

## COMMENTARY

### Blind Watchers of Psi: A Rebuttal of Reber and Alcock

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**Abstract**—Parapsychology will only be accepted as part of mainstream science if physics can be extended to accommodate at least some so-called psychic phenomena. This paper disagrees with the argument of Reber and Alcock that these phenomena can be excluded a priori because they are incompatible with physics. On the other hand, it agrees with their claim that the phenomena cannot be explained in terms of *current* physics (e.g., relativity theory and quantum theory). Rather one needs an extension of physics which amalgamates these theories, this being an aim of mainstream physics anyway, with the new theory also linking to consciousness if this is regarded as a fundamental rather than incidental feature of the universe. One possible extension involves the idea that phenomenal space and physical space are amalgamated as part of a single 5-dimensional structure, the extra dimension being associated with mental (rather than physical) time. Such a model may be required to accommodate even *normal* mind, and incorporating further dimensions might then allow some *paranormal* phenomena. This could also relate to the extra dimensions invoked in some models of particle physics.

#### Introduction

During an evening walk in 1572, the astronomer Tycho Brahe noticed a bright light in the sky and his subsequent observations showed that its apparent position did not change as the Earth moved around the Sun. It therefore had to be at a great distance (outside the solar system) and it turned out to be an exploding star (a supernova). However, his claim was dismissed at the time because it contradicted the prevailing Aristotelian view that the heavenly spheres were the unchanging domain of the divine. Frustrated by those who had eyes but would not see, Brahe wrote: “O crassa ingenia. O coecos coeli spectators” [Oh thick wits. Oh blind watchers of the sky].

I thought of this story when I read the paper by Reber and Alcock (2019),

henceforth RA—indeed it inspired my title. I would not describe these gentlemen as “thick wits,” and it is good that they are at least “watchers,” in the sense that they follow the literature of the field, but they seem to be blinded by their commitment to an outdated view of physics. Actually their paper should be compulsory reading for all students of psychical research—not because of its conclusion (which is flawed in my opinion) but because it illustrates how reasoning can be befuddled by preconceptions. Of course, I have my own preconceptions and may also be befuddled but at least I have studied the evidence and appreciate the need to act like a judge (who is impartial) rather than a barrister (who presents only one side of an issue).

Of course, there are numerous papers attacking parapsychology, but this one is of particular interest because it purports to reject psi on the basis of *physics*. Since I am myself a physicist who has been interested in parapsychology for more than 50 years, I disagree strongly with this claim. Indeed, the purpose of this article is not to argue for the reality of psychic phenomena, since that can be found in the original article by Etzel Cardeña (2018), but to rebut the assertion that they can be excluded a priori on the grounds indicated by RA. On the other hand, I agree with some of their points, and it must be stressed that some parapsychologists are equally keen to sever any connection between psi and physics.

Even though I disagree with RA’s conclusion, the fact remains that many of my physics colleagues (including some much more eminent than I) share their opinion and this has always bothered me. There are well-known exceptions, Cardeña mentioning some of them, but they are a minority. For example, my friend and (very smart) Ph.D. supervisor Stephen Hawking was skeptical of psi, even though he had read J. B. Rhine’s books as a teenager. Of course, being smart is no guarantee of being correct and I console myself with the thought that I have studied the evidence more deeply and had experiences that my skeptical colleagues lack. Nevertheless, belief is a complicated process and spending half my time with people who take the existence of psi for granted and the other half with people of the opposite conviction (some even within the parapsychological community) can be perplexing. It is therefore important to understand the antipathy of physicists (even when it is represented by non-physicists like RA) and react to it respectfully, because I don’t believe parapsychology will become part of mainstream science until it has been embraced by physics.

In this context, I should explain that I have my own model of how to expand physics to accommodate at least some phenomena labeled “psychic,” and I will briefly touch on this later. Of course, the model is very speculative and may be wrong but at least it shows how physics might in principle be extended. And it is really no more speculative than some of the

ideas I have studied in my professional field of cosmology. However, while I can publish papers on the latter in mainstream physics journals, I doubt that I could ever publish my ideas about psi there. This does not mean that my cosmological ideas have been exempt from criticism. When I published one of the first papers on the anthropic principle in *Nature* with Martin Rees 40 years ago (Carr & Rees, 1979), it was dismissed by many colleagues as mere philosophy. However, with the growing popularity of the multiverse proposal (Carr, 2007), it has now become almost mainstream, so perhaps a similar change may happen in psychical research. The context is different but the sociological factors are the same.

To end this Introduction on a positive note, I should point out that there is evidence that physicists may be more open to the existence of psi than psychologists: A survey of U.S. and Canadian academics some decades ago found that 55% of physical scientists thought psi was possible, compared with 34% of psychologists (McClenon, 1982). Another welcome development is that, in addition to the specialist parapsychological journals, there are now a number of more general science journals that include articles about parapsychology. These include the *Journal of Consciousness Studies* (which in 2003 and 2005 devoted entire issues to parapsychology) and the *Journal of Scientific Exploration*.

The plan of this paper is as follows. The next section gives a historical overview of the antipathy of physicists to psychical research. The section following that analyzes the basis of this antipathy, and then “Reasons for Connecting Psi and Physics” argues that a link between psi and physics must nevertheless be forged. The following section addresses some of RA’s criticisms, and the one after that, “Hyperspatial Models as a Possible Extension of Physics,” provides a brief overview of my own attempt to extend physics using the “hyperspatial” approach. The last section concludes with some final thoughts.

### **Historical Overview of Antipathy from Physics**

From the earliest days of psychical research, physicists who took the paranormal seriously and tried to link it to their professional field attracted hostility from their mainstream colleagues. William Crookes’s publications on the subject were ridiculed, even though he was a most distinguished physicist and later became President of the Royal Society. His observations of materializations during experiments with Florence Cook were even attributed to poisoning by thallium—the element he had discovered! Oliver Lodge received a lot of criticism for publishing a paper on telepathy in *Nature*, and William Barrett’s attempts to set up a committee of the British Association to investigate the subject were rejected outright.

Many physicists are antagonistic toward parapsychology in modern times. When the AAAS (American Association for the Advancement of Science) hosted a symposium on psi and physics in 1979, this attracted intense opposition from John Wheeler, who attempted to eject the Parapsychological Association from the AAAS with the battle-cry “Drive the pseudos out of science. . . . Where there’s smoke, there’s smoke” (Wheeler, 1979). At the time I happened to be his guest (in my cosmological capacity) in the Department of Physics at the University of Texas in Austin, but discretion got the better part of valor and I did not voice my disagreement too strongly!

More recently, Gerard ’t Hooft, who won the Nobel prize for physics in 1999 and runs an anti-parapsychology website, has stated (’t Hooft, 2000):

Modern physics seems to offer leeway to the paranormal. As a theoretical physicist, I must assert most emphatically that this leeway is only apparent. There is absolutely no way one can explain the paranormal in this fashion.

The aversion of some physicists to parapsychology was vividly illustrated some years ago by a furor involving the Society for Psychical Research’s Nobel Laureate Brian Josephson. In October 2001 the UK Post Office issued a set of stamps commemorating the centenary of the Nobel Prize. This was accompanied by the publication of a brochure in which various UK laureates—including Josephson—were asked to provide a brief commentary on the area involved in their discovery. Josephson’s suggested that quantum theory may one day lead to an understanding of telepathy and the paranormal:

Quantum theory is now being combined with theories of information and computation. These developments may lead to an explanation of processes still not understood within conventional science, such as telepathy, an area where Britain is at the forefront of research.

This provoked some hostile responses. An article in the *Observer* contained an onslaught from the renowned quantum physicist David Deutsch, who dismissed Josephson’s claims outright:

Telepathy simply does not exist. . . . The evidence for its existence is appalling. . . . The Royal Mail has let itself be hoodwinked into supporting ideas that are complete nonsense.

Other skeptics soon joined the fray. In the same *Observer* article, the previous year’s physics Nobel Laureate, Herbert Kroemer, declared: “Few of us believe telepathy exists, nor do we think physics can explain it.”

Another prominent critic is Sean Carroll, influential because of his many excellent popular books on physics. RA cite a blog in which he rejects psi on the grounds that there are only two long-range forces strong enough to influence macroscopic objects—electromagnetism and gravity—and these could not possibly explain phenomena such as spoon-bending, telepathy, and telekinesis (Carroll, 2008). I agree with that conclusion but disagree with the assumption that psi is an ordinary force. Whatever form of extended physics is required, and some may not even want to call it “physics,” it is surely radically different from current physics. George Williams, another contributor to this *JSE* issue, discusses Carroll’s criticisms in more detail.

Some prominent psychical researchers have been equally uncomfortable with the attempts to link psi and physics. To quote the late John Beloff (1988):

The attempt to reconcile physics and parapsychology is misguided. Asking for an explanation of the mind–matter interaction could only lead to an endless and profitless regress.

This view is supported by Carroll Nash (1986):

In the sense of being independent of space, time, and physical causality, psi is non-physical. Physical causality presumes transmission of energy over time and space between the interacting bodies . . . psi’s apparent independence of physical causality suggests that, for it, cause and effect may be simultaneous. That psi is not a physical force in the classical sense is indicated by the failure of metal chambers and Faraday cages to prevent its occurrence.

J. B. Rhine was skeptical of a physical theory of ESP for similar reasons, and the evidence that psi is space-independent has become stronger since these pronouncements. However, I will argue later that these arguments derive from a misunderstanding of what is entailed in the term “physics.” Although the current “materialistic” physics could not accommodate psi, a new type of “extended” physics might still do so.

Note that Beloff goes even further and suggests that psi may be completely anarchic, in the sense that it obeys no laws at all, which would exclude it from the domain of science altogether. That the existence of psi is fundamentally at odds with the natural sciences is also advocated by MacKenzie and MacKenzie (1980). However, the purpose of psychical research has always been to demonstrate that natural law can be extended to include psi and not to throw the ball back into the court of the “supernatural.” Also, chaos theory and non-linear dynamics have taught us that what appears

anarchic at one level may turn out to have a discernible pattern at another level. Since the scientific enterprise—and more specifically physics—has been so successful hitherto, it surely behooves us to try to push its limits as far as possible.

### Reasons for Physicists' Aversion to Psychical Research

In this section, I will discuss some reasons for physicists' antipathy to psychical research, since any rapprochement will require that these issues be addressed.

(1) One obvious factor is doubts about the strength of the evidence and the fact that—according to an influential paper by Irwin Langmuir (1989)—parapsychology shares many features of pathological science. He lists these as follows: (i) the maximum effect is barely detectable; (ii) many measurements are necessary because of the low statistical significance of the results; (iii) fantastic theories are constructed contrary to experience; (iv) criticisms are met by ad hoc excuses; and (v) the ratio of supporters to critics rises to near 50% and then gradually falls to zero. Perhaps some episodes in the history of parapsychology provide examples of this, but Cardeña's article demolishes the view that the whole field can be characterized in this way. In fact, most areas of science exhibit Langmuir episodes, and there is a particularly severe reproducibility crisis in the psychological sciences (Pashler & Wagenmakers, 2012).

(2) Many physicists reject psi because they feel it would be incompatible with physics. Thus, after his brief foray into metal-bending, John Taylor (1975) remarked:

There is a clear contradiction between science and most supernatural phenomena. . . . The entire edifice of physics would have to be reconstructed from the ground up if it had to embrace psi phenomena.

This view is clearly shared by RA. However, as emphasized by Stephen Braude's Editorial in this issue, one must distinguish between what is *compatible* with physics and what is *explicable* by it. Many psi phenomena may be irrelevant to physics, and even telepathy might be if one adopted a dualist philosophy in which mind/mind interactions do not reduce to brain/brain interactions. The problem is that many psychic phenomena *do* apparently involve an interaction with the physical world and at first sight appear to violate the cherished notions to which RA allude. I will address their specific concerns later but the general point is that physics regularly undergoes paradigm shifts, and that many physical laws, once assumed to be sacrosanct, are now known to be violated. For example, parity and

baryon conservation need not always pertain, and some classical laws are routinely broken in quantum theory. RA are clearly enamored of the materialist mechanistic view of physics, but that was abandoned long ago, even by physicists who are completely skeptical of psi.

(3) Some critics claim that psi cannot be real because standard physics seems to work so well, both relativity theory and quantum theory—the cornerstones of modern physics—having been confirmed with extraordinary precision. However, even mainstream physics accepts that both relativity theory and quantum theory must be modified in any final theory of quantum gravity, so the current paradigm is indisputably incomplete, and precision tests in the standard context may be irrelevant. But if our current model is incomplete, how can we be sure that the final one will not accommodate psi? For example, it is not inconceivable that the marriage of quantum theory and relativity theory (i.e. quantum gravity) will describe modes of interaction or information transfer that are currently unexplained. However, the other side of the coin—and here I agree with RA—is that one cannot expect a theory of psi to be based on relativity or quantum theory alone. Note that quantum gravity effects are likely to involve energies on the order of Planck scale  $10^{19}$  GeV, which is very large relative to elementary particles. However, it corresponds to a rest mass of only  $10^{-5}$ g (viz. a grain of sand), so it is not large in comparison to macroscopic laboratory effects.

(4) The fact that physical psi effects (i.e. psychokinesis) are expected to be very small is important in the context of another criticism of psi: If consciousness really can affect the physical world directly, why does it not show up in ordinary physics experiments, where the sought effects are often tiny? This point is justifiably emphasized by RA and it is also stressed by Bunge (2008). For example, the detection of gravitational waves by the LIGO (Laser Interferometer Gravitational-Wave Observatory) experiment involves displacements of a thousandth the size of a proton (Abbott et al., 2016). So if consciousness can exert forces sufficient to levitate a table or bend a spoon, why does it not influence a host of physical experiments? Although the energy involved in the displacement of the LIGO mirrors is quite large (Grote, private communication), this argument is a genuine concern and certainly precludes explaining psi through the sort of field or particle interactions familiar to current physics. Rather one would need some type of field that transcends the usual space–time description. This is not inconceivable, since there are several physical theories of this kind. This criticism is also important because it suggests that there could be experimenter effects in physics similar to those claimed in parapsychology (cf. the Pauli effect on laboratory equipment).

(5) A deeper reason for antipathy is that many psychic phenomena

involve *consciousness* and physicists have long been uncomfortable with attempts to incorporate even normal aspects of consciousness (let alone paranormal ones) into physics. This is because the contents of consciousness are intrinsically private, whereas physics deals with what is in the public domain. Brian Pippard, for example, even though he was open to the possibility of psi, argued that consciousness will be forever outside the domain of physics (Pippard, 1988):

If the existence of these phenomena is doubtful, it is because the evidence is scanty and often of dubious provenance, it is not because they cannot be invoked in physical terms. They involve after all, a class of system beyond the scope of physical theory—that is to say, conscious human beings. I do not say consciousness is not at this time understood from the laws of physics—I say it cannot be so understood.

Certainly physics in its *classical* mechanistic form cannot incorporate consciousness. However, the classical picture of physics has now been replaced by a quantum one and there are some indications—albeit controversial—that this *can* include consciousness. Also many physicists are uncomfortable with attempts to formulate a Theory of Everything (TOE) without any reference to this. Thus Roger Penrose (1989) anticipates that “our present picture of physical reality is due for a grand shake-up, even greater perhaps than that provided by present-day relativity and quantum mechanics,” while the linguist Noam Chomsky (1975) asserts that “physics must expand to explain mental experiences.” It is certainly conceivable that some future paradigm of physics will make an explicit link with mind and this might well come in at the level of quantum gravity (Penrose 1997). We cannot be sure that such a paradigm would accommodate paranormal phenomena—certainly neither Penrose nor Chomsky would advocate this—but one cannot exclude this possibility. Indeed, it is possible that any extension of physics that includes consciousness will be the thin edge of a wedge that also accommodates psi.

### **Reasons for Connecting Psi and Physics**

Having tried to refute some of the objections to linking psi and physics, in this section, I will present arguments for why one should try to forge such a link.

(1) Incorporating psi into physics would be good for psychical research. An essential feature of any branch of science is that it must involve some *theory* to explain the observations, so if psychical research is to qualify one needs a theory for psi. This is why understanding its properties is

more important than just accumulating statistical proof of its existence. In particular, Henry Margenau (1985) urged:

No amount of empirical evidence, no mere collection of facts, will convince all scientists of the veracity and the significance of your reports. You must provide some sort of model: You must advance bold constructs . . . in terms of which ESP can be theoretically understood.

There are several historical precedents for this. For example, Alfred Wegener's idea of continental drift was not accepted for several decades because there was no theory to explain it. Although it is not inevitable that a theory for psi has to come from physics (rather than from biology, say), it would seem most natural to use the model of the world that already exists and has proved so successful. Also, most scientists adopt a reductionist view, in which the sciences form a hierarchy with physics at the base, so—regardless of whether this is correct—it seems unlikely from a sociological perspective that psi will ever be accepted by mainstream science until it is founded on a theory that connects with physics. Certainly physicists themselves will not accept psi until this happens.

(2) Incorporating psi into physics may be good for physics. Dean Radin (1997) makes this point forcefully:

Physicists who have retained some humility in the face of nature's mysteries are interested in psi because it implies that we have completely overlooked fundamental properties of space, time, energy, and information. Specifically, psi suggests that the conventional boundaries of space and time can be transcended by the ephemeral concept of the 'mind'.

Indeed, one reason physicists figured so prominently among the early membership of the Society for Psychical Research (SPR) was that they saw in psychic phenomena evidence for some new type of physics. An excellent historical account of this can be found in the recent book by Noakes (2019). Barrett was one of the founders of the SPR and four of the first eight presidents were physicists. For the history of physics is full of the inexplicable becoming explicable, and studying anomalous effects nearly always leads to useful insights. Thus, new phenomena should be welcome to physicists, even if they are not at first explicable theoretically. For example, it was only several years after its discovery that superconductivity could be explained. Nevertheless, history shows that phenomena which occur only rarely are often received skeptically at first. A good example of this is ball lightning, which was studied by Lord Rayleigh in the 1890s but not acknowledged to be a real phenomenon until the 1960s. On the other hand,

new phenomena do sometimes turn out to be spurious (e.g., N-rays).

(3) A final theory of physics must accommodate consciousness. There can be no doubting the success of physics within its own terms and many people have proclaimed that the end of physics is in sight, in the sense that our knowledge of the fundamental laws and principles governing the Universe is nearly complete. They argue that we are on the verge of obtaining a TOE. However, this description may seem pretentious, because one is really only purporting to have a final theory of particle physics, and previous claims to be close to a final theory have always proved premature. One feature of the Universe that would seem to refute the expectation that physics is close to a TOE is the existence of consciousness, and many physicists have argued that a consistent model of physics must incorporate this (e.g., Wigner, 1979). But if physics expands to accommodate consciousness, perhaps it can also accommodate psi.

(4) Perhaps the most important reason for wanting to incorporate psi into physics is that many people claim that recent developments in physics already make this possible. The fact that the physical world has turned out to be much weirder than common sense would suggest has led some people to argue that there might well be room for the sort of phenomena studied by parapsychology. To quote Arthur Koestler (1972):

The unthinkable phenomena of extra-sensory perception appear somewhat less preposterous in the light of the unthinkable propositions of modern physics.

Certainly many of the ideas I have studied in my professional field—black holes, time travel, dark matter, the anthropic principle, parallel universes, etc.—are just as speculative as those arising in psychical research. Nevertheless, this suggestion antagonizes many of my physics colleagues, and in my opinion current physics is still not weird *enough* to accommodate psi.

### **Response to Reber and Alcock's Specific Criticisms**

RA have four specific arguments for why psi and physics are incompatible: (1) the lack of a causal mechanism; (2) the implausibility of time reversal; (3) an inconsistency with thermodynamics; (4) a violation of the inverse-square law. Bryan Williams and George Williams have already addressed these criticisms very thoroughly in this *JSE* issue, but I will add a few points. With regard to (1), one can have an extended concept of causality in higher-dimensional models (discussed later). With regard to (2), it is not only parapsychologists who have advocated retrocausal models but also physicists (Cramer, 2006) and philosophers (Price, 2012) who are

just as skeptical of psi as RA. With regard to (3), one possible model of psychokinesis invokes transfer of information rather than energy (Mattuck, 1976), although not all parapsychists favor that. With regard to (4), the inverse-square law is irrelevant even in some physical contexts (e.g., the intensity of a laser beam and quantum entanglement) and even more so in the context of higher-dimensional models.

Here I prefer to focus on some points raised by RA with which I concur, although I doubt they would be happy with my reasons for doing so. Of course, I side with Cardeña on most points, since I'm one of his physicist supporters, but there are some issues that are less clear-cut than he indicates and where he does not go far enough.

(1) I agree with RA that there is currently no coherent physical (as opposed to psychological) theory that accommodates *all* psi phenomena, both micro and macro. There are numerous theories that describe a subset of phenomena, as described in the recent book of May and Marwaha (2015), but no unified model. However, I would like to believe that my own theory (described later) comes close!

(2) I agree with RA that a full explanation of psi cannot come from quantum theory. The long-standing emphasis on this possibility—ever since the 1974 AAAS meeting on *Quantum Physics and Parapsychology*—is unsurprising, since quantum theory already exhibits a host of weird effects (non-locality, entanglement, etc.), and it has even been claimed that consciousness is involved in the collapse of the quantum wave function (Stapp, 1993). This is not the mainstream view but it is not excluded and might be supported by recent studies of the effect of consciousness on the double-slit experiments (Radin et al., 2012). However, despite the impression given in some popular books, standard quantum theory *cannot* explain psi. One would need some non-standard version, such as “post-quantum theory,” which bears a similar relationship to quantum theory as general relativity does to special relativity (Sarfatti, 1998), or “generalised quantum theory” (Atmanspacher, Römer, & Walach, 2002). Even such extensions of quantum theory cannot describe the full range of psi phenomena, so while they may play some role in the final theory, they surely cannot be the full story. Rather one needs a deeper paradigm of physics which underlies both mind and quantum theory and illuminates them both.

(3) I agree with RA that standard relativity theory cannot provide a theory of psi, but for different reasons. They criticize the (standard) “block universe” interpretation of special relativity, but this cannot explain psi anyway since it does not describe even normal consciousness. This is because it not does not explain the passage of time, the most basic feature of conscious experience. For that, one needs an “evolving block universe”

(Ellis, 2014), where the future is not yet formed. One may also need a second time dimension (Carr, 2017), certainly if one wishes to describe precognition (Broad, 1923), and this is distinct from Cardeña's argument about the lack of simultaneity in special relativity.

So the existence of consciousness requires that one goes beyond *both* quantum theory and relativity theory and finds a deeper theory that amalgamates them in some way. But that is precisely what physicists are trying to do in seeking a theory of quantum gravity. Therefore, if consciousness is a fundamental feature of the universe, it is not inconceivable that it will appear at the level of quantum gravity. Indeed, this is the view advocated by Penrose (1994), although he is certainly not a proponent of psi.

### **Hyperspatial Models as a Possible Extension of Physics**

I have argued that one needs a deeper paradigm of physics which underlies both mind and quantum and relativity theories. So what form would this paradigm take? It must transcend the usual description of space and time—which is a feature of some theories of physics anyway—and it must involve mentality at some fundamental level. Also one needs a theory that accommodates *all* mental phenomena and not just the ones labeled “paranormal.” After all, there is already a big problem extending physics to accommodate “normal” mind (sensory perception, memory, dreams, etc). Ultimately, one needs a theory of consciousness itself, this underlying all mental experiences, and there is some indication from physics itself that this may be a fundamental rather than incidental feature of the world. I agree with George Williams in this respect.

One such approach involves hyperspatial models, in which paranormal mental phenomena are interpreted as influences or intrusions from higher dimensions (i.e. those going beyond the four dimensions of classical space–time). Such models have a long history (Carr, 2008). The possibility of an extra spatial dimension was especially popular in the late 19th century, as a result of the work of Abbott (1883), Hinton (1884), and Zöllner (1880). With the advent of relativity theory, it became clear that there really is a 4th dimension but that it is time rather than space. Nevertheless, it was still possible to attribute esoteric significance to this (Carrington, 1920; Ouspensky, 1931) or to contemplate 5-dimensional models with a 4th spatial dimension.

More sophisticated physical models invoked extra dimensions by complexifying the space and time coordinates of relativity theory (Rauscher, 1978; Targ, Puthoff, & May, 1979; Ramon & Rauscher, 1980) or introducing extra time dimensions (Whiteman, 1977). The basic idea is that points can be contiguous in the higher dimensional space even if separated

in 4-dimensional space–time. Subsequently, other higher-dimensional models were proposed by Heim (1988) and Sirag (1993) and myself.

A rather different approach—and one that involves mind explicitly—has come from philosophers rather than physicists and involves the relationship between physical space and perceptual space. That the physical space of objects and the phenomenal space of percepts are ontologically different was first stressed by philosophers such as Freddie Ayer (1940) and Bertrand Russell (1948). More radical was the proposal by C. D. Broad (1953) that these two spaces could be merged into a single space of more than three dimensions in which sensations of all kinds exist. H. H. Price (1953) also held this view, arguing that these spaces must be connected by a new type of causal relation that connects events in parallel universes.

John Smythies (who, sadly, died last January) took this idea further by exploring the relationship between these spaces implied by developments in neurology and introspectionist psychology. In *Analysis of Perception* (Smythies, 1956), he pointed out fundamental flaws in the orthodox mind–brain identity theory and presented his own model, which entailed a sort of extended materialism. He argued that physical and phenomenal space–times should be regarded as different cross-sections of a single higher dimensional space, sharing a common time dimension but described by a different system of 3-dimensional space coordinates. We experience only phenomenal events but some of these represent physical events and there is then a causal relationship via the brain, like the causal relationship between events in a TV studio and on a TV screen. These ideas were developed further by Hart (1965), Dobbs (1965), Whiteman (1967), and Smythies himself (Smythies, 1994, 2003, 2012).

In my own model—motivated by developments in cosmology and particle physics—physical and phenomenal space–times are regarded as projections of a 5-dimensional reality structure. The extra dimension is related to mental time (as distinct from physical time), so I have two time dimensions but the same spatial dimensions, whereas Smythies’ model invokes different spatial dimensions but a common time dimension. My model also accommodates experience of non-physical origin (NDEs, etc.) by extending the reality structure to more than five dimensions. The key point is that many psychic experiences (e.g., telepathy, clairvoyance, apparitions, OBEs, NDEs) seem to require the existence of some form of communal space. This is not the same as physical space but hypothesized to be a higher-dimensional space of which physical space and ordinary perceptual space (including memories and dreams) are just lower-dimensional projections (Carr, 2015a, 2015b). This space is termed the “Universal Structure” and can be viewed as a sort of extended reality—an information space that goes

beyond physical space but subtly interacts with it. The extra dimensions of the Universal Structure comprise a hierarchy of experiential times, these being distinct from physical time.

The crucial step is the identification of the Universal Structure with the higher-dimensional space already invoked by modern physics in models such as M-theory (Witten, 1995), in one version of which the physical world is regarded as a 4-dimensional “brane” in a higher-dimensional “bulk” (Randall & Sundrum, 1999). This identification allows an amalgamated description of physical, psychical, and even some mystical phenomena, these forming a natural continuum. It should be stressed that not all physicists are enamored with higher-dimensional theories, since they are currently untestable and might be regarded as mathematics rather than physics, but they are at least respectable in the sense that eminent physicists work on them.

Although the hyperspatial approach is speculative and prone to the criticism that it could explain anything with a sufficient number of dimensions, it shows that an extension of physics which accommodates mind is at least possible in principle. It also raises a number of important questions that might eventually be answerable: Will the final theory of quantum gravity involve consciousness in some way? Is there a deeper theory of physics that underlies both quantum theory and mentality? Will there ever be direct experimental evidence for higher dimensions from particle physics—for example, from the Large Hadron Collider—and, if so, how could one persuade mainstream physicists to contemplate the possibility that these might have some connection with mind?

### **Final Thoughts**

One of the most striking developments in recent decades has been the extent to which parapsychology has attained academic acceptability within UK Psychology Departments. Currently 100 (?) people in the UK are either studying for or have already obtained a Ph.D. in parapsychology, 37 (?) of whom have gone on to obtain permanent academic appointments in Psychology Departments, where they give lecture courses and continue to pursue their research in the subject (Carr & Watt, 2016). There are currently 17 (?) such departments in the UK. To a large extent this remarkable state of affairs is due to the pioneering efforts of the late Robert Morris, who—as Koestler Professor at Edinburgh University—supervised 32 of the Ph.D.s. The cautious approach that characterized his school won the subject newfound respect, as emphasized by the fact that in 1996–1997 he served as President of the Psychology Section of the British Association for the Advancement of Science.

Unfortunately, the study of the paranormal has not gained academic acceptability within Physics Departments. The only professional physicist who has worked on the subject in a UK university is Professor Brian Josephson at Cambridge University and no Ph.D.s have been obtained in the subject in UK physics departments. Of course, many physicists are *interested* in the subject, at least to the extent of publishing articles about it. They number several dozen in the UK and about 100 worldwide. But they represent only a tiny fraction of the total physics community, and their parapsychological work is usually conducted in their spare time. The few professional physicists who are paid to work in the subject are generally not university-based. In any case, physicists who speculate in this area—whether or not they have a university affiliation—are liable to be regarded with suspicion by their peers.

If the hope of finding a theory of physics that accommodates psi is fulfilled, an important semantic issue will be whether we should call this sort of approach “physics,” since doing so will certainly antagonize an appreciable fraction of both physicists (who are skeptical of psi) and parapsychologists (who see psi as an escape from the confines of physicalism). It is certainly not the sort of physics that describes material objects, so I prefer to call it “hyperphysics,” the formal distinction in my own model being that one might associate normal physics with the brane and hyperphysics with the bulk. However, the important point is that it is the same sort of physics that derives from studying the material world. It emerges naturally from normal (albeit ultra-speculative) physics and its focus is not psi alone.

I started this article with a reference to Tycho Brahe’s observation of a supernova and the skeptical reaction of the “blind watchers of the sky.” It was not until the 1930s—350 years later—that observations of supernovae became commonplace, not until the 1950s that we began to understand the physical mechanism behind them, and not until the 1990s that supernova observations revealed that the expansion of the Universe is accelerating. This indicates that 70% of its density is in the form of “dark energy,” whose identity is still a mystery. There are several similar examples in the history of physics: It took 50 years for the existence of black holes to be confirmed, 50 years for the Higgs particle to be discovered, and 100 years for gravitational waves to be detected. So perhaps we should not be surprised if the timescale on which psi is confirmed experimentally or understood theoretically is also long, and we should not be too disheartened at the apparently slow progress since the founding of the Society for Psychical Research 137 years ago. Contrary to the view of RA, one should not infer that the phenomena are nonexistent, merely that the scientific path to truth is a long one.

## References

- Abbott, B. P., et al. (LIGO-Virgo Collaboration). (2016, February 12). Observation of gravitational waves from a binary black hole merger. *Physical Review Letters*, 116, 061102.
- Abbott, E. A. (1983). *Flatland: A romance of many dimensions*. [Reprint of 1884 text.] New York: Barnes & Noble.
- Atmanspacher, H., Römer, H., & Walach, H. (2002). Weak quantum theory: Complementarity and entanglement in physics and beyond. *Foundations of Physics*, 32(3), 379–406.
- Ayer, A. J. (1940). *The foundations of empirical knowledge*. New York: Macmillan.
- Beloff, J. (1988). Parapsychology and physics: Can they be reconciled? *Theoretical Parapsychology*, 6, 23–30.
- Broad, C. D. (1923). *Scientific thought: A philosophical analysis of some of its fundamental concepts*. London: Routledge & Kegan Paul.
- Broad, C. D. (1953). *Religion, philosophy, & psychical research*. New York: Harcourt-Brace.
- Bunge, S. M. (2008). *Philosophy in crisis: The need for reconstruction*. Amherst, NY: Prometheus Books.
- Cardeña, E. (2018). The experimental evidence for parapsychological phenomena: A review. *American Psychologist*, 73(5), 633–677.
- Carr, B. J. (Ed.). (2007). *Universe or multiverse?* Cambridge, UK: Cambridge University Press.
- Carr, B. J. (2008). Worlds apart? Can psychical research bridge the gulf between matter and mind? *Proceedings of Society for Psychical Research*, 59, 1–96.
- Carr, B. J. (2015a). Hyperspatial models of matter and mind. In E. F. Kelly, A. Crabtree, & P. Marshall (Eds.), *Beyond physicalism: Toward reconciliation of science and spirituality* (pp. 227–273). Lanham, MD: Rowman & Littlefield.
- Carr, B. J. (2015b). Higher dimensions of space and time and their implications for psi. In E. C. May & S. B. Marwaha (Eds.), *Extrasensory perception: Support, skepticism, and science*, Vol. 2 (pp. 21–61). Santa Barbara, CA: Greenwood Publishing.
- Carr, B. J. (2017). Black holes, cosmology and the passage of time: Three problems at the limits of science. In K. Chamcham, J. Silk, J. D. Barrow, & S. Saunders (Eds.), *The philosophy of cosmology* (pp. 40–65). Cambridge, UK: Cambridge University Press.
- Carr, B. J., & Rees, M. J. (1979). The anthropic principle and the structure of the physical world. *Nature*, 278, 605–612.
- Carr, B. J., & Watt, C. (2016). Parapsychology PhDs in the UK. In *Psi Encyclopedia*. London, UK: Society for Psychical Research.
- Carrington, W. (1920). *A theory of the mechanism of survival: The fourth dimension and its applications*. London: Kegan Paul, Trench & Trubner.
- Carroll, S. M. (2008, February 18). Telekinesis and quantum field theory [blog]. *Discover magazine*. Retrieved from <http://blogs.discovermagazine.com/cosmicvariance/2008/02/18/telekinesis-and-quantum-field-theory/#.XbeJ4q97nBU>
- Chomsky, N. (1975). *Reflections on language*. New York: Pantheon Books.
- Cramer, J. G. (2006). Reverse causation and the transactional interpretation of quantum mechanics. In D. P. Sheehan (Ed.), *Frontiers of time: Retrocausation—Experiment and theory*. AIP Conference Proceedings for 87th Meeting of AAAS Pacific Division. Melville, NY: AIP Publishing.
- Dobbs, H. A. C. (1965). Time and ESP. *Proceedings of the Society for Psychical Research*, 54(197), 249–361.
- Ellis, G. F. R. (2014). The evolving block universe and the meshing together of times. *Annals of the New York Academy of Science*, 1326(1), 26–41.
- Hart, H. (1965). Towards a new philosophical basis for parapsychological phenomena. *Parapsychological Monographs*, No. 7. New York: Parapsychology Foundation.
- Heim, B. (1988). *Postmortale zustände? Die televariante area integraler weltstrukturen*. Innsbruck, Austria: Resch.

- Hinton, C. H. (1980). *Speculations on the fourth dimension: Selected writings of Charles H. Hinton*, R. Rucker (Ed.). New York: Dover.
- Koestler, A. (1972). *The roots of coincidence: An excursion into parapsychology*. New York: Random House.
- Langmuir, I. (1989, October). Pathological science [talk originally given at The Knolls Research Laboratory in 1953 and transcribed by R. N. Hall]. *Physics Today*, 42(10), 36–48.
- MacKenzie, B., & MacKenzie, L. (1980). Whence the enchanted boundary? Sources and significance of the parapsychological tradition. *Journal of Parapsychology*, 44(2), 125–166.
- Margenau, H. (1985). *The miracle of existence*. Woodridge, CT: Ox Bow Press.
- Mattuck, R. D. (1976). Random fluctuation theory of psychokinesis: Thermal noise model. In J. D. Morris, W. G. Roll, & R. L. Morris (Eds.), *Research in parapsychology 1976* (pp. 191–195). Metuchen: Scarecrow Press.
- May, E. C., & Marwaha, S. (2015). *Extrasensory perception: Support, skepticism and science*, Vol. 2. Santa Barbara, CA: Greenwood Publishing.
- McClenon, J. (1982). A survey of elite scientists: Their attitudes toward ESP and parapsychology. *Journal of Parapsychology*, 46(2), 127–152.
- Nash, C. B. (1986). *Parapsychology: The science of psiology*. Springfield, IL: Charles Thomas.
- Noakes, R. (2019). *Physics and psychics: The occult and the sciences in modern Britain*. Cambridge, UK: Cambridge University Press.
- Ouspensky, P. D. (1931). The fourth dimension. In *A new model of the universe: Principles of the psychological method in its application to problems of science, religion, and art* (pp. 64–104). New York: Alfred Knopf.
- Pashler, H., & Wagenmakers, E.-J. (2012). Editors' introduction to the special section on replicability in psychological science: A crisis of confidence? *Perspectives on Psychological Science*, 7(6), 528–530.
- Penrose, R. (1989). *The emperor's new mind: Concerning computers, minds, and the laws of physics*. Oxford, UK: Oxford University Press.
- Penrose, R. (1994). *Shadows of the mind: A search for the missing science of consciousness*. Oxford, UK: Oxford University Press.
- Penrose, R. (1997). *The large, the small, and the human mind*. Cambridge, UK: Cambridge University Press.
- Pippard, A. B. (1988). The invincible ignorance of science. *Contemporary Physics*, 29(4), 393–405.
- Price, H. H. (1953). Survival and the idea of 'another world'. *Proceedings of the Society for Psychical Research*, 50(182), 1–25.
- Price, H. (2012). Does time-symmetry imply retrocausality? How the quantum world says "maybe." *Studies in History and Philosophy of Modern Physics*, 43, 75–83.
- Radin, D. (1997). *The conscious universe: The scientific truth of psychic phenomena*. New York: HarperCollins.
- Radin, D., Michel, L., Galdamez, K., Wendland, P., & Rickenbach, R., & Delorme, A. (2012). Consciousness and the double-slit interference pattern: Six experiments. *Physics Essays*, 25(2), 157–171.
- Ramon, C., & Rauscher, E. A. (1980). Superluminal transformations in complex Minkowski spaces. *Foundations of Physics*, 10(7/8), 661–669.
- Randall, L., & Sundrum, R. (1999). An alternative to compactification. *Physical Review Letters*, 83, 4690–4693.
- Rauscher, E. A. (1979). Some physical models potentially applicable to anomalous phenomena. In A. Puharich (Ed.), *The Iceland papers: Select papers on experimental and theoretical research on the physics of consciousness* (pp. 49–83). Amherst, WI: Essentia Research Associates.
- Reber, A. S., & Alcock, J. E. (2019). Searching for the impossible: Parapsychology's elusive quest. *American Psychologist*, June 13. doi:10.1037/amp0000486

- Russell, B. (1948). *Human knowledge: Its scope and limits*. London: Allen & Unwin.
- Sarfatti, J. (1998). Is consciousness a violation of quantum mechanics? In S. R. Hameroff, A. W. Kaszniak, & A. C. Scott (Eds.), *Toward a science of consciousness II—The second Tucson discussions and debates*. Cambridge, MA: MIT Press.
- Sirag, S.-P. (1993). Consciousness: A hyperspace view. In J. Mishlove (Ed.), *The Roots of Consciousness* (pp. 327–365). Tulsa, OK: Council Oak Books.
- Smythies, J. R. (1956). *Analysis of perception*. London: Routledge & Kegan Paul.
- Smythies, J. R. (1994). *The walls of Plato's cave: The science and philosophy of (brain, consciousness, and perception)*. Aldershot: Avebury Press.
- Smythies, J. R. (2003). Space, time and consciousness. *Journal of Consciousness Studies*, 10(3), 47–56.
- Smythies, J. R. (2012). Consciousness and higher dimensions of space. *Journal of Consciousness Studies*, 19(11/12), 224–232.
- Stapp, H. P. (1993). *Mind, matter, and quantum mechanics*. Berlin: Springer.
- Targ, R., Puthoff, H. E., & May, E. C. (1979). Direct perception of remote geographic locations. In C. T. Tart et al. (Eds.), *Mind at Large* (pp. 78–106). New York: Praeger.
- Taylor, J. (1975). *Superminds: An enquiry into the paranormal*. New York: Warner Books.
- 't Hooft, G. (2000). Physics and the paranormal: A theoretical physicist's view. *Skeptical Enquirer*, 24(2), 27–30.
- Wheeler, J. (1979). Drive the pseudos out of the workshop of science. *Skeptical Inquirer*, 3, 12–13.
- Whiteman, J. H. M. (1967). *Philosophy of space and time and the inner constitution of nature: A phenomenological study*. London: George Allen & Unwin.
- Whiteman, J. H. M. (1977). Parapsychology and physics. In B. Wolman (Ed.), *Handbook of Parapsychology* (pp. 730–756). New York: Van Nostrand Reinhold.
- Wigner, E. (1979). *Symmetries and reflections* (pp. 171–184). Woodbridge, CT: Ox Bow Press.
- Witten, E. (1995). String theory dynamics in various dimensions. *Nuclear Physics B*, 443(1–2), 85–126.
- Zöllner, J. C. F. (1880). *Transcendental physics: An account of experimental investigations from the scientific treatises*. London: W. H. Harrison.