn't discuss such categories of anomalous data at all. (Few scientists or philosophers seeking a mainstream audience do.) However, when Goff here speaks

of anomalies, he is addressing only the lack of evidence for non-causally closed neuronal activity that might suggest immaterial mind or soul affecting the brain. Goff must assume that neuroscience is currently in a position to test the relationship between neuroactivity in the brain and some sort of nonphysical entity (soul perhaps). This might indeed be difficult to test in some cases. For example, let's consider a notion of the brain as filter, perhaps along the lines suggested by F. W. H. Myers and others. And let's consider further that the interface between this

brain as filter and some nonphysical entity is inherently holistic. Thus, we have not a narrow portion of the brain responsible for the link, but rather perhaps the brain as a whole. Such a prospect does not seem implausible to me if we are taking the prospect of dualism seriously. (Nevertheless, I do find the unparsimonious nature of dualism unpalatable.) In any case, Goff's view on this is most likely consonant with the vast majority of neuroscientists and philosophers of mind.

Goff then turns to materialism, which currently holds a dominant position among most scientists and (perhaps) philosophers. One particularly common view consistent with materialism is that the progress of neuroscience gives us compelling evidence that we will eventually understand consciousness as the result of processes within the brain. And he notes that advocates of this view are often dismissive of philosophical arguments, which often rely on thought experiments. But Goff notes that materialistic theories based on activity of the brain's neurons cannot disentangle correlation from causation. And he proceeds to make clear to the reader the potential power of thought experiments. Goff reminds us that thought experiments have played crucial roles in scientific breakthroughs, such as Einstein's imagined voyage riding on a photon. Less well-known, but perhaps more



powerful, is a thought experiment worked out by—drumroll, please—Galileo! Goff walks us through Galileo’s thought experiment that led him to cast aside Aristotle’s theory that heavier objects fall faster than lighter ones. Thus, Galileo did not usher in a new understanding of gravity by dropping balls from the Leaning Tower of Pisa (as the story goes) but by thought experiment. Arguably, the father of empirical science made one of his greatest achievements not by empirical testing but through thought experiment.

There are two primary thought experiments philosophers of mind have used against physicalism. These are known as the knowledge problem (about a brilliant neuroscientist named Mary who lives in a black and white room) and the conceivability problem (which invokes philosophical zombies that behave exactly like normal people but possess no conscious experience). As Goff demonstrates, these arguments flesh out how the conceptual resources of physicalism fall short of being able to explain consciousness. The elegant, yet objective, theories that explain the physical world simply provide no room for subjective experiences or the qualitative aspects of the world. This limitation was more or less the price of Galileo’s move to allow only a world that could be described in quantitative terms.

Goff also introduces us to illusionism, perhaps an unusual view among physicalists. Advocates of illusionism—the best-known is Daniel Dennett—argue that in an important sense, our conscious experiences are not real, but instead are best understood to be illusory. However, here they are not speaking about a tendency to be mistaken about the contents of our experience; instead, they assert that we are mistaken about whether we are actually having a truly phenomenal experience in the first place. (I confess, I still can’t quite wrap my head around this claim.) Another influential advocate of illusionism is Keith Frankish.² Unlike other physicalists, Frankish happens to agree with Goff that our conventional scientific understanding cannot account for conscious experience. However, from that point of agreement, Frankish chooses a radically different direction from Goff: He denies the reality of our conscious experience. Frankish, Dennett, and other advocates of illusionism deny conscious experience as a fundamental datum to be explained.³ They argue that we cannot put weight on this sort of data the way we can on that data gathered via conventional, third-person,

objective methods. They generally note that there are many ways we are mistaken about the contents of our experience. Given that the only sort of data we have on conscious experience is 1) inherently unreliable and 2) appears to fit our current theories poorly, the most prudent move is to dismiss the subjective nature of experience. For illusionists, a key advantage of this move is that radical moves, such as dualism or panpsychism, can be avoided. However, Goff argues that this view is ultimately incoherent, as we require our conscious experiences to obtain the data that all science is based on.

The third alternative framework Goff explores, and the one for which he advocates, is panpsychism. Recently, there has been a revival of interest in panpsychism, and a key reason for this is a renewal of attention on Bertrand Russell's arguments on the intrinsic aspect of matter. Less well-known is the contribution made by Sir Arthur Eddington, on whom Goff focusses greater attention. Throughout much of the 20th century, when materialism achieved dominance, these ideas of Russell and Eddington were mostly cast aside or forgotten. But with a growing acceptance of what philosopher David Chalmers has termed the *hard problem*, these arguments are attracting considerable attention. For Goff, to achieve a post-Galilean science that can include consciousness, these arguments of Russell and Eddington will likely play a critical role.

The first component of the Russell-Eddington view has to do with a more perceptive understanding of physics than how it is often portrayed in the popular press. Physics is generally understood as providing a complete understanding of our world. Although it is rarely acknowledged, something important is left out. That is, our scientific methods leave us ignorant about the intrinsic aspect of our world. While the mathematical laws that constitute physics provide us with an excellent characterization of how such ultimate constituents as mass, spin, and energy behave, it does not reveal what such constituents ultimately are. In other words, physics tells us about the causal structure of the world, but leaves us ignorant about what ultimately the structure is based on.

Within general relativity, mass is captured in reference to the curvature of space. Within a more Newtonian context, mass is depicted as resistance to acceleration. That is, mass is ultimately defined in terms of other basic entities, which in turn also are defined relationally.

Thus, the most basic constituents are ultimately presented in terms of relationships to the other constituents. But this view leaves us empty about whatever grounds these relationships. In sum, physics gives us a sophisticated and useful framework to predict the behavior of the physical world, but it does not deliver for us an understanding of the intrinsic aspect of reality.

Russell had an intriguing insight about what this intrinsic element might be: consciousness. Our perception or direct experience is the only thing we have knowledge of outside the abstract relationships of physics. Russell argued that this most intrinsic aspect was neutral with respect to mental or physical properties. This view, known as neutral monism, was championed by Russell and his contemporary William James. However, Eddington took the view that this intrinsic element possesses mental properties, and this leads to panpsychism. Although a number of notable philosophers of mind currently advocate some version of neutral monism, I believe most find panpsychism more appealing. This leads them to consider the possibility that the particles that our world comprises may possess some degree of consciousness.

This framework on the intrinsic aspect of the world has some highly attractive features for those unsatisfied with physicalism. The Russell–Eddington argument escapes the previously mentioned problems faced by dualism and physicalism. We have good reason to think that the physical world is ultimately grounded by something, but physics does not reveal what this might be. We do have acquaintance with something intrinsic, our conscious experience, which, as it happens, we currently struggle to find a way to place in the physical world. An elegant solution is to solve both problems with one move: Place consciousness as the intrinsic aspect that grounds our world. But this framework also faces its challenges. Most applications of this argument lead us to consider whether subatomic particles possess some rudimentary degree of consciousness. The notion that even electrons might be conscious is unpalatable to many. However, many philosophers of mind are more concerned about the combination problem: How do we explain how sentient particles combine to create the rich conscious states with which we are familiar. Goff surveys a number of promising approaches that might help panpsychism overcome this obstacle.

I submit there is another area of panpsychism deserving of

attention that Goff omits here: cosmopsychism. This view builds on Schaffer's (2010) argument that we should understand the universe as a fundamental whole that is ontologically prior to all its parts. Schaffer's argument is based on our understanding of quantum entanglement, that the most basic properties and constituents that our reality comprises are ultimately nonseparable, a fundamental whole at the level of a universal quantum field. Arguably, applying the arguments of Russell and Eddington to this universal quantum field leads us to a universal consciousness; all conscious beings in the universe are thus aspects of this conscious cosmos.⁴ As it happens, Goff (2017) has done excellent work in this area as well, which he discusses in some depth in his more academically oriented book *Consciousness and Fundamental Reality*. Unfortunately, this version of panpsychism is left out of *Galileo's Error*. But to be fair, cosmopsychism is arguably a minority view within panpsychism, which in turn is currently a minority view among philosophers of mind. Perhaps Goff was a bit wary of drawing the "incredulous stare" in a book aimed at a broad audience.⁵

I suspect some readers will hold some interest in cosmopsychism. A framework where our consciousness is ultimately rooted in the nonlocal, higher-dimensional "space" of the quantum field holds some promise for understanding the psi data. Perhaps we might understand examples of anomalous cognition such as telepathy and remote viewing through such a nonlocal field through which we are linked. The physicist David Bohm (2006) suggested that precognition might be understood as an ability to be aware of potentialities from this foundational field. Bohm also speculated that the nonlocal, high-dimensional space of the wave function was likely a neutral foundation for both consciousness and matter (neutral monism).⁶

Given the deep problematic nature of determining the right framework for understanding consciousness, one might ask: Why does it matter? One of the pleasant surprises of Goff's book is his exploration of the contribution panpsychism might make toward a greater sense of meaning. He suggests that alternative frameworks such as dualism and materialism encourage a sense of disconnection with our world. In the case of dualism, our soul or consciousness is commonly depicted as tenuously connected to the physical world. Descartes famously believed non-human animals were mere mechanisms. Materialism

also arguably fosters a view of the world as mechanistic from which we feel separated. Goff suggests this sense of separateness from our environment has contributed to a crisis of meaning. But panpsychism appears to offer a profound reorientation, according to Goff. The world is teeming with consciousness, including in places we have not yet imagined. To explore this possibility, Goff briefly reviews a growing body of fascinating evidence on communication between plants within forests. Rather than being something of an anomaly occurring only in our brains, panpsychism supports a view where consciousness is ubiquitous.

For Goff, panpsychism has implications in other areas of vital interest. The possibility that consciousness exists at fundamental levels suggests that our experience of free will may not be illusory, as more conventional theories often suggest. First, he argues why conventional arguments against free will are substantially less compelling than is typically thought. Then, he explores how sentient particles may possess some degree of agency, and this in turn suggests that higher forms of life, who have richer conscious experiences, may possess free will. Goff also explores how panpsychism (depending on what physics theories turn out to be correct) may ultimately affirm what the mystically oriented have described as a deeper reality where our consciousness is connected. This suggests for Goff a stronger foundation for moral truth and ethics. That is, a deeper reality of nonlocality or oneness suggests a stronger basis for compassion and selfless acts than what can be obtained from more materialistic theories. Further, Goff raises the possibility that this deeper, more profound level of consciousness may support some aspect of our being surviving bodily death.

Overall, Goff provides a highly accessible wealth of ideas on consciousness that genuinely attempts to expand our notion of what science can be. And his explorations suggest this might bring not only a richer understanding of the world, but also a greater experience of meaning.

NOTES

- ¹ Goff here focuses on substance dualism, rather than on property dualism, and he characterizes property dualism as the view that all things are physical, but some of these physical things (such as our

brains) have physical and non-physical characteristics or properties. However, we should perhaps recognize alternative versions that arguably fit with such anomalous data such as OBEs and accounts of past life memories. For this, we might see some kind of intrinsically undifferentiated “stuff” that is the basis of the physical or the mental, neither of which reduces to the other. Thus, property dualism might remain monist (in contrast to substance dualism) while also avoiding privileging either physical or mental kinds of stuff.

- ² Frankish is good friends with Goff, although the two remain polar opposites in their respective theories. As of this writing, the two have aired quite a few debates on Twitter, providing their Twitter followers with contrasting perspectives on consciousness.
- ³ It might interest some to note that Frankish, in making his argument to deny the reality of consciousness, compares conscious experience to psychokinesis. Psychokinesis, Frankish argues, is more likely the result of a mistake or a trick rather than something real that needs to be explained through a radical change in our scientific understanding of the world. And it is similarly the case with consciousness, he argues (Frankish, 2016, pp. 12–13).
- ⁴ Arguably, cosmopsychism has the resources to avoid the combination problem. However, it faces another obstacle, which is the decombination problem: how different kinds of conscious states arise from a conscious cosmos.
- ⁵ To be doubly fair, Goff discusses what might be described as a close cousin to cosmopsychism later in the book in a section entitled *Spirituality Naturalized* (pp. 206–210).
- ⁶ I’ve recently explored a panpsychist version of Bohm’s implicate order that I believe fits well with the psi data (Williams, 2019).

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