BELOW AWARENESS:

A NEW UNIFYING THEORY OF SPIRITUAL ENCOUNTERS, FROM GHOSTS AND DEMONS TO FAIRIES AND NYMPHS

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For the best wife in the world, Jordi

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Introduction

When your day job involves operating on people's eyes, you can't help but wonder what they're seeing. Take cataract surgery. The aim is to replace the cloudy lens (the cataract) with a prosthetic implant. Patients often tell me (for they're usually awake during the procedure), that as the prosthetic lens unfolds, their world blossoms into a rainbow-filled kaleidoscope. For a brief moment, I'm jealous. To experience the same wonder, I'll likely have to wait fifty years before my cataracts need doing, or I could take LSD, but that'd probably get me struck off.

Every day, diagnosing and treating so much eye disease impresses upon me how delicate and vulnerable is the miracle of sight. I know it sounds dramatic, but I've honestly learnt to treasure every reflection off an iridescent beetle's wings, every shaft of sunlight breaking through the clouds at sunset, every knowing glint in my wife's turquoise eyes. But one sight I've never been able to marvel at: ghosts, demons, spirits, whatever you want to call them. When people report such sightings, I can only imagine them. And then my scientific training overrules such day-dreaming. No evidence supports the existence of disembodied intelligences. Angels and demons, fairies and nymphs: all just superstitions and cases of mistaken identity, obviously. And if you've never met anybody who claims to have seen a ghost, it's probably easy to agree. But I have. And for a long time, I've wondered *what* these people are seeing. I've wondered *how* these people are seeing.

This book is a study of these encounters, phenomena typically

lumped under the term 'paranormal'. Our measurement devices cannot detect these entities, as far as we're aware.

What we have, instead of objective measurements, is a rich collection of stories, first-hand accounts, and the odd grainy photograph. We know crowd-sourced data is extremely valuable, as demonstrated in the 2020 pandemic: the COVID symptom tracker app taught us about the virus in real time.[1] However, this data was admittedly less prone to error than, say, a folktale. Luckily for us, anthropology, among other academic disciplines, is replete with accounts of extraordinary experiences. We can analyse these reports in depth, since academics are specifically trained to be less biased than the average eyewitness. Upon inspecting this extensive body of evidence stretching across many different cultures, I've formed the opinion there is something worth investigating here: too many people independently report the same experiences across time and space for us to pass it off as random chance and human error. It's no longer adequate to simply point a camera, detect nothing, and conclude nothing is present. With this attitude, we'd never have discovered radio waves, X-rays, or any other form of electromagnetic radiation invisible to the naked eye, which is most of it.

Neither can the field of anomalistic psychology, the academic study of paranormal beliefs, dispense with every mischievous poltergeist. Psychologists would explain that the consistency and commonality of spiritual encounters only "confirms something rather trivial, i.e., that the central nervous system of all human beings exhibits some common functional properties.[2]" It'll be just as trivial for me to demonstrate the inadequacy of this argument in chapter one. And the popular claim that group spiritual encounters can be explained by shared delusions is even less persuasive. Among other reasons to be elaborated upon, shared delusional disorders are so much rarer than the spiritual encounters they supposedly explain. Most importantly, I'll review the other commonly proposed scientific explanations for spirits, to show

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[1] Menni C, Valdes AM, Freidin MB, *et al.* Real-time tracking of self-reported symptoms to predict potential COVID-19. *Nat Med*. 2020 Jul;26(7):1037-1040.

[2] Brugger, Peter. 'From Haunted Brain to Haunted Science: A Cognitive Neuroscience View of Paranormal and Pseudoscientific Thought'. *Hauntings and Poltergeists: Multidisciplinary Perspectives*, 1 January 2001, 195–213.

how they probably do explain away the majority of spiritual encounters, but cannot explain them all. Even the 'Sherlock Holmes of Psychical Research', Peter Underwood, after thirty-five years of investigations, estimated that "98% of reported hauntings have a natural and mundane explanation".[3]

Focusing on the 2% that remains, I'll seek to unify a host of human experiences variously considered paranormal, spiritual, or religious in nature, but which I'll posit represents a real facet of the universe as yet unexplained. Furthermore, I'll put to work a range of scientific and mathematical theories to deduce the nature of these phenomena. Last, and most importantly, once I'm sure of an explanation, I'll make testable predictions— the hallmark of any useful scientific hypothesis.

So how do we pick out the meaningful data for us to analyse?

There's no shortage of peculiar claims within the paranormal genre, but most are easy to test. For example, we know for a fact that dowsing doesn't[4] work.[5] We know for a fact that faith healing doesn't[6] work.[7] If a claim can be tested under controlled conditions in a laboratory, we've done it. One category of claims cannot be tested in this way: those requiring fieldwork. Here's an example: for a cryptozoologist, who seeks legendary or extinct animals, the laboratory is worthless. The only way to prove Nessie exists is to go and find her in Loch Ness. Unfortunately for Nessie, many actual zoologist believe the Loch Ness ecosystem couldn't support a giant serpentine monster. But you'll always find a few zoologists who aren't so sure. After all, several species of giant animal have remained hidden in the ocean until relatively recently. Despite the centuries-old legend of the kraken, the colossal squid (*Mesonychoteuthis hamiltoni*) was only discovered in 1925 and we still know little about its life cycle. More recently, the

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[3] Underwood, Peter. *No Common Task: Autobiography of a Ghost Hunter*. First Edition. London: George G.Harrap & Co Ltd, 1983.

[4] U.S. Geological Survey. *Water Dowsing*. USGS Publications Warehouse. 1977.

[5] Foulkes RA. Dowsing experiments. *Nature.* 1971. 229, 163–168.

[6] Rose L. Some Aspects Of Paranormal Healing. *BMJ*. 1954. 2(4900):pp. 1329–1332.

[7] Benson H, Dusek JA, Sherwood JB, *et al*. Study of the Therapeutic Effects of Intercessory Prayer (STEP) in cardiac bypass patients: a multicenter randomized trial of uncertainty and certainty of receiving intercessory prayer. *Am Heart J.* 2006 Apr;151(4):934-42.

megamouth shark (*Megachasma pelagios*) was only discovered in 1976, despite it measuring around five metres in length. Physics, too, has its own fieldwork mysteries. Ball lightning is an extremely rare and unpredictable form of spherical luminescence reported since the 19th century, but the lack of reproducible data and reliance on observer reports means we still haven't proven its existence. Therein lies the problem with fieldwork: the world is vast, and its phenomena not evenly distributed.

The difficulty with cryptozoology then, is its reliance on field work, that requirement to go outside and sift through the real world. But if somebody discovered incontrovertible evidence of Nessie, they'd no longer be classed as a cryptozoologist. In the same vein, it's often said that alternative medicine proven to work is, from then on, just called medicine. Hence we cannot give much credence to cryptozoology—it's zoology for amateurs. The game is not over for cryptozoologists, however, because nobody doubts the very possibility of their subject of interest. Nobody doubts the existence of a set of entities called 'animals'.

In fact, of the paranormal phenomena dependent on fieldwork, the existence of only one set seems to fly in the face of everything we know about the universe: all cultures promulgate tales of spirits. If you find the word 'all' unlikely here, read on and see. Even shamanism, the mastery of the spirit world, has been found on every continent. The modern Western equivalent is the Victorian obsession with seances and ectoplasm. This has since evolved into the reality-television spectacles of ghost-hunting, which take the guise of science but not the approach. Don't presume monotheism ever killed belief in these spirits either, for every tradition has its own cautionary tales and methods of exorcism.

To summarise, paranormal beliefs are provably nonsense except for one category: the existence of spiritual entities. So what do I mean by this then? What kinds of experiences are we talking about? And what scientific principles might explain away the majority? That's chapter 1. Once we are left with the 'actual' spirits, we may then ask: by what mechanism do they interact with us? And how might we therefore detect them? That's chapters 2 and 3. After this, we can tackle the most fundamental question of all: how do we situate their existence within the laws of physics? What actually 'are' spirits? That's chapter 4. Once

we've proposed a hypothesis, we must test it, and that's chapters 5 and 6. Spoiler: the best explanation for these spiritual entities might be considerably less spooky than you'd hope, but probably a lot stranger than you'd ever predict.

CHAPTER ONE

Defining Spiritual Encounters

In which we define spiritual encounters and explore current scientific explanations

We commonly think of these things as conscious entities without a physical form. Whether they are intelligent and have agency is an open question to which we shall return, but their key feature seems to be a lack of physicality. I won't define them as non-physical though, for they seem to have a tangential relation, at least, to the matter studied in physics (we'll explore this in the next chapter). For ease of discussion, we require a one-word term. The most popular, as well as morally neutral, is 'spirit'. So what's lumped together under this umbrella term?

- In Christianity, they are the angels common to all Abrahamic religions, along with the Devil/Satan/Lucifer and his demonic servants.
- In Judaism, they are *Mazzikim*, *Rukhot*, *Se'irim*, *Dybbukim*, and *Sheydim* (whence comes the English 'Shades').
- In Islam, they are *Djinn, Div, Pari,* and *Ghul* (whence comes the English 'Ghoul').
- In Hinduism and Buddhism, they are *Preta* (usually translated

as 'hungry ghost'), *Yakshas*, *Rakshasas*, and *Bhootas*.
- In Shinto, they are *Kami*, *Yokai*, and *Oni*.
- In the traditional Yoruba religion, they are *Orishas*. With so many individual belief systems across the African continent, only a few more examples can be provided: the Igbo people (Nigeria) have *Akalogoli*, the Luo people (Kenya) have *Jochiende*, and the Mende people (Sierra Leone) have *Tingoi*.
- In Vodou, they are *Lwa*.
- In Indonesian folklore, they are *Hantu*.
- In Mu-ism, they are *Kwisin* and *Sin*.
- In Maori beliefs, they are *Kehua, Atua, Maero, Patupaiarehe* and *Taniwha.*
- In European folklore, they are fairies, fae or fair folk (terms expanded below).
- To the ancient Romans, they were the *Panes*/*Panetes*, *Lares*, *Manes*, *Lemures*, *Genii*, *Genii Locorum*, and *Umbrae*.
- In paranormal and spiritualist circles, they are ghosts, poltergeists (from German folklore), and phantasms.
- In alchemy, they are gnomes, undines, sylphs, and salamanders (not the same thing as the amphibian of the same name, but taking its form nevertheless)
- Gods and Goddesses have often been classed by scholars as a subtype of spirit.[8] By adopting this worldview, today's occultists may employ multiple conflicting belief systems without losing sleep. For example, they often talk about communing with the Gods of the ancient Egyptians, Greeks, Norse, and Babylonians. Historically, polytheism was the dominant belief throughout antiquity, before a shift to henotheism (i.e. the belief that many Gods exist but only one is worthy of devotion), followed by the spread of 'true' monotheism (i.e. no other Gods exist). In Judaism, foreign deities are often referred to as mere *Sheydim*, in contrast to the one supreme deity purported to have created them all.[9] We,

[8] Bekker, Balthasar. *The World Bewitched; Or, an Examination of the Common Opinions Concerning Spirits ... Translated from a French Copy, Approved of and Subscribed by the Author's Own Hand. Vol. 1*. For R. Baldwin, 1695.

[9] Benjamin W. McCraw, Robert Arp. *Philosophical Approaches to Demonology*.

> too, may wish to consider some religions as the communal worship of spirits. Animism, Shamanism, and ancestor worship are included here, and many examples have already been given e.g. the ancient Roman *Lares*— household guardian deities specific to families, derived from ancestral spirits.

This is not an exhaustive catalogue of terms used in each of these belief systems, let alone an exhaustive catalogue of terms used across the world. Neither are any of these terms equivalent to one another, but all are similar in that they represent self-aware entities, often intelligent, not normally visible to us, yet exhibiting human-like personalities. They can usually communicate with us, and possess supernatural abilities we lack. None are universally considered good or evil, except for angels and demons for whom this is the only significant difference. But most cultures have a more nuanced understanding of their spirits than good/bad. There are 300 different classifications of *Kami* listed in the *Kojiki*,[10] an early Japanese chronicle of myths and legends. Each is said to have a particular temperament and function. Likewise, 'fairy' is also an umbrella term. The *Fairy Census*,[11] which gathers tales and sightings of fae for systematic analysis, lists eight types of fairies: banshees, boggarts, brownies, gremlins, hikey sprites, Jenny Greenteeth, leprechauns, and pixies. But any child could list the names of others. Often, one belief system will merge with an older system as their associated cultures mingle. For example, early British Christians explained away the fairies of their traditional folktales as being demoted angels. In Vodou, a blending of African religious traditions and Catholicism, each *Lwa* is identified with a particular Saint. But political and cultural factors can also take precedence. Most famously, the first Greek Pharaoh, Ptolemy I Soter, created the cult of Serapis, who was a pre-existing amalgam of deities, in order to unify the Egyptians and Greeks under his rule. A melting pot of different beliefs is known as a 'syncretism', and they pop up a lot. Syncretisms explain

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Routledge, 2017.

[10] No Yasumoro O, Gustav Heldt. *The Kojiki: An Account of Ancient Matters*. Columbia University Press, 2014.

[11] Young SR. *Fairy Census I: Part 1, Britain and Ireland*. Pwca Books and Pamphlets, 2023.

many convergences of belief, meaning we can't point to all of these geographically varied but qualitatively similar accounts of spirits as proof of their existence. These beliefs didn't develop independently; It's all just cultural transmission, right?

Not all of it. For example, isolated Amazonian peoples developed animistic beliefs before any contact with the Western world.

Everett's Account

At this point, the learned sceptic might point to the Piraha people (pronounced *pee-da-HAN*), who, as was discovered by the Christian missionary and linguist, Daniel Everett, don't believe in any supreme deity. According to Everett, they lost interest when they found out he had never met Jesus. From his time among them, Everett deduced that the Pirahas believe only in things they can see. But as he also discovered, the Pirahas absolutely believe in a world of spirits. In the prologue of *Don't Sleep, There Are Snakes*,[12] he recalls the following experience:

> "Don't you see him over there?" he asked impatiently. "Xigagai, one of the beings that lives above the clouds, is standing on the beach yelling at us, telling us he will kill us if we go to the jungle."
>
> "Where?" I asked. "I don't see him."
>
> "Right there!" Kohoi snapped, looking intently toward the middle of the apparently empty beach.
>
> "In the jungle behind the beach?"
>
> "No! There on the beach. Look!" he replied with exasperation.
>
> In the jungle with the Pirahas I regularly failed to see wildlife they saw. My inexperienced eyes just weren't able to see as theirs did.
>
> But this was different. Even I could tell that there was nothing on that white, sandy beach no more than

[12] Everett, Daniel. *Don't Sleep, There Are Snakes: Life and Language in the Amazonian Jungle*. Profile Books, 2010.

> one hundred yards away. And yet as certain as I was about this, the Pirahas were equally certain that there was something there. Maybe there had been something there that I just missed seeing, but they insisted that what they were seeing, Xigagaí, was still there.
>
> Everyone continued to look toward the beach. I heard Kristene, my six-year-old daughter, at my side.
>
> "What are they looking at, Daddy?"
>
> "I don't know. I can't see anything."
>
> Kris stood on her toes and peered across the river. Then at me. Then at the Pirahas. She was as puzzled as I was.
>
> Kristene and I left the Pirahas and walked back into our house. What had I just witnessed? Over the more than two decades since that summer morning, I have tried to come to grips with the significance of how two cultures, my European-based culture and the Pirahas' culture, could see reality so differently. I could never have proved to the Pirahas that the beach was empty. Nor could they have convinced me that there was anything, much less a spirit, on it.

We learn from this account that the Pirahas encounter spirits just like everyone else in the world, although they don't necessarily worship them. And just like everywhere else in the world, only certain people possess the ability to see these spirits.

The spirit encounters by the Piraha people are even more remarkable for the fact that they are such extreme empiricists in every other aspect of their lives. According to Everett, the Pirahas have no creation myths, no abstractions, not even a concept of numbers above what they can count on their fingers. They are only interested in first-hand experiences, and enough of them do have these experiences that the existence of spirits is assumed to be obvious. Modern appraisals of Everett's studies suggest flaws in his conclusions regarding the uniqueness of the Piraha language (e.g. the Pirahas do indeed possess

mythology),[13] but it's clear that spirits remain a part of everyday life for them, however one chooses to analyse their culture.

What are the Pirahas seeing then? Is it just neurological deceit?

Explanation by Psychiatry

Psychosis is defined as a detachment from locally shared understandings of reality, and often involves hallucinations and delusions. Shared psychotic disorders appear in any standard psychiatry textbook.[14] *Folie à deux*, for example, is a delusional disorder whereby two people share such a close emotional link that when one of them experiences genuine psychosis, so does the other. This emotional connection must be so strong that most documented pairs have been siblings or married couples (90%), the majority of whom were socially isolated.[15] This disorder has never involved a whole village— the emotional connection between so many people would be too dilute. For this reason, the largest group size known to have been affected is the family unit (most famously, and allegedly, the Burari deaths), when it's known as *folie à famille*. Cases of this have occurred within remote villages but, even then, have never spread beyond the affected family. In fact, all types of *folie* are rare, estimated to account for 1.7 to 2.6% of psychiatric hospital admissions.[16] The final nail in the coffin is that psychosis is distressing to its sufferers, with the delusions of *folie* usually being paranoid in nature.

If not a *folie*, perhaps the Pirahas are affected by mass hysteria then? Mass psychogenic illness, as it's more respectfully called, is a dramatic illness greatly upsetting to its sufferers. Again, the Pirahas do not appear so troubled by their spiritual encounters. More importantly,

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[13] Nevins A, Pesetsky D, Rodrigues C. Pirahã Exceptionality: A Reassessment. *Language*. 2009. 85(2): 355–404.

[14] Casey, Patricia, and Brendan Kelly, eds. *Fish's Clinical Psychopathology: Signs and Symptoms in Psychiatry*. 3rd edition. London: RCPsych Publications, 2007.

[15] Silveira JM, Seeman MV. Shared psychotic disorder: a critical review of the literature. *Can J Psychiatry*. 1995 Sep;40(7):389-95.

[16] Wehmeier P, Barth N, Remschmidt H. Induced delusional disorder. a review of the concept and an unusual case of folie à famille. *Psychopathology*. 2003 Jan-Feb;36(1):37-45.

mass psychogenic illness does not involve features of psychosis. It's primarily a behavioural reaction among people with a shared belief—a disorder of anxiety causing rapid-onset physical symptoms, usually headaches, dizziness, and nausea.[17] However, some believe it's just a reassuring label used when we've investigated a group of people with a disease and failed to identify a cause.[18] Either way, it's not a persuasive explanation for the Pirahas experiences.

Last, we might speculate the Pirahas are afflicted by a culture-bound syndrome—a mental illness unique to one culture that doesn't fit any other category of mental illness. The International Statistical Classification of Diseases and Related Health Problems[19] (ICD-10), used by all psychiatrists outside of America, lists twelve such syndromes. Most famously of these is Amok syndrome, which gave us the English phrase 'running amok'. Malaysians believe this occurs when a person is possessed by a *Hantu Belian*, a tiger spirit, causing a sudden outburst of reckless and aggressive behaviour which may end in murder-suicide. This is often provoked by an insult, feelings of jealousy or desperation. To a Western mind, Amok syndrome seems not dissimilar to 'lone wolf' terrorism, which we require no spirit to explain.

Amok syndrome is a good example of a spiritual account more reasonably explained by modern psychology.[20] The terrorist mindset is well studied. Risk factors for radicalisation include a history of a psychotic condition, social isolation, unemployment, failure to achieve aspirations, and being a young male.[21] These are the same for Amok

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17 Jones TF. Mass psychogenic illness: role of the individual physician. *Am Fam Physician.* 2000 Dec 15;62(12):2649-53, 2655-6.

18 Singer, Jerome. "Yes Virginia, There Really Is a Mass Psychogenic Illness." *Mass Psychogenic Illness: A Social Psychological Analysis.* Ed. Colligan et al. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers, 1982. 21–31.

19 World Health Organization. *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines*. World Health Organization, 1992.

20 Saint Martin ML. Running Amok: A Modern Perspective on a Culture-Bound Syndrome. *Prim Care Companion J Clin Psychiatry*. 1999 Jun;1(3):66-70.

21 Smith A. Risk Factors and Indicators Associated With Radicalization to Terrorism in the United States: What Research Sponsored by the National Institute of Justice Tells Us. *U.S. Department of Justice.* 2018.

syndrome, which we call 'spree killing' in the West. But before we knew any of this, how could we have coped with unexplained horrific behaviour? Within psychoanalytic theories, therapists talk about mental 'defence mechanisms'— stories we subconsciously tell ourselves to cope. And stories of spirits, before the scientific revolution, were the most obvious way to fill our knowledge gaps. In the same way, a storm deity like Thor or Jupiter could explain thunder and lightning. Because when we think we understand something, it automatically becomes less scary and unpredictable. Crops need rain? Pray to the Gods.

A clearer example of this is the *Tikoloshe* or *Tokoloshe* of Zulu mythology, which was used to explain why people inexplicably died in the night.[22] The *Tikoloshe* was said to be a short monster which would choke you to death with long, bony fingers. The best defence, so the story went, was to sleep with your bed raised off the floor so they couldn't reach you. We now know the *Tikoloshe* deaths were the result of keeping a fire burning while plugging all the windows and doors, leading to the production of carbon monoxide by incomplete combustion. The Zulu people traditionally slept on mats on the floor, and carbon monoxide sinks because it's denser than air. Therefore, raising the bed off the floor prevented death, but not because an evil spirit forgot its step ladder. We see how science once again declaws a spirit myth. I mention this as a reminder that we must be vigilant for other, more mundane, explanations of spiritual encounters. I also mention it as a stark comparison to the Piraha encounters, for which a mundane explanation is not forthcoming. Nobody in Everett's account was intoxicated, and multiple people saw the spirit, along with multiple outsiders who confirmed the absence of anything physical in its place. What gap in our knowledge was this spirit supposed to fill?

Returning to the Piraha account, it's clear a culture-bound syndrome cannot explain what happened for much the same reason mass psychogenic illness can't: this is not an illness. A mental illness, by most accepted definitions, must cause distress or functional

[22] Zimkhitha S-T, Yaseen A. '"I Will Not Lie to You. The Tokoloshe Exists": Mythical Creatures and Their Influence on Mental Health Amongst A Sample of Amaxhosa in the Eastern Cape, South Africa'. *Indilinga African Journal of Indigenous Knowledge Systems* 21, no. 1 (1 August 2022): 102–18.

impairment.[23] For example, anxiety is a physiological response to stressful situations. That is to say, a certain amount of anxiety is normal. It only becomes pathological when it starts to negatively impact one's life, affect employment opportunities, destroy social standing.

Explanation by Salience Attribution

An alternative explanation is that the human brain naturally exists on a spectrum of pattern-seeking, also known as salience attribution. Our ability to find patterns was evolutionarily selected for, because spotting a camouflaged predator is a useful trick if you can pull it off. When this pattern-seeking is too strong, we find patterns between unrelated things. This is called apophenia, and the subtype we are interested in is called pareidolia—the perception of images or sounds in random stimuli. Pareidolia is a well-studied illusion and can be reliably measured.[24] When our pattern-seeking ability is even stronger, we experience delusions (defined as firm, fixed, false beliefs) and other psychopathology. Hence we end up with the "aberrant salience hypothesis" of schizophrenia.[25]

Are the Pirahas abnormal in their attribution of salience? I draw your attention to Everett's description of what they were looking at: a completely empty beach. If their salience detection was this aberrant, it seems likely that the patterns in the foliage of the rain-forest's trees would be so meaningful, so prone to aberrant salience, as to make hunting impossible. The Pirahas are accomplished hunter/gatherers. If anything, their salience detection is less prone to error than ours.

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[23] Telles-Correia D, Saraiva S, Gonçalves J. Mental Disorder-The Need for an Accurate Definition. *Front Psychiatry.* 2018 Mar 12;9:64.

[24] Mamiya Y, Nishio Y, Watanabe H, *et al*. The Pareidolia Test: A Simple Neuropsychological Test Measuring Visual Hallucination-Like Illusions. *PLoS One.* 2016 May 12;11(5):e0154713.

[25] Kapur S. Psychosis as a state of aberrant salience: a framework linking biology, phenomenology, and pharmacology in schizophrenia. *Am J Psychiatry.* 2003 Jan;160(1):13-23.

Baxstrom's Account

At this point, you might begin to tire of the Pirahas and wonder why I'm placing so much emphasis on them. It's true a good scientist does not trust a study of n=1 so readily. The reason is that Everett's account is typical for these encounters across the world. Let me provide one more example, which took place on the other side of the world from the Amazon, although many other accounts are freely available.[26]

Richard Baxstrom is a lecturer in social anthropology at the University of Edinburgh. Early on in his career, he visited an illegal, makeshift temple on the banks of the Klang river in Kuala Lumpur, Malaysia, for a night-time, spirit-summoning ritual.[27] Over a hundred people attended. He writes the following:

> "Belakang!" (which translates approximately as "at the back" in Malay), my interlocutor whispers excitedly. "Point, point!" he then urges me, switching to English. He wants the camera on. The ghosts are there and he wants to make sure I "get" them. Is this not what I am there for? I press the "record" button. I point the camera at the dark river just beyond the boundary of the lit compound. I film it all.

But when he watched the tape back:

> The resulting footage proves absolutely nothing. Reviewing it after the fact, the sense that something was there returns to me, but there is really nothing but darkness hovering over the Klang that night according to the tape.

At the end of this paper, he concludes:

> To date, I have expunged the entire ghost-hunting affair that I began this article with from my published writings on Brickfields and Malaysia, electing to stick to writing about ghosts that I could legitimately

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[26] Young, David E. *Being Changed by Cross-Cultural Encounters: The Anthropology of Extraordinary Experience*. Edited by Jean-Guy A. Goulet. Peterborough, Ont.: Broadview Press Ltd ,Canada, 1994.

[27] Baxstrom R. Knowing Primitives, Witches, and the Spirits: Anthropology and the Mastery of Nonsense, *Republics of Letters.* 2013.

> (according to the standards of the "social science" to which I belong) claim to have "mastered."

His reasoning:

> More bluntly, with its explicit focus on the invisible ghosts rather than the testimonies and actions of the (deluded) ghost hunters, it stands as bad fieldwork. I should have documented what my interlocutors said and did; instead, I simply tried to write (and, even more insanely, film) the abyss. In the age of anthropology by audit, this is quite simply nonsense; one cannot play Bartleby and Faust simultaneously.

Whereas Everett responded by accepting the mystery, Baxstrom responded by denying everything. Can anybody blame him? The tape saw nothing, he saw nothing, and only the Malaysians saw anything. So the Malaysians are outvoted. As a one-off experience, we might be tempted to agree, but if we compare to similar spiritual encounters across the world, like Everett's, denial starts to look more tenuous. Other examples of spiritual encounters will be described later, but for now, let's make another attempt to explain what happened.

Explanation by Suggestibility

For a phenomenon experienced by a group, as in both of these accounts, the most promising explanation, championed by the psychologists, Rense Lange and James Houran, is the power of self-reinforcing cognitive biases.[28] In other words, if you believe somewhere has ghosts, you'll 'see' ghosts (e.g. via pareidolia as discussed), and the more you see ghosts, the stronger your belief in ghosts, and so on, in a vicious circle. So the longer you spend in a haunted house, the more hauntings you'll experience— a 'perceptual contagion' effect, as evidenced by Lange and Houran's unhaunted house study.[29] A key contributor to this cycle is the behaviours and

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[28] Houran J, Lange R. Hauntings and poltergeist-like episodes as a confluence of conventional phenomena: a general hypothesis. *Percept Mot Skills*. 1996 Dec;83(3 Pt 2):1307-16.

[29] Houran J, Lange R. Diary of events in a thoroughly unhaunted house. *Percept Mot Skills.* 1996 Oct;83(2):499-502.

beliefs of the surrounding people, as they're usually how you learn somewhere has ghosts in the first place.

Consider one of the older psychological theories of emotion, the Schachter-Singer two-factor theory. Briefly, it explains how we use environmental cues to interpret physiological arousal e.g. increased pulse rate + seeing somebody next to you is scared = you're scared.[30] In Schachter and Singer's experiments, healthy volunteers were injected with adrenaline and sat in a waiting room with an actor told to mimic euphoria or fear. The volunteers generally copied the actor's reactions. The extent to which a person will accept a suggestion like this is called 'suggestibility', and it can be determined in a hypnosis session (i.e. more easily hypnotised means more suggestible, as that's how hypnosis works). Importantly for us, suggestibility correlates with paranormal beliefs.[31]

If you're suggestible, it isn't only the beliefs of surrounding people who affect your experience, but environmental cues such as creepy paintings on the wall, and your own prior beliefs too. Lange and Houran analysed a large sample of eyewitness reports of 'ghostly' encounters, and found that approximately 30% of witnesses expressed a prior belief in spirits.[32] Their psychological model therefore predicted that contextual variables alone were sufficient to induce ghostly perception. To test the idea that paranormal experiences can be explained by suggestibility, they then asked 22 people visiting a theatre (one not known to be haunted) about unusual experiences, having suggested to half of them beforehand that the place was haunted.[33] Positive suggestion was found to be associated with reporting unusual phenomena. But a larger investigation (by a

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[30] Schachter S, Singer J. Cognitive, Social, and Physiological Determinants of Emotional State. *Psychological Review*. 1962. 69 (5): 379–399.

[31] Hergovich A. Field Dependence, Suggestibility and Belief in Paranormal Phenomena *Personality and Individual Differences* 34, no. 2 (1 February 2003): 195–209.

[32] Lange R, Houran J, Harte T M, *et al*. Contextual Mediation of Perceptions in Hauntings and Poltergeist-like Experiences. *Percept Mot Skills. 1996.* 82(3), 755-762.

[33] Lange R, Houran J. Context-Induced Paranormal Experiences: Support for Houran and Lange's Model of Haunting Phenomena. *Percept Mot Skills, 1997.* 84(3_suppl), 1455-1458.

different team) of Hampton Court Palace, one of the most haunted places in England, did not substantiate this theory.[34] Data was collected from 678 members of the public. Before their visit, half were told the area was associated with unusual phenomena, and half were not. Although both groups reported unusual phenomena, the primed group did not report significantly more of them. Prior believers in ghosts, however, did report significantly more unusual phenomena.

There is a problem with the suggestibility theory for our cases anyhow: neither Everett nor Baxstrom saw anything despite mass suggestions from people around them. Baxstrom himself was completely ready to believe, having attended with the intention of filming a ghost, and left disappointed. The likely reason is a lack of pareidolia. We know that people primed to look for 'purported ghost voices' in white noise are more likely to report perceiving voices, through heightened pareidolia, which explains the classic electronic voice phenomena (EVP) celebrated by TV ghost-hunters.[35] In fact, pareidolia is easy to experience in the case of random static, but is much less likely to occur within more recognisable patterns. You won't mistakenly interpret the outline of a chair as the outline of a bird. Hence, as discussed, we must conclude that pareidolia, even when primed as in the case of EVP, cannot explain what the Pirahas saw on that empty beach.

As such, many of the suggestibility studies deal with non-visual perception, which is easier to misinterpret. Perhaps most famously, Wiseman's fake seances tricked a third of participants into thinking a static table had moved in the dark, and a fifth of participants into believing genuine paranormal activity had occurred.[36] Prior believers were more frequently tricked. But this was stage magic, illusions that anybody can replicate, designed to fool. Accordingly, suggestibility has been implicated in people's gullibility regarding fake-psychic

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[34] Wiseman R, Watt C, Greening E, *et al*. Investigation into the Alleged Haunting of Hampton Court Palace: Psychological Variables and Magnetic Fields. *J Parapsychol* 66 (1 December 2002).

[35] Williams JM, Blagrove M. Paranormal experiences, sensory-processing sensitivity, and the priming of pareidolia. *PLoS One.* 2022 Sep 14;17(9):e0274595.

[36] Wiseman R, Greening E, Smith M. Belief in the paranormal and suggestion in the seance room. *Br J Psychol.* 2003 Aug;94(Pt 3):285-97.

conjuring tricks.[37] These experiments may show the importance of suggestibility in seances, but have nothing to say about other spiritual encounters, especially when no trickster is present. And the experience of those participants didn't come close to a visible spiritual entity. In any case, imagine I can trick somebody into believing they are seeing a floating skull, by using a holographic projector. It wouldn't be possible to conclude that every other similar vision is the result of the same trickery. One floating skull might be an actual skull concealing a remote-controlled drone. Another might be a hallucination in somebody with mental illness. Who was trying to trick the Pirahas?

Second problem: the Lange-Houran experiment does not tell us about the cause of their correlation. Are people more likely to experience unusual phenomena if they're specifically looking? Probably. You're also more likely to spot a fossil on the beach if you're specifically looking for one. It's not unreasonable that a believer in ghosts is more sensitive to unusual phenomena, and more likely to attribute unusual phenomena to ghosts because of their beliefs. But that doesn't mean none of these unusual phenomena will be 'true' ghosts, only that many of them will be false positives. So are believers more likely to see ghosts because they're more suggestible to these stories, or because they've seen real ghosts before, which is what made them believe in the first place? In other words, did the belief cause ghosts or the ghosts cause belief?

Suggestibility might explain many paranormal experiences, specifically emotional responses since these are easily influenced, but they cannot feasibly explain them all, such as the two examples discussed among other accounts of visible spirit forms. I have included my own account in chapter six, in which a colleague saw a ghost next to me, sadly invisible to anybody else in the room. I'll show how no priming occurred in this case, and neither did prior beliefs explain the incident. But I'm getting ahead of myself. What might explain other spirit encounters?

Here's a rundown of the best scientific explanations so far, in order of

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[37] Hergovich A. The Effect of Pseudo-Psychic Demonstrations as Dependent on Belief in Paranormal Phenomena and Suggestibility. *Personality and Individual Differences* 36, no. 2 (1 January 2004): 365–80.

increasing feasibility.

Explanation by Electromagnetic Interference

Paranormal-like experiences are a known symptom of epileptic seizures involving the brain's temporal lobe. Furthermore, people who report more paranormal experiences also report more temporal lobe signs,[38] i.e. signs of temporal lobe dysfunction. One may therefore hypothesise that paranormal experiences and temporal lobe epilepsy lie on the same spectrum.[39] However, there is only weak evidence that these self-reported 'temporal lobe signs' actually correlate with temporal lobe activity.[40] And actual epileptic activity wasn't tested in these studies. Michael Persinger, who undertook much of this research, nevertheless speculates that changes in the Earth's magnetic field might stimulate the temporal lobe, causing paranormal experiences, and that variation in temporal lobe lability explains varied 'spirit sensitivity'.[41] But do human brains even respond to magnetic fields? One well-conducted study showed a neural response to certain rotations in magnetic fields,[42] detected only in certain participants, but it hasn't been replicated. And even cells in a petri dish respond to magnetic fields, so this isn't evidence that our behaviour is influenced by magnetic fields. Indeed, another similar study didn't find anything at all.[43] However, it's not implausible that humans may have a

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38 Persinger MA. Propensity to report paranormal experiences is correlated with temporal lobe signs. *Percept Mot Skills*. 1984 Oct;59(2):583-6.

39 Persinger MA. Religious and mystical experiences as artifacts of temporal lobe function: a general hypothesis. *Percept Mot Skills*. 1983 Dec;57(3 Pt 2):1255-62.

40 Makarec K, Persinger MA. Temporal lobe signs: electroencephalographic validity and enhanced scores in special populations. *Percept Mot Skills*. 1985 Jun;60(3):831-42.

41 Persinger MA. The neuropsychiatry of paranormal experiences. J *Neuropsychiatry Clin Neurosci.* 2001 Fall;13(4):515-24.

42 Wang CX, Hilburn IA, Wu DA, *et al*. Transduction of the Geomagnetic Field as Evidenced from alpha-Band Activity in the Human Brain. *eNeuro.* 2019 Apr 26;6(2):ENEURO.0483-18.2019.

43 Sastre A, Graham C, Cook MR, *et al*. Human EEG responses to controlled

geomagnetic sense, since many other animals do. The question is whether it might explain paranormal experiences. If the Earth's relatively weak magnetic field was strong enough to be relevant, everyone stepping into an MRI scanner should immediately be haunted. Even your phone should be haunted. In the previously mentioned study of Hampton Court Palace, electromagnetic field strength and variance were measured and only significantly correlated with the reports of unusual phenomena in 2 of 6 areas. Importantly, no difference was found between believers and non-believers. A larger survey of electromagnetic fields at various supposedly haunted sites found only 2 in 50 sites had complex fields varying over time.[44] Persinger has attempted to prove his theory with the infamous 'God helmet', which applies a weak rotating magnetic field to the temporal lobe. He found a significant effect.[45] But a different team found the helmet makes no difference when tested in a double-blind trial (i.e. when nobody knows if the helmet is switched on).[46] No difference in effect was found between the real helmet and a sham helmet either.[47] This isn't surprising. Imagine you're completely unperturbed by the Earth's 45 microteslas (Tesla is the unit of magnetic field strength), such that you need a compass to navigate, but you're unaccountably spooked by the God helmet's measly 1 microtesla. The average MRI magnetic field is 30,000 times stronger than the Earth's. An MRI

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alterations of the Earth's magnetic field. *Clin Neurophysiol.* 2002 Sep;113(9):1382-90.

[44] Braithwaite JJ. Putting magnetism in its place: a critical examination of the weak intensity magnetic field account of anomalous haunt-type experiences. *J. Soc. Psychical Res.* 2008 72 34–50.

[45] Persinger MA, *et al*. The Electromagnetic Induction of Mystical and Altered States Within the Laboratory. *Journal of Consciousness Exploration & Research*. 2010.1 (7): 808–830. ISSN 2153-8212.

[46] Granqvist P, Fredrikson M, Unge P, *et al.* Sensed presence and mystical experiences are predicted by suggestibility, not by the application of transcranial weak complex magnetic fields. *Neuroscience Letters*. 2005. 379 (1): 1–6.

[47] Simmonds-Moore C, Rice DL, O'Gwin C, *et al.* Exceptional Experiences Following Exposure to a Sham "God Helmet": Evidence for Placebo, Individual Difference, and Time of Day Influences. *Imagination, Cognition and Personality*, 2019. 39: 44–87.

scanner's strong magnetic fields (1.5 to 3 teslas) do occasionally induce an experience of strange flashing lights, known as magnetophosphenes, or other sensations such as vertigo, but this is relatively rare.[48] So it's no surprise that attempts to create a 'haunted room' using electromagnetic fields have failed.[49] Detractors would complain the pattern of the field wasn't right. But they'd be missing the point: whether one finds strange electromagnetic fields at haunted locations or not, the key test is whether replicating that field also replicates the experience. Nobody has accomplished this to date.

Explanation by Infrasound

Infrasound is sound below the frequency range of human hearing. In 1998, Vic Tandy, an engineer and lecturer in information technology, famously investigated a 'haunted' laboratory that was causing everyone in it to suffer shortness of breath, cold sweats, depression, and apparitions in the peripheral vision.[50] He uncovered a fan emitting 19 hertz infrasound at the epicentre. Switching it off fixed the problem instantly. A NASA technical report has detailed the resonant frequency of the human eye as 19 hertz,[51] and it turns out the same is for true for much of the human body, including the chest. So Tandy speculated that the vibration of the eye caused 'smearing' of vision which was interpreted as ghosts. This frequency has subsequently been detected at many supposedly haunted locations, such as a cellar beneath a tourist information centre in Coventry.[52]

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[48] Weintraub MI, Khoury A, Cole SP. Biologic effects of 3 Tesla (T) MR imaging comparing traditional 1.5 T and 0.6 T in 1023 consecutive outpatients. *J Neuroimaging.* 2007 Jul;17(3):241-5.

[49] French CC, Haque U, Bunton-Stasyshyn R, *et al*. The "Haunt" project: an attempt to build a "haunted" room by manipulating complex electromagnetic fields and infrasound. *Cortex.* 2009 May;45(5):619-29.

[50] Tandy V, Lawrence TR. The Ghost in the Machine. *Journal of the Society for Psychical Research.* 1998. Vol.62, No 851

[51] Ohlbaum MK. Mechanical resonant frequency of the human eye in vivo, Ph.D. dissertation, Air Force Aerospace Medical Research Lab, Wright-Patterson AFB, OH. 1976.

[52] Tandy V. Something in the Cellar. *Journal of the Society for Psychical Research.*

Unfortunately, there is no baseline infrasound data to compare non-haunted locations to haunted locations, so we may just be seeing a 'positive testing' fallacy. Tandy's measurements themselves are lacking any systematic methodology. The theoretical basis is also shaky: resonant vibrations should cause distortion of the whole vision, not just the peripheral areas. On balance, Tandy's theory does not hold as much water as is popularly assumed,[53] and attempts to use infrasound to create a 'haunted room' have failed (i.e. the same 'haunted room' study as before).

Explanation by Toxicity

The usual suspects are carbon monoxide (CO), formaldehyde and pesticides. The former is most common. Symptoms of CO toxicity include: headache, dizziness, chest pains, and a constant sense of dread. Investigative journalist, Carrie Poppy, gave a TEDx talk in 2016 describing her own experiences.[54] She went through multiple psychiatrists and spiritual mediums before someone on the internet advised to ring her gas company. Doing so saved her life. She wasn't the first to suffer this experience. One of the earliest reports of CO toxicity being confused with a haunting (including hallucinations and physical illness) was published in the American Journal of Ophthalmology in 1921.[55] Mould exposure may also cause hallucinations,[56] such as in ergotism, so it's been suggested that moulds in old books may induce a ghostly experience.

2000. Vol.64.3, No 860

[53] Braithwaite J, Townsend M. Good vibrations: The case for a specific effect of infrasound in instances of anomalous experience has yet to be empirically demonstrated. *Journal for the Society of Psychical Research.* 2004. 70 (885), p211-224.

[54] Poppy, Carrie. 'Carrie Poppy | Speaker | TED'. https://www.ted.com/speakers/carrie_poppy.

[55] Wilmer WH. Effects of Carbon Monoxide upon the Eye. *American Journal of Ophthalmology* 4, no. 2 (1921): 73–90.

[56] Hyvönen S, Lohi J, Tuuminen T. Moist and Mold Exposure is Associated With High Prevalence of Neurological Symptoms and MCS in a Finnish Hospital Workers Cohort. *Saf Health Work.* 2020 Jun;11(2):173-177.

Explanation by Hallucination

Physiological hallucinations. Transition states of consciousness have long been observed to cause hallucinations. These are known as hypnagogic or hypnopompic hallucinations, when a person is falling asleep or waking up, respectively. We call them 'physiological' because they appear to be normal and common.[57] Occasionally, a person may experience sleep paralysis during hypnagogia, whereby the 'body' has fallen asleep but the 'mind' remains partially conscious, which is a known consequence of the rapid eye movement (REM) stage of sleep. Hallucinations may occur during these episodes (colloquially called 'night terrors'), making them particularly…terrifying.[58] Last, bereavement hallucinations (i.e. those involving a recently deceased loved one) are so common they are probably the norm rather than the exception,[59] assuming they are in fact hallucinations. The fact is, although I've included this category in a list of 'scientific explanations', we don't know why these hallucinations occur. We think the aforementioned REM stage of sleep might be involved, if it's intruding into wakeful consciousness, but there's not enough evidence to be sure.[60] Most people are reassured to know they are 'normal' though, so this mystery is often overlooked.

Psychopathology. Hallucinations and delusions occur in psychotic disorders such as schizophrenia, or may be artificially induced by psychoactive drugs. We don't fully understand these hallucinations

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[57] Ohayon MM, Priest RG, Caulet M, *et al*. Hypnagogic and hypnopompic hallucinations: pathological phenomena? *Br J Psychiatry*. 1996 Oct;169(4):459-67.

[58] Stefani A, Högl B. Nightmare Disorder and Isolated Sleep Paralysis. *Neurotherapeutics*. 2021 Jan;18(1):100-106. doi: 10.1007/s13311-020-00966-8. Epub 2020 Nov 23.

[59] Kamp KS, Steffen EM, Moskowitz A, *et al*. Prevalence and Phenomenology of Sensory Experiences of a Deceased Spouse: A Survey of Bereaved Older Adults. *OMEGA - Journal of Death and Dying*. 2023. 87(1), 103-125.

[60] Waters F, Blom JD, Dang-Vu TT, *et al*. What Is the Link Between Hallucinations, Dreams, and Hypnagogic-Hypnopompic Experiences? *Schizophr Bull*. 2016 Sep;42(5):1098-109.

either, but we at least know they're caused by disease.

Explanation by Environmental Physics

These are the less interesting but easily misidentified phenomena, which Vic Tandy lists as follows in his 1998 paper: water hammer in pipes and radiators (noises), electrical faults (fires, phone calls, video problems), structural faults (draughts, cold spots, damp spots, noises), seismic activity (object movement/destruction, noises), and exotic organic phenomena (rats scratching, beetles ticking). I've missed off electromagnetic fields from his list as I discussed this above. I'll add another common one in its place though: slightly wonky shelves (apparent sudden movement of objects). I don't have much to say about these things because they're probably responsible for most paranormal experiences.

None of these theories are likely to explain Everett's and Baxstrom's accounts, but it's important to get all the major scientific explanations for spiritual encounters out of the way before continuing. All of these explanations together, along with the inevitable hoaxes, tell us the majority will be explainable by known scientific phenomena. I cannot emphasise this enough: if spirits exist, they are responsible for a minority of the reported experiences.

So let's imagine, having ruled out these things, we find a 'real' spirit and wish to assess its capabilities. What do we do?

CHAPTER TWO

The Measurement Problem

In which we analyse the forces through which spirits might interact with the world, and how we might therefore perceive them

To study a phenomenon, is to measure it. This is currently the greatest barrier to a scientific study of spirits. At first glance, we'd assume that without a reliable ability to measure their properties, we cannot draw objective conclusions. But it's the very thing that defines them, that lack of physicality, which makes measurement difficult, since physicality is a necessary property of our measurement devices. How might we surmount this problem?

Consider the types of forces through which we interact with anything. What's known as the standard model of physics, our best description of reality, describes four fundamental (i.e. irreducible) forces: gravity, strong nuclear, weak nuclear, and electromagnetic. The majority of human technology is based on manipulating the electromagnetic force, which encompasses the phenomena of light, electricity and magnetism.

Electromagnetism

What actually is this electromagnetic force? We find an explanation within quantum electrodynamics, considered the jewel of modern physics because of its incredibly accurate predictions.[61] In this theory, the electromagnetic force is described as 'mediated' by a particle known as the photon, the smallest possible discrete unit of light. This means the electromagnetic force is said to be experienced when a photon is exchanged between two other particles, such as the electrons in atoms. For example, if a camera is to capture an image of your face, the electrons in the detector material must absorb incoming photons from your face. The resultant increase in an electron's energy causes it to be ejected (known as the photoelectric effect), and it can then be stored for measurement. Many people claim to have captured the image of a spirit using a camera. If they are right, these spirits must therefore interact with the electromagnetic force. This has several implications:

- Spirits should reflect light, making them readily detectable via our cameras.
- Spirits must possess their own electromagnetic fields, which should also be measurable. What is a field in physics? Simply put, it's an abstraction, defined as a region in which every coordinate has a quantity associated with it. For example, a magnetic field is a region of space in which every point has an associated magnetic field strength. The magnetic field happens to be a vector field (as opposed to scalar), which means every point has not just a magnitude but a direction too. In the context of a force, this direction is called 'charge'. For example, a negative charge in a positive field will experience attraction, and the strength of attraction depends on the charge's location in the field. Spirits should therefore also have a positive or negative charge, and experience attractive/repulsive forces. Has anybody ever dangled a magnet in front of a ghost? I don't know, but all of this serves as the rationale for the EMF metres so beloved by the modern ghost-hunter. Electromagnetic fields are all measurable with such a device,

[61] Feynman, Richard P. *Quantum Electrodynamics*. 1st edition. Boca Raton London New York: Perseus, 1998.

although the measurements easily confounded by environmental stimuli like wiring and light-switches.

- Electromagnetic fields can be manipulated. If a spirit is sustained by an electromagnetic field, we could easily increase the electromagnetic energy available to said spirit, thereby increasing the likelihood of manifestation. Ghost-hunters sell purpose-built 'EMF pumps' based on this idea, but in fact, we already surround ourselves with strong electromagnetic fields. MRI scanners use terrifically strong magnetic fields. How often are these rooms haunted? More pertinent to the average person, microwave ovens or mobile phones should also attract or 'feed' spirits. I wish my microwave was haunted, but it's not.
- Spirits comprise the same energy as us. As far as we know, photons can only interact with the same particles we're composed of, the same units of matter that make up everything else. So if spirits are of the same category of 'stuff' as the rest of the observable universe, what's the difference? Some postulate that spirits are beings of 'pure energy', which would mean they comprise only the particles that mediate the fundamental forces e.g. photons. It's not easy to imagine how this would work, but the idea is an old one. In the *Qur'an*, it's written that *Djinn* are created by God from 'subtle/smokeless fire',[62] although more likely this relates to the distinction between spirituality and physicality.

No photographs or EMF measurements have definitively been attributed to spirits. It's true some people have taken good photographs, even films, but all are now dubious. The first problem is, photography and filmography no longer carry any weight of evidence. Fakery is too easy. The second problem is, if spirits can be photographed, the commonality of smartphone cameras means we should be inundated with credible, high-quality images. We are not, even accounting for the first problem. If spirits are dead people, even more so, since the dead outnumber the living. The third problem is, many industries use EMF monitoring to pinpoint electrical leaks from faulty power-lines. At least one company would've detected any

[62] Qur'an 15:27.

anomalies, but none have.

In the final analysis, any electromagnetic phenomenon should be reliably measurable with modern technology. After all, the electromagnetic force is the one that humans have mastered the most: optics, electronics, and chemistry dominate our lives. But we haven't detected spirits this way.

Even if we ignore this fact, accounts of spirits portray them interacting with physical objects in ways forbidden by the laws of electromagnetism. For example, one object cannot pass through another because of repulsive electrostatic forces – hence why you can sit on a chair and not fall through it. You're actually never properly touching the chair because of the electromagnetic force. But ghosts pass through walls with ease. One might point out that some wavelengths of light do pass through walls, and this is correct. For example, you need a thick shield of lead to block gamma rays, but just a thin sheet of copper will block infrared. This ends up being irrelevant for two reasons: (1) We can only see visible light by definition, which is therefore how we see ghosts, and these wavelengths are indeed blocked by walls. (2) No metal is commonly employed to impede a ghost's progress, which is unusual given how many other strange techniques are used by ghost-hunters and demonologists. Throwing salt over your shoulder doesn't terminate electromagnetic fields, and neither does prayer. On the contrary, these seem to be the equivalent of leaving your door unlocked and politely asking a thief to stay out, instead of just barricading the door shut. Perhaps ghost-hunters should carry sheets of different metals instead, to see if they can foil a poltergeist's mischief, literally.

There is one notable exception: iron is said to repel malevolent spirits in many cultures. Most famously, the biblical King Solomon used iron shackles to tame demons,[63] and Western magicians followed his example thereafter. God, who such people often consider as just another spirit, isn't too keen on iron either, for as it says in *Judges*:[64]
"And the LORD was with Judah; and he drove out the inhabitants of the mountain; but could not drive out the inhabitants of the valley,

[63] Solomon. *The Testament of Solomon*. Translated by Frederick Cornwallis Conybeare. Mockingbird Press, 2017.

[64] Judges 1:19.

because they had chariots of iron." It's forbidden to even touch any of God's altars with iron, let alone build one from it.[65] In medieval England, iron fences built around graveyards were said to constrain the spirits of the dead. And if you've ever relied on a horseshoe for good luck, you've also engaged with this trope, as the power is said to be in the iron itself rather than the shape. In one of the oldest examples, Pliny the Elder in his *Natural History*[66] advises that an iron nail from a tomb, driven above a door frame, will deter evil spirits. Use of iron nails in this way is found in the folklore of many European countries, from Belgium to Slovenia.[67] We wouldn't want to exclude non-Western traditions either. A Buddhist talismanic blade, the *phurba*, is also forged from iron for this reason.[68]

It's unclear why iron is so hateful to these spirits, although it's suggested God hates iron because it's used to kill people and fairies hate it because they get offended by people digging up the lifeblood of their earth. In Tibetan mythology, meteoric iron is sacred because of its heavenly origins. But many occultists today claim it's something to do with electromagnetic field interference. The argument usually goes like this: spirits subside on electromagnetic energy, but iron 'grounds' this energy like a lightning rod, hence weakening the spirits. There's never any mention of other electrical conductors here, one of which is more important: you. If you or your home weren't conductive, you wouldn't need a lightning rod, which is just a piece of metal designed to act as an electrical path of least resistance for a lightning bolt so it doesn't pass through you or your television. All homes in the United Kingdom must be earthed by law. That's what the top prong of our electrical plugs is for, and why other countries get away with using plugs of two prongs only. And yet, despite having the safest plugs in the world, the United Kingdom is one of the most haunted countries in the world.

The other main occultist theory then: iron disturbs the navigational

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65 Exodus 20:22, Deuteronomy 27:6.

66 Pliny, translated by H. Rackham. *Natural History, Volume I: Books 1-2*. Revised edition. Cambridge, Mass.: Loeb, 1989.

67 Kropej, Monika. *Supernatural Beings from Slovenian Myth and Folktales*. Založba ZRC, 2012.

68 Müller-Ebeling, Claudia and Christian Rätsch and Surendra Bahadur Shahi. *Shamanism and Tantra in the Himalayas*. Transl. by Annabel Lee. Rochester, Vt.: Inner Traditions. 2002.

senses of a spirit in the same way it disturbs the accuracy of a magnetic compass. The problem with this theory is, you can still use a magnetic compass on an iron ship. You just have to account for the 'deviation' caused by the iron, which is easy to do: spin the ship around and measure the deviation at each heading, then add or subtract to any subsequent heading. Every ship has a corresponding deviation table or graph for this purpose, vital to navigation. In any case, the world is full of natural iron, so any being whose senses are affected by it should be able to cope with the meagre iron content of a horseshoe, in the same way that humans are accustomed to natural daylight and therefore don't flee from light bulbs. The main counterargument to this: spirits don't normally wander around our world unless we drag them down into it. However, most people who see spirits haven't attempted to summon them beforehand so we won't discuss it further here.

Occasionally, one other metal is purported to repel evil spirits: silver. This metal has the highest electrical conductivity of any element, and that's still irrelevant because all of the same problems apply. If iron or silver repel spirits, we can't blame the electromagnetic force.

All in all, the electromagnetic theory of spirits must be jettisoned, or at least heavily modified. If spirits do interact with the electromagnetic force, it's clearly not their strength.

The Other Forces

You'll recall three other fundamental forces in physics. We already know of matter that interacts only through gravity. We call it dark matter and it seems to make up 30% of the observable universe. However, poltergeist activity is virtually never confined to gravitational disturbances. Apparitions, flickering lights, and loud noises are all manifestations of the electromagnetic force. Manipulation of gravity could only explain movement or levitation of objects. Even so, gravitational field changes are easily detectable through the use of a simple laser pointer, because gravity bends light—we call it gravitational lensing and astronomers see it all the time around black holes. Nobody has ever reported the bending of a laser beam in the presence of a spirit, even though laser grids are certainly used by

ghost-hunters to detect ghostly movements. If we're honest, trying to use the force of gravity to explain entities known precisely for their ability to defy it was never likely to succeed. So what about the strong and weak nuclear forces? We can rule these out on the basis that their effects are confined to the nuclei of atoms, due to their colourful properties and short range, respectively.

We must now begin again, this time from the assumption that spirits don't exist in the same manner as the matter and energy currently measurable by physicists. If this is the case, how is anyone perceiving them?

Mechanisms of Perception

Consider how our brains receive and process different inputs. A computer receives input, processes it, and produces a corresponding output. But a brain is not analogous to a computer, because a brain can process and produce output in the absence of any input. We know that in the state of sensory deprivation, the brain will generate its own perceptions in a psychotic-like experience wholly unrelated to the outside world (e.g. recall those sensory deprivation tanks from the 1970s).[69] This isn't the only circumstance in which the brain will hallucinate.

Surveys show that as many as 60% of people who've lost their spouses report at least one grieving hallucinatory experience.[70] These can be auditory, visual or even a felt presence. We don't know why they happen, but we know they're common. Some people might point to this fact as proof of ghosts, but then they must explain why only the grieving person is subject to the experience. If something objectively exists, it should be experienced by everyone in its vicinity, shouldn't it?

Many accounts do exist of tourist-group ghost sightings,

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[69] Daniel C, Mason OJ. Predicting psychotic-like experiences during sensory deprivation. *Biomed Res Int.* 2015;2015:439379.

[70] Castelnovo A, Cavallotti S, Gambini O, *et al*. Post-Bereavement Hallucinatory Experiences: A Critical Overview of Population and Clinical Studies. *Journal of Affective Disorders* 186 (1 November 2015): 266–74.

particularly at battlefields e.g. Gettysberg.[71] Platoons of soldiers are reported to march obliviously past these tourists, their feet hovering at the level of a road that no longer exists. Attempts to photograph these ghosts are usually unsuccessful, because the photograph, even if taken quickly enough, never seems to match the subjective experience. A pale wisp, perhaps in the vague shape of a head, might be captured by the camera, in stark contrast to the cavalry in full regalia reported by eyewitnesses.

The most logical conclusion is as follows: the image is not formed by photons, but mostly by something else. In other words, the data used by the brain to construct the visual perception of ghosts is not generated by the eyes, but by another sensory faculty. The question then, is what?

It's clear no other conventional sensory organ can be responsible for the reasons already discussed. Possible but extremely unlikely is the existence of a sensory organ as yet undiscovered, but anatomists are generally more trustworthy than that. Whatever the source, we know our primary sensory organs are densely concentrated within the head. This is, in fact, the key purpose of a head, and is so advantageous a design that heads containing complex brains (i.e. concentrations of the nervous system and sensory organs) have evolved independently at least nine times in the animal kingdom—a process known as cephalization.[72] If we possess an undiscovered sense then, probability dictates the most likely location will be the head.

Another clue: any sensory organ external to the brain requires its own cranial nerve to transmit information to the brain. For example, the eyes have the optic nerves and the ears have the vestibulocochlear nerves. Here's the problem: no cranial nerve is unaccounted for. Each of the twelve cranial nerve pairs is well studied, and we know their courses and functions.[73] If the source is not external to the brain then,

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[71] Nesbitt, Mark. *Ghosts of Gettysburg: Spirits, Apparitions and Haunted Places on the Battlefield: Volume 1*. Second Chance Publications, 2015.

[72] Moroz LL. Phylogenomics meets neuroscience: how many times might complex brains have evolved? *Acta Biol Hung*. 2012;63 Suppl 2(0 2):3-19.

[73] Alan R. Crossman PhD, and David Neary MD FRCP. *Neuroanatomy: An Illustrated Colour Text*. 6th edition. Amsterdam: Elsevier, 2019.

the only remaining place to search is within the brain itself. Many structures of the brain are mysterious in some way, so an unknown sensory function in some part of the brain is certainly feasible from a biological perspective.

This mystery sensory faculty might also be leveraged to unify a number of other paranormal experiences, such as telepathy and precognition, if you think they're real. The usual name given to it by enthusiasts is 'the third eye', and the usual candidate floated by these enthusiasts is the pineal gland, located near the centre of the brain.

The Pineal Gland Hypothesis

In some animals, this gland is linked to a vestigial eye which does actually detect light. In humans, the pineal gland's major function is to secrete a hormone called melatonin, which regulates our sleep patterns. As the brain ages, the gland accumulates calcareous deposits. We don't know why this calcification happens, but it impairs the gland's ability to secrete melatonin, and is probably the reason why elderly people tend to suffer wake-sleep cycle disturbances.

Now for the big question: why are spiritualists interested in the pineal gland? The answer is they think it produces a psychoactive chemical called N,N-dimethyltryptamine (DMT), which is one of the active ingredients in the ayahuasca drink used by Amazonian shamans. DMT is a potent hallucinogen which induces an enlightenment experience often described as religious in nature.[74] One of the pioneers of hallucinogen research, Dr Rick Strassman, administered DMT to nearly 60 volunteers in the 90s and found almost half of them claimed to have interacted with non-human beings. Although the DMT molecule is a cousin of psilocybin (of 'magic mushroom' fame), and both induce experiences of 'oneness' with the universe, their effects appear to be qualitatively different. Psilocybin completely dissolves the ego (i.e. one's sense of self), whereas DMT appears to preserve it, hence allowing an interaction between the self

[74] Davis AK, Clifton JM, Weaver EG, *et al*. Survey of entity encounter experiences occasioned by inhaled *N,N*-dimethyltryptamine: Phenomenology, interpretation, and enduring effects. *J Psychopharmacol.* 2020 Sep;34(9):1008-1020.

and the hallucination. Dr Strassman's conjecture was that DMT floods the brain at the time of death, causing the psychedelic 'near-death experience' occasionally reported by those lucky enough to recover from a cardiac arrest. He popularised his ideas in *DMT: The Spirit Molecule*,[75] in which he concludes that the function of DMT might be to usher the soul in and out of the body during birth and death. Since Strassman, many researchers have compared DMT hallucinations and near-death experiences, discovering persuasive similarities.[76] Also, we know the dying brains of rats and humans exhibit a spike in gamma waves (a pattern usually indicative of consciousness) at the time of death,[77] and in 2019, Borjigin and Strassman found that dying rat brains do indeed release a surge of DMT.[78] But, although the evidence is accumulating, we still have no clear-cut evidence the same is true of human brains.[79] The tests are invasive and humans prefer to die peacefully. We don't even have any evidence the human pineal gland produces DMT. We only know it's produced somewhere in the body because we find minute traces of it in the blood. It may just be a waste-product.

This is an area of ongoing research so let's park the DMT bandwagon for now, because spiritualists have been interested in the pineal gland from long before Strassman.[80] This should make you more, not less, suspicious. Descartes is often quoted here: 'this gland is

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[75] Strassman, Rick. *DMT: The Spirit Molecule: A Doctor's Revolutionary Research into the Biology of Near-Death and Mystical Experiences*. Later Printing edition. Rochester, Vt: Inner Traditions Bear and Company, 2001.

[76] Timmermann C, Roseman L, Williams L, *et al*. DMT Models the Near-Death Experience. *Front Psychol.* 2018 Aug 15;9:1424.

[77] Borjigin J, Lee U, Liu T, *et al*. Surge of neurophysiological coherence and connectivity in the dying brain. *Proc Natl Acad Sci U S A.* 2013 Aug 27;110(35):14432-7.

[78] Dean JG, Liu T, Huff S, *et al*. Biosynthesis and Extracellular Concentrations of N,N-dimethyltryptamine (DMT) in Mammalian Brain. *Sci Rep*. 2019 Jun 27;9(1):9333.

[79] Barker SA. N, N-Dimethyltryptamine (DMT), an Endogenous Hallucinogen: Past, Present, and Future Research to Determine Its Role and Function. *Front Neurosci.* 2018 Aug 6;12:536.

[80] Shoja MM, Hoepfner LD, Agutter PS, *et al*. History of the pineal gland. *Childs Nerv Syst.* 2016 Apr;32(4):583-6.

the principal seat of the soul',[81] but it's difficult to trust the opinion of a man who didn't even know where the pineal gland is in the brain. All of his anatomical descriptions of the gland are wrong, even in the context of what was known by doctors at the time. Furthermore, Thomas Willis, in 1681, argued the pineal gland couldn't be the seat of the soul because most animals have this gland, and of course, only a human can have a soul.[82] If you think other animals can have souls too, you won't care, but it's a nice counterargument otherwise. Last, spiritualists like to overlay a picture of the eye of Horus on a picture of a brain, to prove the ancient Egyptians knew about the pineal gland as the 'third eye'. Visiting any museum should dissuade you of this idea. Mummification specifically requires the removal of the brain through the nostrils with a long spoon, because the ancient Egyptians thought it was unimportant rubbish. All organs were removed except for the heart, which was believed to be the true centre of a person's being and intelligence, and therefore the only organ necessary for the afterlife.

Ignorance of the ancients aside, we should ask: has anyone actually tested whether there's a difference between the pineal glands of 'spirit sensitive' people and the average Joe? A Brazilian team looked at the volume of the pineal gland (on MRI) and level of urinary 6-sulfatoxymelatonin (the main metabolite of melatonin) in 16 mediums compared to 16 healthy controls.[83] No difference was found. While bad for the pineal gland hypothesis, this is good news for mediums, as it's evidence they're not just mentally ill (pineal gland abnormalities are associated with schizophrenia). In fact, as the authors state, "evidence increasingly demonstrates that culturally well-integrated mediums are often mentally and physically healthy."

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[81] Verbeek, Theo, and Erik-Jan Bos. 'Treatise on Man'. In *The Cambridge Descartes Lexicon*, edited by Lawrence Nolan, 725–27. Cambridge: Cambridge University Press, 2015.

[82] Willis, Thomas. Discourse of Musculary Motion. In Willis, Thomas, The Remaining Medical Works, edited and translated by Samuel Pordage, volume 2, 34– 49. London: Printed for T. Dring, C. Harper, J. Leigh, and S. Martyn. 1681.

[83] Bastos MAV Jr, Bastos PRHO, E Paez LEF, *et al*. "Seat of the soul"? The structure and function of the pineal gland in women with alleged spirit possession-Results of two experimental studies. *Brain Behav.* 2020 Jul;10(7):e01693.

Clairvoyance

Let's return to the topic at hand, because actually, it doesn't matter where in the brain we might find the source of spirit perception. What's important for now is the basic idea: the organ that perceives spirits should be the brain itself. As people have different levels of vision due to differing eye anatomy, people might have different levels of spirit sensitivity. A few implications of this idea:

- Just as you can be trained to spot rare insects camouflaged among the soil or pick out specific musical motifs among a complex fugue, perhaps you can be trained to make better use of spirit perception.
- Just as you can augment your vision with spectacles, perhaps some device or drug might augment spirit sensitivity.
- Just as you can be congenitally deaf or blind, perhaps some people are congenitally bereft of spirit sensitivity.

I'm going to stop calling it 'spirit sensitivity' now. It's a mouthful. One-word terms only. 'Clairvoyance' is probably the best fit. Note: I'm not going to include in this definition the abilities of precognition, remote viewing, or other kinds of extrasensory perception, although they are usually considered types of clairvoyance. These things are too easy to test, and the well-designed tests are unanimous: nobody can do these things reliably under controlled conditions. The most profitable skill of mediumship is 'reading' information about people, usually claimed to work via psychic ability or receiving information from spirits, and tests have also shown whatever this is to be ineffective.[84] So we are sticking only to pure spirit sensitivity for now. When a clairvoyant (who may not necessarily be a professional medium) can see a spirit manifestation but nobody else can, the explanation is that nobody else's clairvoyance is adequate. You can see this as an excuse or as natural variation. Not every golfer can pot a hole-in-one.

In truth, this explanation equally applies to those other clairvoyance skills. If only 1 in 10,000 people are precognisant, combining their test results with a thousand failed test results is going

[84] O'Keeffe C, Wiseman R. Testing alleged mediumship: Methods and results. *British Journal of Psychology,* 2005. Vol. 96, 165–179.

to lose you the signal. Counterargument: all volunteers claim significant levels of clairvoyance. My response: 80% of people rate themselves as above-average drivers. By definition, only 50% of people can be above an average. It's called the Dunning-Kruger effect.[85] Despite this annoyance, many people (a few famous scientists among them e.g. Alan Turing)[86] think there is good statistical evidence of telepathy, but that's not the topic of this book so we won't dwell on it.

How would you know if you're clairvoyant? How could you tell what spirit perception 'feels' like? It's easy to forget that the average human mind is subject to a 'background noise' of thoughts and feelings, a maelstrom of cerebral activity which makes concentration tricky. The cure for this chaos is meditation, essentially training oneself to maintain a singular focus. Meditation is employed in mystical traditions around the world, such as meditative Kabbalah[87] in Judaism and the use of Koans[88] in Zen Buddhism. Its effects on mental health are well studied, negative as well as positive.[89]

With this in mind, it may simply be the case that most people's thoughts are too unfocused, rendering them incapable of detecting the signal among the noise. Clairvoyants often talk about atmospheric changes accompanying a spirit manifestation, typically a subjective temperature drop or a felt presence. Dramatic emotional changes might also be reactions to spirits. For example, touching a supposedly haunted object often invokes sudden intense fear. If you've got lots of other emotions swirling around, lots of serotonin and dopamine distracting you, perhaps you'll miss the specific flush of

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85 Dunning, David. "Chapter Five – The Dunning–Kruger Effect: On Being Ignorant of One's Own Ignorance". *Advances in Experimental Social Psychology*. Vol. 44. Academic Press. pp. 247–296. 2011.

86 Leavitt, David. 'Turing and the Paranormal'. In *The Turing Guide*, edited by Jack Copeland, Jonathan Bowen, Mark Sprevak, and Robin Wilson. Oxford University Press, 2017.

87 Kaplan, Aryeh. *Meditation and the Kaballah*. New edition. Vancouver: Red Wheel/Weiser, 1986.

88 Yamada, Koun. *The Gateless Gate: The Classic Book of Zen Koans*. New edition. Boston, Mass: Wisdom Publications,U.S., 2004.

89 Goyal M, Singh S, Sibinga EM, *et al*. Meditation programs for psychological stress and well-being: a systematic review and meta-analysis. *JAMA Intern Med.* 2014 Mar;174(3):357-68.

neurotransmitters caused by the detection of a spirit.

Maybe this is why clairvoyants often say it's easier to 'see energy' in the dark, leaving aside the question of what they mean by 'energy'. It's universally acknowledged that ghost-hunters and occultists love to do everything in the dark. Sceptics would explain that darkness is so beloved because it increases the chances of error. For example, not many amateur ghost-hunters understand the nuances of their technology, and care only that it bleeps and flashes. So the most popular ghost-hunting equipment is deliberately engineered to be glitchy, to produce random static, all the better for your pareidolia to uncover patterns that aren't really there. Darkness does exactly the same thing to our vision, which is our primary sense. In the dark, that coat hung over a chair looks much like a burglar. However, bin the useless tech and the darkness can be useful for focusing the other senses, in the same way that a visually impaired person might develop a more acute sense of hearing. Closing the eyes to blot out distractions is a popular shortcut to meditation.

In fact, focusing the mind is not massively tricky. Possibly I am being overly harsh in assuming most people have no clairvoyancy. A poll in 2017 found that 33% of surveyed Britons admitted to believing in ghosts, and 21% hadn't made up their mind.[90] Of this 54% of people, 40% reported seeing or feeling the presence of paranormal activity in the past, with a further 24% saying that may have had a paranormal experience. Younger people were more likely to have seen a ghost. We can't say how many of these people misidentified whatever they were experiencing, how many flickering lights turned out to be loose wiring. In fact, the majority should be explainable this way, as previously discussed. If so, only a small percentage of the population have some level of clairvoyancy, but even a small percentage of a population of millions is still a lot of people. Anyhow, the percentage of the population with a high level of proficiency in any given skill is always low. How many people are naturally good at tennis without rigorous training? Again, people tend to overestimate their own skills: most people who think they're good at tennis

[90] Lewis, Kayleigh. 'BMG Halloween Poll: A Third of Brits Believe in Ghosts, Spirits or Other Types of Paranormal Activity'. *BMG Research* (blog), 30 October 2017. https://www.bmgresearch.co.uk/bmg-halloween-poll-third-brits-believe-ghosts-spirits-types-paranormal-activity/.

wouldn't last two seconds against one of history's greats. Natural talent or genius is so rare we have a specific term for people said to possess it: child prodigy.

Training a Skill

Consider how we might identify a child prodigy pianist. Teach any child to play the piano from a young enough age and they'll end up playing at a level that seems incredible to the musically illiterate. So what's the difference between such a person and a genius like Mozart, who was composing at the age of five? Actually, not much. Mozart developed into a prodigy because of the life-long sacrifices of his father Leopold, a brilliant musician and dedicated teacher, who spent his life dragging Mozart from one high-profile recital to the next. Mozart's sister was also a talented pianist, having also been taught by their father from early on – the guinea pig for his teaching methods. In summary, Leopold Mozart made it his life mission to turn his children into musical prodigies, and he succeeded. We see a similar story with the Hungarian educational psychologist, Laszlow Polgar. Having studied the biographies of hundreds of famous intellectuals, he realised all had two things in common: 'they all started at an early age and studied intensely'.[91] So he tested his ideas on his own children, purposefully moulding them into chess geniuses, and sure enough, all three of his daughters— Susan, Sofia, and Judit —made chess history. Time and time again, the pattern repeats. Boris Sidis, also a psychologist, turned his son, William, into a polymath who could converse in 25 languages. A tennis coach named Richard Williams developed a training schedule that successfully transformed his daughters into household names: Serena and Venus Williams.

The key to attaining clairvoyancy (or any skill) then, should be comprehensive training, and to train a skill, one needs to assess current skill so as to provide feedback. It's easy to tell when someone is playing tennis properly: they win. It's not easy to tell when someone is, say, detecting radio waves, because you can't see radio waves yourself.

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[91] Myers, Linnet. "Trained To Be A Genius, Girl, 16, Wallops Chess Champ Spassky For $110,000". *Chicago Tribune*. 18 February 1993. Archived from the original on 19 October 2018.

An easy solution would be to employ a device built for the purpose of detecting radio waves. So, now imagine we don't have one. Imagine we're not even sure radio waves exist. Then what?

If you can't detect spirits yourself, can you at least assess somebody else's ability to detect spirits?

Theoretically, yes. That's the subject of the next chapter. However, readers less interested in anatomy and medical engineering may wish to skip to the chapter that follows it, which deals with the meatier question of what a spirit actually 'is'.

CHAPTER THREE

Assessing Vision

In which we devise a method for assessing a person's spirit sensitivity, also known as clairvoyance

When people recount their spiritual encounters, they usually report seeing…something, from blue spheres of light or wisps of smoke, to apparitions of humanoids or frightening beasts. But didn't we decide it's unlikely spirits are reflecting or emitting any photons detectable via our eyes?

Actually, the primacy of vision in spiritual encounters makes sense in the context of what we know about people with no vision. Among those born blind, many learn to use echolocation: the ability to navigate using only sound. They achieve this by clicking their tongues and listening to the echoes so as to judge the distance from obstacles, even building up a mental picture of their surroundings. Here's how: the region of the brain responsible for vision, the occipital cortex, can adapt to process non-visual input in the absence of any visual input.[92] In other words, these blind people are 'seeing' sound in much the same way the average person sees light. I've already mentioned a more

[92] Norman LJ, Thaler L. The Occipital Place Area Is Recruited for Echo-Acoustically Guided Navigation in Blind Human Echolocators. *J Neurosci.* 2023 Jun 14;43(24):4470-4486.

direct way the occipital cortex may produce the experience of vision in the absence of visual stimuli: magnetophosphenes— although rare, the magnetic fields of MRI scanners can induce flashing lights. If the occipital cortex can be recruited to process sound, perhaps it's also recruited to process whatever is being sensed in spirit perception.

Before attempting to solve the problem of assessing spirit vision, it'll therefore be instructive to solve the problem of assessing 'normal' vision.

Visual acuity is the ability to distinguish between two objects. The smaller the distance between the two objects, the better your visual acuity. It's the most basic measure of vision, the function of the eye, and is frequently the only thing I care about. The easiest way to measure visual acuity is to ask your patient to read a Snellen chart, which displays a group of letters of decreasing sizes. The smaller the letters they can read, the better their visual acuity.

Rarely, a patient cannot read a Snellen chart because, for example, they are illiterate or unable to communicate. Illiteracy has an obvious solution: the 'tumbling E' chart, comprising letter 'E's pointing in different directions that the reader must indicate ('up, left, left, down' and so on). The latter problem is more challenging. You could ask the patient to take a formal visual field test, whereby a light is flashed in different places and the patient is asked to push a button whenever they see it. But occasionally a patient might not be capable of pushing a button, or even moving their eyes. And a pre-verbal child might be perfectly capable but not cooperative. So we see visual acuity relies on behaviour; it's actually a subjective measure.

In a case where no outward signs of consciousness can provide information on what a patient is thinking and seeing, the only viable solution is to measure the electrical activity of the brain, using an electroencephalograph (EEG). This is basically a headset made of electrodes placed across the scalp, so it's portable and cheap relative to other diagnostic tests.

Electroencephalography

When we want to know specifically whether a patient can see or not, we can measure the electrical activity of the region of the brain

responsible for vision: the occipital lobe. This EEG waveform is called a visually-evoked potential (VEP), which is a subtype of event-related potentials i.e. any EEG waveform triggered by an event, which in the case of a VEP is a visual stimulus. There is a correlation between visual acuity and the amplitude of the VEPs, although it's by no means easy to sift out the various confounders and compare the leftovers with suitable reference data to estimate visual acuity. But it can be done.

More interestingly, VEPs can reveal information about objects we can't directly see. The setup of Wang and Faccio's 'ghost imaging' experiment[93] is as follows (and there's a diagram in their paper if this description is too confusing): a light projector illuminates an object, and the transmitted light is diffused by ground glass onto a wall, which is divided by a second wall in a T-shape. A person is on the other side of the second wall to the projector, so can only see a vague pattern of light diffusing through the slit between the two walls. It's impossible for any person to identify the object from this faint shadow. Next, the light is flickered at a particular frequency, creating a particular frequency of VEPs in the person's brain. These are processed computationally with an adaptive feedback loop, to reconstruct a 16x16 pixel image of the object, which I remind you, cannot be directly seen by the person.

If VEPs can show us that kind of information then, spirit perception shouldn't be any trouble. The basic idea, is to measure VEPs of a clairvoyant in the throes of spirit perception. If these VEPs are found to be similar to those resulting from visual stimuli, we'll know we've found something worth investigating. And if they claim to hear a spirit's voice, we can similarly measure activity in the auditory cortex. It's already possible to predict imagined speech using an EEG headset, to a limited extent.[94]

The problem is, imagined speech is precisely what the 'spirit's voice' might turn out to be: fraud. Imagined imagery might also confuse our interpretation of VEPs, because the brain processes

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[93] Wang G, Faccio D. Computational Ghost Imaging with the Human Brain. *Intell Comput.* 2023;2:0014.

[94] Lopez-Bernal D, Balderas D, Ponce P, *et al*. A State-of-the-Art Review of EEG-Based Imagined Speech Decoding. *Front Hum Neurosci.* 2022 Apr 26;16:867281.

imagined imagery the same way as real imagery.[95] Unfortunately, there's no statistical test for cheating.

Two-factor authentication

If it's too difficult to tell the difference between when the brain is processing real versus imagined imagery, we might search for a different signal occurring simultaneously. Think two-factor authentication. So what second signal should we choose?

To answer, we may consider what processes should be occurring simultaneously with spirit perception. Here are some obvious candidates, in decreasing order of probable utility:

- **Attention.** The brain's resources are preferentially allocated to processing stimuli that are more relevant to the individual. For example, you'd care more about a charging bull than you would about a windmill in the distance. We'd therefore predict that meaningful stimuli should produce a different EEG response when compared to non-meaningful stimuli. Chapman and Bragdon were the first researchers to identify this difference: a positive spike in an event-related potential that occurs 300 milliseconds after a meaningful event, but isn't present when the same event isn't relevant to the test subject.[96] That is to say, it occurs within any event-related potential when active discrimination has occurred between stimuli.[97] We now call this waveform the P300, and it's easiest to measure over the brain's parietal lobe. It has since become an important tool for assessing attention and cognition. For example, the time taken for the P300 to appear (i.e. latency) is longer in people with cognitive impairment due to their difficulty in processing information. In fact, the P300 can take

[95] Shimizu H, Srinivasan R. Improving classification and reconstruction of imagined images from EEG signals. *PLoS One*. 2022 Sep 21;17(9):e0274847.

[96] Chapman R, Bragdon H. Evoked Responses to Numerical and Non-Numerical Visual Stimuli while Problem Solving. *Nature* 203, 1155–1157 (1964).

[97] Picton TW. The P300 wave of the human event-related potential. *J Clin Neurophysiol.* 1992 Oct;9(4):456-79.

up to 100 milliseconds longer to appear in people with Alzheimer's disease than in the average young person, turning it into more of a 'P400'.[98] We also find P300 waveforms with delayed latency as well as reduced amplitude in schizophrenia.[99] This makes the P300 ideal for our purposes, because we'd like to know if a person claiming to see a spirit is actually hallucinating as part of a psychotic illness, rather than perceiving something 'real' in a mentally healthy state. As an example of how we'd actually use the P300 then, imagine placing an EEG headset on one of those Piraha people seeing that *Xigagai* spirit on a beach. We'd expect a P300 to appear when the spirit materialises, and we'd expect the absence of a P300 if the beach was completely empty.

- **Communication.** In cases where a person is claiming to talk to a spirit, we might look for signs of receiving and processing communication. I place the emphasis on receiving rather than transmitting because, as already discussed, we know how to decode imagined speech and it won't help us. The most well known region of the brain responsible for processing speech is Wernicke's area, located in the temporal lobe. If you electrically stimulate this area, you knock out the person's ability to comprehend language.[100] Their ability to produce speech remains unimpaired, and people with damage to Wernicke's area continue to speak fluently, albeit nonsensically. Unfortunately, we can't utilise this knowledge of neuroanatomy if we insist on using EEG because of its poor spatial resolution: it's too difficult to localise electrical signals to specific regions of the brain. Functional MRI techniques would be better suited, but that has disadvantages of its own. If we want to assess perception of spirits, we must insist on using EEG because of its superior temporal resolution and

[98] Parra MA, Ascencio LL, Urquina HF, *et al*. P300 and neuropsychological assessment in mild cognitive impairment and Alzheimer dementia. *Front Neurol*. 2012 Dec 5;3:172.

[99] Blackwood D. P300, a state and a trait marker in schizophrenia. *Lancet*. 2000 Mar 4;355(9206):771-2.

[100] Lesser RP, Lüders H, Morris HH, *et al*. Electrical stimulation of Wernicke's area interferes with comprehension. *Neurology*. 1986 May;36(5):658-63.

portability. So we need another event-related potential. Luckily, there's an equivalent of the P300 for verbal comprehension: the N400. As the name implies, this is a negative deflection in the EEG waveform at 400 milliseconds post-stimulus. It's elicited when processing anomalously structured sentences,[101] such as one with an unexpected ending (e.g. it's annoying when sentences don't end the way octopus). Like P300, N400 is also affected by schizophrenia.[102] There's also the P600, elicited by the processing of syntactical and grammatical errors,[103] such as subject agreement violation (e.g. the boys runs), as opposed to the semantic errors that trigger the N400. Historically, a third signal known as Left Anterior Negativity was also studied with regards to language processing but was found to result from an overlap of the P600 and N400,[104] so it's just an artefact that nobody need discuss anymore. The P400 and N600 are well studied, but their interpretation remains controversial, with little agreement on what is actually going on.[105] However, they do localise to somewhere around Wernicke's area,[106] which further supports their importance. Luckily for us, we don't need to fully understand the origin of these signals to make use of them. The N400 has already been exploited in the

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101 Kutas M, Federmeier KD. Thirty years and counting: finding meaning in the N400 component of the event-related brain potential (ERP). *Annu Rev Psychol.* 2011;62:621-47.

102 Kumar N, Debruille JB. Semantics and N400: insights for schizophrenia. *J Psychiatry Neurosci.* 2004 Mar;29(2):89-98.

103 Kim A, Osterhout L. The independence of combinatory semantic processing: evidence from event-related potentials. *J Mem Lang* 2005;52:205–25.

104 Tanner D. Robust neurocognitive individual differences in grammatical agreement processing: a latent variable approach. *Cortex* 2019;111:210–37.

105 Seyednozadi Z, Pishghadam R, Pishghadam M. Functional Role of the N400 and P600 in Language-Related ERP Studies with Respect to Semantic Anomalies: An Overview. *Noro Psikiyatr Ars.* 2021 Jan 27;58(3):249-252.

106 Service E, Helenius P, Maury S, *et al*. Localization of syntactic and semantic brain responses using magnetoencephalography. *J Cogn Neurosci*. 2007 Jul;19(7):1193-205.

design of brain-computer interfaces.[107] We might therefore look for the N400 and P600 in a person claiming to receive communications from a spirit. However, we won't find anything if the spirit happens to be a stickler for grammar. We might have to ask the spirit to make random grammatical errors, or we can just await further EEG research into language processing.

- **Meditation.** We have discussed how spirit perception may require a meditative state. The neuroscience of meditation is challenging to study because of the diversity of meditation techniques, the subjective variations, and differences between beginner and novice meditators. These studies usually investigate the steady oscillatory changes in an EEG waveform, rather than event-related potentials, since meditation is an ongoing process and not a sudden event. Conventionally, different bands of oscillation frequencies are assigned Greek letters. For example, alpha waves are those ranging from 8 to 13 hertz, usually occurring in the occipital cortex. An easy way to increase alpha wave activity in your occipital cortex is to just close your eyes,[108] whereas meditation seems to increase alpha activity in the frontal cortex.[109] Unfortunately, such a huge variety in meditation practices means that EEG studies have not resulted in any consensus.[110] Interested readers may find a review of the neural oscillations underlying meditation elsewhere.[111]

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[107] Dijkstra KV, Farquhar JDR, Desain PWM. The N400 for brain computer interfacing: complexities and opportunities. *J Neural Eng*. 2020 Mar 5;17(2):022001.

[108] Hohaia W, Saurels BW, Johnston A, *et al*. Occipital alpha-band brain waves when the eyes are closed are shaped by ongoing visual processes. *Sci Rep*. 2022 Jan 24;12(1):1194.

[109] Travis F. Autonomic and EEG patterns distinguish transcending from other experiences during Transcendental Meditation practice. *Int. J. Psychophysiol. 2001.* 42, 1–9.

[110] Brandmeyer T, Delorme A, Wahbeh H. The neuroscience of meditation: classification, phenomenology, correlates, and mechanisms. *Prog Brain Res.* 2019;244:1-29.

[111] Lee DJ, Kulubya E, Goldin P, *et al*. Review of the Neural Oscillations

> Where does all of this leave attempts to assess spirit perception then? We'd need to define the specific meditation technique employed by our clairvoyant, as well as its specific EEG correlates. Then we'd need to hope the act of spirit perception doesn't interfere with these recognisable oscillations, which it almost certainly would. We know that EEG oscillations naturally change patterns throughout the course of a single meditation session anyway.[112] Last, the elephant in the room: we don't know for sure that meditation is a prerequisite for spirit perception. Perhaps an opposite mental state is required for all we know (spoiler: this is discussed in the last chapter). To conclude then, looking for meditation-associated neural oscillations probably can't help us right now.

That last point is actually quite devastating. We don't know what mental state is required for spirit perception, and the reason is simple: we don't know what a spirit 'is'.

We can study how we perceive sound because we know the fundamental nature of sound: the vibration of particles, usually transmitted through the air. We can then hypothesise how such vibrations might be detected and converted to information our brains can understand. But we don't know the fundamental nature of spirits, so we can't hypothesise similarly. Hence this chapter has been a workaround, a way of detecting when we've perceived something, but not how.

Let's therefore delve into the question at the core of this book. What are spirits?

Underlying Meditation. *Front Neurosci.* 2018 Mar 26;12:178.

[112] Guo X, Wang M, Wang X, *et al*. Progressive increase of high-frequency EEG oscillations during meditation is associated with its trait effects on heart rate and proteomics: a study on the Tibetan Buddhist. *Cereb Cortex*. 2022 Sep 4;32(18):3865-3877.

CHAPTER FOUR

Towards a Unifying Theory

In which we investigate the true nature of spirits, and attempt to situate their existence within the laws of physics

We should now address the most fundamental question: what actually is a spirit?

The answer given is usually one or a combination of four:

Human souls, as a form of afterlife. This is the commonest idea: some part of a human's intelligence persists after death, which can ascend to heaven or an equivalent other-world (e.g. Elysium, Valhalla, HaOlam HaBa, Jannah, Svarga, Tlalocan), descend to a shadow underworld (e.g. Hell, Hades, Gehenna, Duat, Rarohenga, Naraka) or wander the Earth perhaps until some exit condition is met. If the soul is one of your ancestors, they're usually keeping an eye on you and offering guidance. One of the oldest examples is a ghost story recorded by Pliny the Younger in a letter written to his friend, Licinius Sura.[113] In the second of three accounts, a philosopher named Athenodorus

[113] Pliny, The Younger, and Betty Radice. *The Letters of Pliny the Younger*. Reissue edition. Penguin Classics, 2003. Book VII, letter 27.

exorcises a haunted house in Athens by discovering the apparition's physical remains and giving them a public burial with proper funeral rites. Older still are the Mesopotamian tales of *Gidim* (in Sumerian) and *Etemmu* (in Akkadian), from as far back as 5,000 years ago. These spirits of the dead required regular offerings from living relatives, lest the spirits become restless and inflict misfortune, which could also happen as a result of improper burial. We read in the Akkadian *Gilgamesh Epic*[114] that, "…dust is their food, clay their bread. They see no light, they dwell in darkness, They are clothed like birds, with feathers." So great was their presence in everyday life, that whole schools were dedicated to the practice of summoning and banishing these spirits. Even today, the veneration of ancestral spirits is practised all over the world through festivals and rites such as *faun phii* in Thailand, *jerye* in Korea, and *jìngzǔ* and *bàizǔ* in China. Across much of Eastern and South-Eastern Asia, the Ghost Festival is held during the seventh month of the Chinese calendar, when the spirits of the deceased are thought to roam the streets and must hence be appeased with incense, food and drink, and even live performances of traditional operas.[115] As every civilisation has had a concept of spirits and the human soul, every civilisation has offered a different answer to the question of what a soul actually 'is'. The ancient Greeks had a multitude of theories about the soul, or *psuchê*, too many to summarise here.[116] For example, Plato believed in a tripartite soul. The ancient Egyptians also believed in a soul of numerous parts, most importantly the *ka* (the self as pertains to community status) and *ba* (the self known only to oneself and the Gods). In Judaism, the soul, or *nefesh*, is explained as follows: "The Lord God formed the man of dirt from the ground and He breathed into his nostrils the breath of life, and man became a living soul.[117]" Later kabbalistic teachings then expanded the soul to five dimensions. Clearly, the history of the concept is too

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[114] Dalley, Stephanie, trans. *Myths from Mesopotamia: Creation, The Flood, Gilgamesh, and Others*. Revised ed. edition. Oxford: OUP Oxford, 2008. Page 89.

[115] Wei, Liming. *Chinese Festivals: Traditions, Customs and Rituals* (Second ed.). Beijing. 2010. pp. 46–49.

[116] Lorenz, Hendrik, "Ancient Theories of Soul", *The Stanford Encyclopedia of Philosophy* (Summer 2024 Edition), Edward N. Zalta & Uri Nodelman (eds.) https://plato.stanford.edu/archives/sum2024/entries/ancient-soul/

[117] Genesis 2:7

vast to do it justice here. You could write a whole book on the topic.[118]

Non-human disembodied intelligences, usually the natives of a different plane of existence, a counterpart universe, often called the spirit world, astral plane, or a whole catalogue of planes or worlds depending on the belief system (e.g. the four kabbalistic worlds[119] of *Assiah, Yetzirah, Beriah,* and *Atzilut*). The Hermetic principle of 'as above, so below' is an occult favourite. According to the alchemist and physician, Paracelsus, each of the four visible elements of nature (fire, earth, air, water) has an invisible spiritual counterpart, and each of these counterparts is inhabited by its own type of nature spirit, now called an 'elemental', although he didn't coin that term. But he did write a whole treatise on the four types: Pygmies/Gnomes, Undines, Sylphs and Salamanders.[120] Other civilisations have used different names such as dryads, nymphs, fairies, sprites, among many others, but the idea is the same. For example, in Jainism, elemental spirits of nature are called *ekendriya,*[121] although Jainism cosmology asserts an added fifth element of 'plant'. And as for ghosts, these would just be malicious spirits pretending to be ex-humans for purposes of trickery. This idea was most famously put forward in Ludwig Lavater's *De Spectris*[122], which was the most popular spiritual textbook for several generations, consulted by the likes of Shakespeare while writing *Hamlet*. Lavater was a Protestant minister who rejected the Catholic idea of purgatory, and therefore identified ghosts as demons in disguise rather than damned souls on vacation. This soon became the dominant view in Protestant theology. However, the same theory had

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118 Goetz, Stewart, and Charles Taliaferro. *A Brief History of the Soul*. 1st edition. Malden, Mass.: Wiley-Blackwell, 2011.

119 Kaplan, Aryeh. *Sefer Yetzira: The Book of Creation: In Theory and Practice*. 2nd Revised edition. York Beach, Me: Red Wheel/Weiser, 1997.

120 Paracelsus, Sigherist, Henry E. "A Book on Nymphs, Sylphs, Pygmies, and Salamanders, and on the Other Spirits". In Sigherist, Henry E. (ed.). *Four Treatises of Theophrastus von Hohenheim Called Paracelsus*. Baltimore and London: Johns Hopkins University Press. (1996) [1941].

121 Williams, Robert. *Jaina Yoga: A Survey of the Mediaeval Śrāvakācāras*. Motilal Banarsidass. 1991. Page 33.

122 Lavater, Ludwig. *De spectris, lemuribus ...: liber unus*, [1569]. Legare Street Press 2021

already been common in Judaism. In the *Talmud*, *Sheydim* are mentioned in a list of things created on the sixth day of creation, meaning God had time to create their souls but not their bodies. One Rabbi speculates:[123] "Demons assume the shape of men, but have no shadow" —what follows, in true Talmudic fashion, is a debate on the number of shadows. But it was also believed these spirits were similar to both men and angels:[124] "Like angels, they have wings and fly from one end of the world to the other, and know the future; and like men they eat, propagate, and die." Paracelsus similarly described elementals as humanoid in their behaviour, because technically he thought elementals were not properly spirits, but somewhere in between true spirits and mortal men. This raises an intriguing possibility: every creature might comprise a unique ratio of spiritual to physical flesh. Unfortunately, nuanced theories such as these were buried in favour of the Judaeo-Christian tendency to lump all elementals under the term 'demon', universally considered evil. Let us not overly focus on evil spirits however. In much of the world, animist belief systems paint non-human spirits as belonging not to nature's building blocks, but to specific components of the natural world sacred to a land's inhabitants e.g. an ancient tree at the edge of a village or a river that supplies water to several tribes. For example, grandfather spirits in native American cultures are often representatives of different winds. More usually revered though are the spirits of particular animals, plants, and locations. Note that the eagle spirit, for example, isn't the soul of a particular eagle, but of the idea of an eagle, representing freedom, courage and higher awareness.

Memories of emotional and traumatic events, imprinted on the fabric of reality, or more specifically, some kind of co-existing intermediate dimension that Henry Price, an Oxford professor of logic, named the 'psychic ether'.[125] If true, spirits possess no agency of their own, and

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123 Babylonian Talmud. Gittin 66a9.

124 Babylonian Talmud. Chagigah 16a: 5-7

125 Price HH. Haunting and the psychic ether hypothesis; with some preliminary reflections on the present condition and possible future of psychical research. *Proceedings of the Society for Psychical Research.* 1939. 45, 307–343.

are simply non-interactive tape recordings re-playable under certain conditions. The most popular formulation is 'stone tape theory', as described in Thomas Lethbridge's *Ghost and Ghoul*,[126] and posits that some objects, particularly rocks, carry memory. Charles Babbage, the inventor of the computer, proposed a similar theory in his *Ninth Bridgewater Treatise*,[127] namely that spoken words leave permanent impressions on the air. A more modern take can be found in Peter Underwood's *The Ghost Hunter's Guide*.[128] His 'electrical impulse wave theory' states that during a period of extreme stress, physical or emotional, the human brain exhibits increased electrical activity, which upon reaching a certain level, may transmit a telepathic image. Such an image might transfer onto a house, so that a suitably receptive person in that house continues to pick up the image for years to come. Underwood suggests that the intensity of the telepathic image fades with time, causing the frequency of manifestation to decrease, like 'a battery running down'. Some people think witnessing a ghost actually recharges this battery. Whatever the details, it's important to note that Underwood doesn't think this theory explains all types of ghosts. In fact, he believes the majority of ghosts likely have no objective reality outside of the human mind— figments of the imagination. As you can see, stone tape theory and its variants are only really discussed in the context of ghosts so aren't applicable to spirits in most of the world, but Underwood's talk of subjectivity does bring us nicely to the next viewpoint.

Mental creations. In this view, the mind, and specifically the power of intention, can alter reality, to the point of creating new intelligences. This is an important part of a worldview we call 'magic' – that humans are participators in the universe rather than unbiased observers as in the scientific worldview. It may surprise you to learn that magic survived the renaissance. Many people continue to practice the magic of their ancestors, even in developed countries among bustling

126 Lethbridge, T. C. *Ghost and Ghoul*. Routledge and Kegan Paul, 1967.

127 Babbage, Charles. *The Ninth Bridgewater Treatise*. Cambridge Library Collection - Religion. Cambridge: Cambridge University Press, 2009.

128 Underwood, Peter. *Ghost Hunter's Guide*. First Edition. Blandford Press, 1986.

metropolises. You, too, may be guilty of low-level magical thinking without realising. This is something we'll discuss further because the majority of magical technology is based on communion with spirits. For example, invocation is the practice of summoning a spirit into oneself i.e. a possession. Evocation is the practice of summoning a spirit in front of you, causing an audiovisual manifestation. The spirit in either case can then be petitioned. Funnily enough, practitioners of magic disagree on what these spirits actually are. At one end of the spectrum, spirits are seen as external intelligences in their own right, as 'real' as any other creature. At the other end of the spectrum are what I'll call 'internalists', who believe spirits are just elements of one's own psyche, a holographic projection of a part of the consciousness not normally accessible to us, as 'real' as your own self/ego but maybe not as much as a wooden table. Carl Jung's archetypes are frequently discussed here, since they fit the bill as universal, inborn, patterns of human behaviour and identity hidden within the 'collective unconscious' of humanity.[129] Classic examples of archetypes include events such as birth and death, and personas such as the mother (representing nurture and femininity), and more relevant to occultists, the shadow (the suppressed aspect of the psyche we usually want nothing to do with). This is all distinctly non-spooky, more akin to psychology than spiritualism. Jung himself, as one of the most famous psychiatrists of all time, wrote a lot about spirits, regarding them as "unconscious autonomous complexes which appear as projections because they have no direct association with the ego",[130] and thus just an "appendix of psychology",[131] for much of his career. To clarify Jung's jargon, his theory of complexes describes the overall psyche as composed of independent fragments, which he called 'complexes', of which the 'ego-complex' (our conscious sense of self) is the main character. Other complexes may become conscious by associating with the ego-complex although some never do. And some of these

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[129] Vedor JE. Revisiting Carl Jung's archetype theory a psychobiological approach. *Biosystems.* 2023 Dec;234:105059.

[130] Jung, Carl G. *Psychology and the Occult*. 1st edition. London: Routledge, 2008. Page 137.

[131] Jung, Carl G. *Psychology and the Occult*. 1st edition. London: Routledge, 2008. Page 148.

autonomous complexes might show up in dreams and others as spirits during wakeful states of consciousness. Jung therefore provides a full psychological theory of spirits. However, the majority of internalists are more extreme than Jung, and believe not only that spirits are all in your head, but that so is everything else. As Lon Milo DuQuette, a modern magician, subtitles one of his books,[132] "It's All in Your Head... You Just Have No Idea How Big Your Head Is". This idea is explained more in the *Kybalion*,[133] a compilation of 'New Thought' ideology masquerading as Hermeticism. Its first principle: 'The All is Mind' – everything in the universe is composed of mind, so of course your own mind has power to interface with, and thus influence, reality. This is the alchemy of 'mental transmutation'. In summary, the general idea is that some (or all) spirits are sculpted and manifested by the human mind. When these spirits break off from their progenitor(s), and assume independent lives of their own, occultists refer to them as 'egrogores' or 'thought-forms'. In Tibetan Buddhism, the term is *tulpa*, said to be created via intense meditation. Modern ghost-hunters talk about telepathic images or 'apparitional dramas' co-created subconsciously by multiple people— what the physicist and radio engineer, George Tyrrell, called a 'psychological marionette'.[134]

So which is it? You might now be expecting me to pick one and elaborate. Instead, I'm going to sidestep these theories entirely, because I'm more interested in *what* they are as opposed to *who* they are. Let's approach the problem with a more physicist-like mindset: if we split apart a spirit, what constituents would we discover? What is a spirit's essential nature?

Two main underlying possibilities:

1. An unknown dimension or parallel universe ('the stage')
2. An unknown fundamental force or particle ('the actor')

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132 DuQuette, Lon Milo. *Low Magick: It's All in Your Head ...You Just Have No Idea How Big Your Head Is*. Illustrated edition. Woodbury, Minn: Llewellyn Publications,U.S., 2010.

133 Three Initiates. *The Kybalion - Centenary Edition: Hermetic Philosophy*. Centennial edition. Tarcherperigee, 2018.

134 Tyrrell, George N. M. *Apparitions*. 2nd pr. Duckworth & Co., 1953.

Dimensions and Parallel Universes

Read Edwin Abbot's *Flatland*.[135] You don't need to right now. I'll summarise: it's the tale of a sentient square living in a 2-dimensional land, who has no idea he's 2-dimensional (or what that means) until he's visited by a prophetic sphere, who appears to him as a circle of varying radius as its body passes through the 2-D plane. How would you, a 3-D creature, appear to a 4-D creature, if the fourth dimension is time? Imagine a film of yourself walking, eating, sleeping. Pause it. Now take every frame of this animation and stitch them all together. You are a long, spiralling, string of spaghetti stretching out from the day you were born to the day you die. But maybe that's an oversimplification, because many physicists now believe the universe probably has more dimensions than four. String theory implies ten, and bosonic string theory, twenty-six.

So we may theorise that what we call spirits are higher-dimensional creatures, interacting with the usual forces as we do, but without the same appearances, owing to their higher-dimensional bodies.

Theories like this might explain some of their unusual properties. Take M-theory, which requires eleven dimensions.[136] It models the total universe as a bulk of membranes ('branes' for short), our 3-D universe being just one brane within this higher-dimensional bulk. The particles responsible for fundamental forces are localised to a single brane, except for the one responsible for gravity, which therefore leaks into the bulk and affects surrounding branes. This explains why the force of gravity is by far the weakest of all the fundamental forces, relatively: It's leaky. So imagine what you could do if you lived on other branes, or more interestingly, outside of any brane i.e. within the bulk itself. Gravity would be your preferred way to interact with humanity. Think poltergeist. It doesn't explain other interactions though.

As you may have noticed, M-theory is a demonstration of parallel universes. But science-fiction is replete with many 'types' of parallel

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135 Abbott, Edwin A. *Flatland: A Romance of Many Dimensions by Edwin A. Abbott*. Independently published, 2020.

136 Miemiec A, Schnakenburg I. Basics of M-Theory. *Fortsch. Phys.* 2006. 54: 5–72.

universes. At one end of the spectrum, are 'parallel universes' within our own universe. This is the idea that in an infinite universe, everything that can happen will happen, making it likely that an exact replica of you is sitting reading an exact replica of this text somewhere on the other side of the universe, if you travel far enough to find them. At the other end of the spectrum is the idea of an axis of probability (more accurately, the illusion of probability), with an infinite number of universes running along it (a mathematical 'multiverse'), as is sometimes contrived to interpret quantum mechanics.[137] And in the middle is the idea of bubble universes all existing in the same physical 'space', like fizz in a glass of champagne. There are too many conceptions of the idea to list. But a common trope in literature is the portal to a sister universe filled with exotic beasties, eldritch horrors, or hell itself. So it might be the case that spirits are actually creatures from a different universe, leaking through, or clawing at the boundaries. Samhain, the Celtic religious festival which probably metamorphosed into Halloween, is a celebration of boundaries: between Summer and Winter, life and death. During this time, it's said the boundary between this world and the other is at its thinnest, most easily traversed. Dramatic for sure, but not testable, unless you can step across to the other side and take pictures. Nobody has ever managed it to our knowledge. Theories of parallel universes in general are difficult to test. Wherever you go, you can't help but take this universe with you, because you are a part of it. So it's not clear how one might attempt to exist in another universe, even if the laws of physics happen to be the same there. Even if you accept you're likely staying here for good, and you just want to peek outside, knowing what to look for is tricky. For example, one may theorise that if bubble universes exist around our own, they must occasionally collide, and cause some kind of signature change out there in the stars, like a bruise. Astronomers have searched for such signs and come up empty-handed.[138] We must therefore abandon the idea of spirits as denizens of a parallel universe

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[137] Vaidman, Lev, "Many-Worlds Interpretation of Quantum Mechanics", *The Stanford Encyclopedia of Philosophy* (Fall 2021 Edition), Edward N. Zalta (ed.), https://plato.stanford.edu/archives/fall2021/entries/qm-manyworlds/

[138] Feeney SM, Johnson MC, Mortlock DJ, *et al*. First Observational Tests of Eternal Inflation. *Phys. Rev. Lett.* 107, no. 7 (August 2011): 071301.

for now, in favour of something more evidence-based.

Fundamental Forces and Particles

To explore this idea properly, I first need to explain a couple of basic things which may seem tedious but will, I promise, be relevant. A force is simply an interaction between two things. We call a force 'fundamental' if we can't reduce it to more basic forces. In physics, four fundamental forces are known: the electromagnetic force (light, electricity and magnetism), the strong nuclear force (glues the nuclei of atoms together), the weak nuclear force (responsible for some types of radioactive decay), and gravity (holds really big things together). We think of each force as acting through a field: a mathematical abstraction whereby each coordinate in space has a quantity associated with it, which we call the 'field strength' at that location. Three of the four fundamental forces can be modelled with a quantum field theory (QFT), which combines classical field theory, special relativity, and quantum mechanics.[139] Those three theories are the most successful theories in physics. In other words, QFTs are currently our best model for how these forces behave. In a QFT, a force is mediated via exchange of a specific type of particle, called a gauge boson. You already know an example of one: the photon, which mediates the electromagnetic force. These appear to pop in and out of existence as they are exchanged, and are therefore known as 'virtual' particles. However, they are no more 'popping in and out of existence', no less 'real', than any other particles.[140] This is because QFT models every particle as just a local energy fluctuation in a relativistic quantum field, like a ripple on the surface of a pond. Don't worry about the terms 'relativistic' and 'quantum' for now. The important conclusion is that particles and waves are just illusions in this sense— the more 'real' entity is the energy fluctuation in the field. Every type of fundamental particle therefore has its own field, from quarks to electrons.

As previously described, the photon is the gauge boson for the

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[139] Peskin, Michael E., and Daniel V. Schroeder. *An Introduction To Quantum Field Theory*. 1st edition. Boca Raton London New York: CRC Press, 1995.

[140] Jaeger G. Are Virtual Particles Less Real? *Entropy (Basel).* 2019 Feb 2;21(2):141.

electromagnetic force. For the strong nuclear force, we have gluons, and for the weak nuclear force, we have W and Z bosons. Where the theory collapses is the force of gravity, which should theoretically be mediated by a gauge boson called the graviton. Nobody has ever detected the graviton. As a result, many alternative theories for gravity have sprung up in its place, including string theory (the most popular), loop quantum gravity, and emergent gravity. An attempt at unifying general relativity (our best model of gravity) with quantum mechanics (our best model of everything else) is therefore termed a 'theory of everything'— the holy grail of physics. Apart from the four known gauge bosons, we know of one other boson. This one is a force-carrier particle not responsible for a fundamental force, but for something else instead. We call it the Higgs boson, named after one of its proposers (before its existence was experimentally confirmed in 2013), and it's responsible for a field that gives particles their mass. Because mass has no direction (e.g. the positive or negative charge of the electromagnetic force), the Higgs boson is classified as a scalar boson, not a gauge boson. It's the only fundamental scalar boson.

Technically, the definition of a scalar particle is one with a 'spin' of zero. Spin is a quantum property that has nothing to do with spinning. It's just called that because its classical analogue is angular momentum. But particles don't rotate around an axis like the planet Earth. They just behave like they do (don't worry, nobody really understands quantum mechanics). However, when talking about the fields that underlie these particles, it makes no sense for a field to have a 'spin'. Fortunately, spin can also be understood as the direction of the field, so a spinless field has no direction.

In chapter two, we discussed how spirits don't appear to interact with the known fundamental forces. One possible explanation might therefore be an unknown fundamental force at work. A fifth force is not a new concept in physics, and has been proposed to explain a number of anomalous observations, such as the 'dark energy' seemingly causing the rate at which the universe expands to increase over time. This is usually known as 'quintesscence' theory.[141] If there

[141] Caldwell RR, Rahul D, Steinhardt PJ. Cosmological Imprint of an Energy Component with General Equation-of-State. *Physical Review Letters*. 1998. 80 (8): 1582–1585.

is a fifth force, it's not unreasonable to posit a class of particle which interacts only via this fifth force, assuming a QFT. Known particles may also interact via this fifth force to varying degrees. Spirits may comprise a mix of these 'fifth-force-only' particles, a kind of 'exotic' matter similar to the 'dark matter' that interacts only through gravity and seems to make up most of the universe. The term 'exotic matter' is often used more specifically for a hypothetical form of matter with negative mass, but can also be used more generally for states of matter not encountered in everyday life, such as Bose-Einstein condensates and quark-gluon plasma. Another hypothetical counterpart to matter is known as 'mirror matter', which would interact mainly via 'mirror bosons', and therefore not interact much with our own matter. Nobody has detected any of these theoretical particles, and it's not for lack of trying. However, we're unlikely to find something we're not actively seeking.

If we want to look for this spirit-associated field, we need a better idea of the phenomena mediated by this field. So to gain a better understanding, let's consider what properties we can attribute to spirits. We can't say anything about size, colour, speed, or any other conventional physical property. By definition, spirits are non-physical. So what else is there?

Consciousness

As stated, spirits are minds without physical bodies. Looking at our own human bodies, we possess both physical and mental components, analogous to hardware and software. If the physical world we know of is the hardware, we could think of a spirit-associated field as the software, since spirits only have the mental component. We might therefore theorise this spirit-associated field is what mediates the phenomenon of consciousness, a 'ghost in the machine' of the universe. This is a brave claim. It's more commonly assumed that consciousness is just an epi-phenomenon: a mere by-product of the brain's pattern of electro-chemical signals, but ultimately unimportant to behaviour.[142] Many scientists take this

[142] Robinson, William, "Epiphenomenalism", *The Stanford Encyclopedia of Philosophy* (Summer 2023 Edition), Edward N. Zalta & Uri Nodelman (eds.),

position, which is strange because it's self-contradictory. If epi-phenomenalism is correct, the mind cannot affect anything physical, and our brains should therefore have no knowledge of the mind, which is precisely what epi-phenomenalism claims to be. Furthermore, if the mind is functionless, it'd have disappeared long ago, rather than being favoured by the forces of natural selection: being conscious seems to be advantageous to survival. Other scientists therefore take the opposite approach and see consciousness as purely a function, a process rather than a thing.[143] This, too, has many problems. For example, the 'inverted qualia' objection asks how a functional sensation could be separate from a subjective sensation. A colour-blind person might satisfy the functional definition for experiencing green, but subjectively experience red, in which case there's more to consciousness than function.

I only mention these theories of consciousness because they're commonly believed by scientists. The puzzle of what causes the subjective feeling of consciousness is unsolved and has many possible explanations. The philosopher, David Chalmers, called it 'the hard problem of consciousness', as opposed to the 'easy problem' which is examining the physical systems and figuring out the mechanisms involved.[144] The hard problem cannot be solved by cognitive science, even in principal, because the question will remain: why is function accompanied by experience? We are currently unable to tell whether something is truly conscious or just behaving that way, pointing to a serious explanatory gap between the physical world and consciousness.[145] Like many of the topics discussed so far, this is a huge one. Responses to the hard problem have ranged from full-blown denialism to full-blown mind-body dualism.[146] Instead of rifling

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https://plato.stanford.edu/archives/sum2023/entries/epiphenomenalism

143 Levin, Janet, "Functionalism", *The Stanford Encyclopedia of Philosophy* (Summer 2023 Edition), Edward N. Zalta & Uri Nodelman (eds.), https://plato.stanford.edu/archives/sum2023/entries/functionalism/

144 Chalmers DJ. Facing up the Problem of Consciousness. *Journal of Consciousness Studies.* 1995. 2 (3): 200–219

145 Levine J. Materialism and Qualia: The Explanatory Gap. *Pacific Philosophical Quarterly.* 1983. 64 (4): 354–61.

146 Van Gulick, Robert, "Consciousness", *The Stanford Encyclopedia of Philosophy* (Winter 2022 Edition), Edward N. Zalta & Uri Nodelman (eds.),

through all of them, I'll present Chalmers' own solution, which is rising in popularity among philosophers of mind. I'll argue it also fits best with the idea of a spirit-associated field, or any other explanation for spiritual encounters.

Panpsychism

Let's start with Descartes's most famous quote: "I think therefore I am." When all is said and done, this is the only thing you truly know about the universe: some of it is conscious. You are experiencing the world. You may be experiencing it through the imperfect filter of your senses, and your brain's imperfect reconstruction of events, but you know there is something experiencing it, and that something is you. Then ask yourself about the relationship between 'you' and the external universe. Where does your consciousness end and the rest of the universe begin? Is it a sharp discontinuity or a smooth gradient? There are two options: (1) your consciousness and the universe are made of different stuff, in which case you must explain what it is about your consciousness that makes it so special and what makes it possible for the different categories of stuff to interact, or (2) your consciousness and the universe are made of the same stuff, in which case there's nothing to explain. Panpsychism is the idea that the second option makes less assumptions and should therefore be preferred, the idea that everything in the universe possesses some degree of mentality.[147] This isn't to say atoms have dreams, because that'd be silly. But everything, even down to the scale of atoms, should possess some inner mental state in the panpsychism view. We can't describe what it's like to be an atom because its mental state would be so different to our own, but we also have trouble describing what it's like to be a bat, a thing which more obviously seems conscious, so it shouldn't bother us too much. Or rather, both problems should bother us equally.

Occam's razor is the rationalist principle that, given the choice of

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https://plato.stanford.edu/archives/win2022/entries/consciousness/

[147] Goff, Philip, William Seager, and Sean Allen-Hermanson, "Panpsychism", *The Stanford Encyclopedia of Philosophy* (Summer 2022 Edition), Edward N. Zalta (ed.), https://plato.stanford.edu/archives/sum2022/entries/panpsychism

two hypotheses, we should prefer the one that makes the least assumptions or assumes the least number of entities. Panpsychism certainly beats the competition when it comes to Occam's razor, which makes it an attractive idea to some. Others would surmise, from living in the universe, that simplicity isn't among its key traits. Either way, panpsychism has a number of strengths as a theory. First, it does something physics can never do: it explains the intrinsic nature of things. Physics only ever describes how things behave according to mathematical models. If you ask a physicist what a particle actually is, they'll explain in terms of energy and fields. If you ask what these things actually are, the answer can only ever be 'mathematical abstractions'. At the most, all a physicist can ever say is that there's a unit of energy, and it behaves according to a given set of rules. At the least, it's just an accounting tool which may or may not correspond to something that actually exists. But in panpsychism, the answer is simple: mentality. The second advantage of panpsychism, is that it removes the need for a mysterious thing called emergence, which means the properties of a system cannot intelligibly be derived from the properties of its components. If we agree there's nothing special about the stuff that makes up living things, that it's fundamentally the same stuff as everything else in the universe, it's otherwise challenging to explain where mentality enters the picture without a concept of emergence. Panpsychism has its own problems though. Consciousness (i.e. the experience of what it's like to be something, not the same thing as mentality), seems to occur when enough mentality is present, but nobody agrees how. It's called the combination problem: how do 'little' bits of consciousness combine to form 'bigger' bits? Panpsychism's main problem, however, is its testability.

Consciousness Field Theory

Returning now to the idea of a consciousness-mediating field, if consciousness is an omnipresent field which interacts with our brains to produce our experience of the world, panpsychism would explain what's going on. I should warn you, the common analogy for this idea of the brain as a 'receiver' of consciousness is misleading. Force effects are typically bidirectional. In general relativity, just as mass curves spacetime, spacetime curves mass, with gravity being the effect of the

mass following the curves. Even in classical Newtonian gravity, two objects both exert a gravitational force on each other, such that you attract the Earth as the Earth is attracting you. So the brain should alter the consciousness field as much as the field alters the brain. The field would integrate consciousness like an all-encompassing glue.

Consciousness field theory (CFT) is not a new idea. The most well-known flavour is the electromagnetic field theory of consciousness (Johnjoe McFadden's CEMI theory),[148] which posits that certain electromagnetic field states are identical to conscious perception (note this doesn't answer the hard problem of consciousness). The most obvious refutation is that consciousness isn't affected by strong magnetic fields like those in an MRI scanner. Neither is the brain protected from these magnetic fields, or we couldn't so easily record its electrical activity with an electroencephalograph. There are several more problems with CEMI, to the extent that no serious neuroscientist is interested. Besides, we are looking for a fifth force, as we've concluded spirits don't have much to do with electromagnetism. Paul Mocombe's CFT is set up this way, and he names its theoretical mediator the 'psychion'.[149] Unfortunately, he provides little theoretical grounding, which is unsurprising given his philosophical specialism is African and Diasporic Studies.

So what kind of field might really account for consciousness then? Returning to panpsychism, you'll recall the explanation for the essence of a particle was mentality. It seems intuitive that mentality isn't directional. As with mass, you cannot have a net 'negative' mind, so a consciousness field would be scalar, and require a scalar boson similar to the Higgs boson. This would be convenient as it seems odd we've only found one fundamental scalar boson so far, when there's loads of fundamental gauge bosons (not that this is a good reason to decide something might exist). An alternative possibility: the Higgs field itself is the one that mediates consciousness. If the essence of a particle is mentality, then a particle's mass should be intricately related to this

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[148] McFadden J. Integrating Information in the Brain's EM Field: The Cemi Field Theory of Consciousness. *Neuroscience of Consciousness* 2020, no. 1 (1 January 2020): niaa016.

[149] Mocombe PC. Consciousness Field Theory. *Arch Neurol & Neurosci.* 9(4): 2021. ANN.MS.ID.000718.

mentality, and they might therefore end up being two sides of the same coin. This would also explain why nobody has detected another kind of fundamental boson despite the valiant efforts of particle physicists and their impressively high-energy colliders. To complicate matters, some physicists suspect the Higgs boson might not be fundamental at all. But, to date, nobody has convincingly modelled a composite Higgs boson that aligns with all the experimental measurements for the wildly different particle masses it must explain. The same holds true for the idea of a 'family' of Higgs bosons, which'd be comparable to the two bosons of the weak nuclear force. In any case, blaming consciousness on the Higgs field will do little to solve Chalmers' hard problem: why should interactions with the Higgs field cause a subjective feeling of existence?

There's another difficult question to answer for any CFT. Non-brain and brain are made of the same basic stuff. Any putative consciousness force acting on the brain must therefore be interacting with the usual particles familiar to physicists. So what's preventing it from interacting with non-brain matter too? Perhaps it does, your chair is conscious, and it has no way of telling you. A more serious possibility is that the consciousness field only interacts with certain quantum states found in the brain. In the nineties, Nobel prize winning physicist, Sir Roger Penrose, collaborated with an anaesthetist, Dr Stuart Hameroff, to develop a theory of quantum consciousness now known as orchestrated objective reduction. Briefly, this theory revolves around collapsing quantum states in a neurone's microtubules, tiny protein filaments which serves as structural support in cells.[150] Evidence is lacking, but nobody's come up with a more convincing quantum consciousness theory so far.

Speaking of evidence, readers in the know might well have been wondering why I've not mentioned their favourite theory of consciousness. It's true: I've not so much as named any of the popular ones yet. CFTs are fringe science. The two main theories neuroscientists actually care about are integrated information theory (IIT) and global workspace theory. So if we want to explore the idea of spirits as entities situated within the phenomenon of consciousness,

[150] Hameroff S. 'Orch OR' is the most complete, and most easily falsifiable theory of consciousness. *Cogn Neurosci.* 2021 Jan-Jan;12(2):74-76.

those are the theories to discuss.

Integrated Information Theory

First proposed by Guilio Tononi in 2004, IIT does what it says on the tin: it identifies consciousness as the degree to which information is integrated (i.e. an interdependent cause-effect structure) in a given system.[151] Rather than starting from what we know about the brain and working backwards like other theories do, IIT is built from the top-down. It starts by defining axioms of consciousness: things we definitely know about consciousness from first-hand experience e.g. axiom one – it exists. This first axiom handily evades Chalmers' hard problem. IIT can therefore be interpreted with panpsychism, which is great news for Chalmers. What's more, IIT, being a mathematical theory, also solves panpsychism's combination problem. It even allows a mathematical quantification of consciousness: the Φ metric. For readers unaccustomed to mathematical jargon, that's the Greek letter 'phi' being used to represent a variable, something you can measure. In simpler terms, the higher the phi, the more conscious the system. This ability to measure consciousness is an absolute gift. With such a powerful theory on the market, I'd argue we no longer have any reason to believe in CFT, if we ever did.

So if we are looking for an explanation for spirits within the phenomenon of consciousness, IIT is probably the place to look, not a fringe theory of a fifth force or parallel universe.

Predictions of Integrated Information Theory

ITT makes testable predictions, and many have been proven correct in situations where its main competitor, global workspace theory, has failed,[152] making IIT the current favourite theory of

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151 Tononi G. An information integration theory of consciousness. *BMC Neurosci.* 2004 Nov 2;5:42.

152 Cogitate consortium *et al.* An Adversarial Collaboration to Critically

consciousness. Despite this success, I should mention that IIT in its 'strongest' current form is definitely false – the mathematics just doesn't work out, and it's easy to devise systems of integrated information that obviously can't do anything intelligent, let alone be conscious (e.g. low-density parity check codes).[153] But we may find use for a 'weaker' IIT: one that's more pragmatic, doesn't state it applies to all systems everywhere, and doesn't flat-out identify consciousness as maximally integrated cause-effect structures when we know from first-hand experience that this can only be a necessary rather than sufficient condition.[154] IIT is very much a work in progress. For now then, let's assume that Φ, or some more mathematically-coherent form of Φ, does tell us something useful about the level of consciousness in a given system, even if not the full story.

One of the more interesting predictions stems from IIT's exclusion principle, that in a system composed of different subunits, each of varying levels of Φ, only the systems with the local maxima of Φ will be conscious. Put simply, conscious systems can't overlap or be nested within each other. If a smaller group of neurones suddenly gained a higher Φ than the rest, it'd take over as the dominant consciousness. And if the largest Φ dropped suddenly, the consciousness would fragment into separate subunits of consciousness formed by groups of neurones with the second highest Φ, perhaps fluctuating as one group overwhelms another. This would explain what happens when you fall asleep. Your overall consciousness disappears, and dreams take over.

Why do I focus on this particular prediction? Recall my list of popular explanations for spirits. The latter-most stated that spirits are just subunits of consciousness not normally accessible to us during our usual phase of consciousness. This is exactly what IIT's exclusion principle predicts, as just described. One might now imagine religious or magical rituals designed to 'hack' the consciousness and cause such

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Evaluate Theories of Consciousness. *bioRxiv*, 1 January 2023, 2023.06.23.546249.

153 Aaronson, Scott. 'Why I Am Not An Integrated Information Theorist (or, The Unconscious Expander)', Shtetl-Optimized (blog). 21 May 2014. https://scottaaronson.blog/?p=1799.

154 Mediano PAM, Rosas FE, Bor D, *et al*. The Strength of Weak Integrated Information Theory. *Trends in Cognitive Sciences* 26, no. 8 (1 August 2022): 646–55.

a situation to occur. For example, shamans all over the world are experts in using drumming, chanting, and fasting to induce altered states of consciousness, such as 'soul flight' (an out-of-body journeying experience).[155] Now recall my list of scientific explanation for spirits from chapter one. I mentioned that hypnagogic and hypnopompic hallucinations are so accepted as normal in the world of medicine as to be deemed physiological. These are defined by the transition states of consciousness, between waking and dreaming. You can connect the dots. It seems IIT is capable of explaining many spiritual encounters. But what about encounters where multiple people see the same thing independently? IIT states that each person would have to possess a group of neurones which integrates well enough with an analogous group of neurones in a separate person, to form a collective consciousness. Normally, an individual's own greater Φ would take the lead, but dropping it by inducing a trance state may theoretically allow the collective to predominate. We might then discover Jung's archetypes within. Is there a group of neurones in each person that can integrate with the same group in another person?

Mirror neurones are a class of neurone which fire when an animal copies the actions of another— they literally 'mirror' behaviour. Their functions are highly controversial, possibly ranging from language to empathy, but we do know they facilitate sociability. I won't attempt to summarise the literature around the mirror neurone system as one may readily find a review themselves,[156] but they're as good a candidate as any for an explanation of group spiritual encounters. They've already been implicated in the development of autism and schizophrenia.[157]

If spirits really do amount to renegade subunits of consciousness then, how do we answer our original question? What is the nature of a spirit? Consciousness is certainly not a force or field if we believe IIT.

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155 Winkelman, Michael J. *Shamanism: A Biopsychosocial Paradigm of Consciousness and Healing*. 2nd edition. Santa Barbara, Calif: Praeger, 2010.

156 Jeon H, Lee SH. From Neurons to Social Beings: Short Review of the Mirror Neuron System Research and Its Socio-Psychological and Psychiatric Implications. *Clin Psychopharmacol Neurosci*. 2018 Feb 28;16(1):18-31.

157 Valizadeh A, Mbwogge M, Rasouli Yazdi A, *et al*. The mirror mechanism in schizophrenia: A systematic review and qualitative meta-analysis. *Front Psychiatry*. 2022 Sep 21;13:884828.

In fact, if we take IIT as an explanation for spirits (i.e. that they're a particular system of integrated information) what we are really asking is: what is the nature of information?

Nature of Information

The smallest discrete unit of information is the 'bit', which can take the values '0' or '1'. All information is composed of strings of binary in this way. But what is a bit 'made of'?

Most would answer that information is nothing more than a mathematical abstraction that tells us about the reduction in uncertainty. Other physicists theorise that information has a finite and quantifiable mass, and are trying to measure it. This idea was first raised by Rolf Landauer in 1961, pointing to his now-famous principle: the minimum energy needed to erase one bit of information is proportional to the temperature at which the system is operating. Landauer's principle has been tested and confirmed numerous times since then. But claiming that the information itself has mass is a newer idea. Melvin Vopson, an associate professor at the University of Southampton, reckons this mass is 3.19×10^{-38} kilograms at room temperature,[158] and that every particle in the universe stores information about itself. I don't know if he's aware of panpsychism, but if not, somebody should draw it to his attention. He even suspects that information might be all there is to the universe. The legendary physicist, John Wheeler, was the most famous proponent of this idea, encapsulated in his catchy doctrine: 'It from Bit.[159]' His 'participatory anthropic principle' states that everything is created by conscious observers. In his own words: "This is a participatory universe."

His words remind me of a particular book. Chris Gosden, in his *History of Magic*,[160] chronicles an inter-dependent triple-helix of science, religion, and magic spiralling throughout the history of

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158 Vopson MM. Experimental protocol for testing the mass–energy–information equivalence principle. *AIP Advances* 1 March 2022; 12 (3): 035311.

159 Jaeger, Gregg. On Wheeler's Quantum Circuit. *The Quantum-Like Revolution*. 2023. pp. 25–59.

160 Gosden, Chris. *The History of Magic: From Alchemy to Witchcraft, from the Ice Age to the Present*. Dublin: Penguin, 2021.

human thought. What are the differences between them? He says:

> Magic works through human participation in the universe. In religion the primary human relationship is with one god or many gods. Science distances people from the world, taking them out of it, which leads to their observing and understanding physical operations in abstract terms, before applying that knowledge for practical ends.

We'll come back to that. Returning to the topic at hand, only time will tell whether Vopson's experiments support his theories. For now, the nature of information remains mysterious. Luckily, we needn't worry for our purposes.

We now have reached a hypothesis of spirits as subunits of consciousness, perhaps in the same family as the phenomenon of dreaming. Both can only rise to the surface when general consciousness is suppressed, as in sleep or trance. Let us now explore the implications of this hypothesis, and determine whether it's concordant with the previous chapters: ideas about spirit behaviour; how we are able to perceive spirits; and how we might test whether somebody else is perceiving spirits.

CHAPTER FIVE

Underbelly of Consciousness

In which we define and evaluate an integrated information theory of spirits, using mixed accounts of spiritual encounters and manipulation

If we are right, we can now think of a spirit as a sort of consciousness parasite, an entity of pure integrated information that subsists on the underside of a larger host consciousness (i.e. a larger, more integrated, system of integrated information). This sounds bizarre, until you remind yourself this 'parasite' is just a bundle of neurones firing at each other within the greater bundle of neurones that is the human brain. If you recall the common explanations for the nature of spirits, this idea also seems to be a neuroscientific dressing up of Jung's theory of complexes. In other words, we have replaced Jung's independent autonomous complexes with independent conscious systems of integrated information. The key difference is that Jung's theory is inherently untestable (a damning weakness of most psychoanalytic theories) and therefore not particularly useful. In fact, much of Jung's work is widely regarded as non-scientific,[161] not that this makes it any

[161] Jones RA. Jung's "Psychology with the Psyche" and the Behavioral Sciences. *Behav Sci (Basel)*. 2013 Jul 18;3(3):408-417.

less valuable from an academic standpoint, but the scarcity of empirical evidence cannot be denied, even for the ideas unambiguous enough to be testable. Our integrated information theory of spirits as consciousness parasites does not suffer the same problem, as will be demonstrated.

But as soon as we use the term 'parasite', biological comparisons present themselves. Richard Dawkins is most famous for writing *The Selfish Gene*,[162] in which he posits that a gene, despite being a non-living strand of DNA, can behave 'selfishly' due to the forces of natural selection. In other words, genes that are good at being replicated, get replicated the most. We now know of many 'parasitic' genes, that is, genes that don't serve us any purpose but seem to exist because they're good at getting themselves replicated. Using our gene-replicating equipment (such as ribosomes, tRNAs, etc.) for their own ends without conferring any benefit upon the wider organism certainly meets the definition of 'parasite'. To avoid confusion with living parasites though, biologists call them 'transposons' ('transposable elements'), and they are an active study of research as many are thought to cause disease by inserting themselves into normal genes, thereby disrupting their function.

Where Dawkins got himself into trouble was by taking the principles of natural selection even further, applying them to ideas themselves. He coined the term 'meme' to describe self-replicating ideas spread by imitation within a culture ('mimesis' + 'gene' = 'meme'), and modelled them as if they're viral phenomena. For example, the most successful meme of all, in the eyes of Dawkins, is religion. For these reasons, Dawkins seems to think memes should be considered as living things "physically residing in the brain."

Before we have a chance to confuse ourselves then, let's be clear: ideas, or 'memes', are not conscious. At best, they are building blocks of the subjective experience. But information alone isn't conscious. To have an increased Φ, the information must at least be highly integrated. Take the example of a mental image. We know a lot about how vision is processed within the brain. Particular areas of visual cortex process movement (V5), colour (V4), and dynamic shapes (V3).

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[162] Dawkins, Richard. *The Selfish Gene: 40th Anniversary Edition*. 4th edition. New York, NY: OUP Oxford, 2016.

In the temporal cortex, where image recognition takes place among other things, there are individual neurones that respond to vertical lines, and others to horizontal lines. All of these theoretically have a non-zero Φ, but nowhere near high enough for a system obviously recognisable to us as conscious.

With that cleared up, we can imagine the existence of bundles of neurones acting selfishly under the forces of natural selection. Actually, we have a word for this: cancer. This is very much an organic parasite. It's therefore important to distinguish this from what we are saying is a spirit: a non-organic parasite. I use the medical terminology here: 'organic' disease is what we call mental health problems that result from a 'physical health' problem e.g. an autoimmune encephalitis masquerading as schizophrenia. Non-organic brain disease, in comparison, is the domain of psychiatry.

So it's not the bundle of neurones in and of itself, but the electro-chemical activity it's hosting. Obviously these things aren't fully separable, but the key distinction is that the neurones are not biologically different from other neurones, as opposed to those found in neuronal tumours (which, incidentally, are uncommon – most brain tumours derive from supporting cells). In fact, the actual activity of the neurones may not be as critical to consciousness as one might suppose.

One of the most controversial predictions of IIT: even if all neurones in a brain are 'silent' i.e. inactive but not disabled, the Φ remains unchanged, because 'negative' information is still information. The fact that a light is switched off is as informative as the fact that a light is switched on. Therefore, a brain should still have conscious experiences even when none of its neurones are firing. This might be what's happening during meditation, characterised as it is by lower frequency waveforms on EEG. For our purposes, the implication is that any lesser subunit of consciousness should also remain conscious when inactive. Any spirit might continuously be present, even when silent, always lurking below the surface of awareness.

If all of this is true, how well does it match up with everything we've discussed in previous chapters?

1. Spirits don't appear to interact with the electromagnetic force, or any other force in nature, because they're not physical. Spirits are entirely mental. Hence why they take on a multitude of forms dependent on the observer's socio-cultural

background and expectations. Native Americans see their ancestors. The pope's exorcists see demons.

2. Eyes don't see spirits; the brain does. Now we know why—the spirit resides in the brain itself. In this view, any photograph which shows a smudge where the spirit was supposed to be is just a case of pareidolia, or a non-spooky physical stimulus piggybacked on by the spirit. An important conclusion of this was best stated in 1879 by the American neurologist, Dr George Beard:[163] "It's not our houses but our brains that are haunted."
3. Some people are more perceptive to spirits than others. It's feasible some brains are structured in a way that makes them more welcoming to the information structures involved, just as some patches of soil are more fertile than others. I don't think this is the same as what hypnotists call suggestibility, as it refers to a separate phenomenon. In other words: propensity to host a spirit (offering fertile ground) is not the same as the propensity to slip into a trance (allowing existing spirits to manifest themselves). An overlap is of course possible. This will be explored more in the next chapter.
4. Selected mental techniques, rituals or drugs may enhance spirit perception by manipulating conscious perception to allow spirits to rise to the surface. Trance states are well studied, important in the majority of magical and otherwise occult rituals. This will also be explored more in the next chapter. Perhaps we're more likely to see ghosts in the dark because the darkness causes mild sleepiness, akin to a mild trance. Lecture theatres, on the other hand, are not usually haunted because they are so dark and warm as to cause instant deep sleep.
5. Traditional techniques for warding off evil spirits tend to correlate with what we find scary or shocking ourselves. For example, lighting fireworks or bonfires is common in Eastern cultures. Catholic exorcists believe that ringing a bell is an excellent method due to an association with the church and

[163] Beard GM. The psychology of spiritism. *North American Review*. 1879. 129, 65-80.

holiness, which the devil apparently hates. This all makes sense because, in the common imagination, spirits think a little like humans do (If we'd be scared, so would they). In reality, it probably works because a loud shock is likely to cause wakefulness, snapping us out of any mild trance that would've otherwise allowed spirits to float up and terrorise us. As for iron, perhaps the coldness of the metal does the same thing (e.g. touching the horseshoe as one crosses the home's threshold), or it's the persistent threat of something sharp keeping us alert (e.g. nails and blades). For silver, maybe the shine is of more importance. And the use of salt, gems, and amulets probably affects our consciousness through symbolism. We normally call that the placebo effect.

6. Group spirit encounters might be explained by mirror neurones. So why do outsiders often fail to participate? They have not grown up among the people in question, so don't have a similar enough set of mirror neurones that allows integration with the corresponding mirror neurones in the natives. The outsiders also aren't steeped in local mythology, folktales, and symbolism. As discussed, the socio-cultural background shapes the spiritual encounter. Even if the outsider attains the requisite trance, it's therefore likely they'll fail to integrate with the rising collective consciousness. However, many anthropologists do report seeing spirit forms, usually after deep engagement with the group of people being studied, so it is possible. Again, maybe something like suggestibility comes into play here.
7. As for detecting spirit perception, using an EEG headset remains a promising option, perhaps even more so than before.
8. The invocation and evocation practices (i.e. summoning and manipulating spirits) of ceremonial magic are easily explained. Not so easily explained are the claims of practical results.

It seems to work well until that last point. If you sighed at the mention of magic, don't worry. I did too. The problem is, a high number of people practice magic today, and claim dramatic results. Most aren't trying to sell anything. You can read detailed accounts on anonymous internet forums, where people share tricks and ask

questions about their experiences. Drugs are not involved, usually. We see the same kind of accounts throughout history. Dr John Dee, one of the more famous magicians and court astronomer to Queen Elizabeth I, kept detailed diaries of his experiments.[164] He never published them himself. Why would he bother if he didn't think his records of communication with spirits were accurate? Another example: there's a plethora of necromancy manuscripts from the 15th century housed in the Medici library—[165]note that necromancy was the practice of divination by talking to the spirits of the dead; not making their skeletons rise up from the ground to attack your enemies. These manuscripts were written by clerics (the majority of literate people at the time) who were risking execution for heresy by even possessing them. The church forbade all forms of witchcraft. Why risk death if you didn't think the documents were valuable? Any technology is only as valuable as its results.

Magic

To be clear, I don't think magic works. I've seen no evidence it's anything other than wishful thinking, over-interpretation of coincidences, and coping strategies for what is known in the medical profession as 'shit life syndrome'.

It's also worth saying that I refuse to call it magick with a 'k', because the man who popularised this as a way to distinguish it from mundane stage illusion magic was so horrid that I barely even want to mention his name.[166]

So why am I even talking about it? I'll mention two other peculiarities that intrigue me, before explaining.

The first is that magical manuscripts are highly conserved. I use

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164 Skinner, Stephen. *Dr John Dee's Spiritual Diary (1583-1608): A Completely New & Reset Edition of True & Faithful Relation... with a Complete Translation of All Latin Passages*. Golden Hoard Press Pte Ltd, 2019.

165 Johnson, Brian. *Necromancy in the Medici Library: An Edition and Translation of Excerpts from Biblioteca Medicea Laurenziana, MS Plut. 89 Sup. 38*. Hadean Press Limited, 2021.

166 Crowley, Aleister. *Magick: Liber ABA Bk.4 (Magick Bk. 4): Book Four Parts I-Iv*. 2nd Revised ed. edition. York Beach, Me: Red Wheel/Weiser, 1998.

that term in the same way it's used in genetics: a highly conserved sequence of DNA is one that's remained relatively unchanged throughout evolutionary history (i.e. tens of millions of years). When we find a highly conserved sequence, we know not to mess with it, because any organism that tried an alternative in the past clearly didn't last very long. In short, it's an indicator of function. Now, one of the oldest magical works is the *Greek Magical Papyri* (PGM),[167] a collection of spells and rituals dating from the 2nd century BC to the 5th century AD. Its magical techniques are highly similar to those found later on in the *Hygromanteia,*[168] a grimoire probably dating to the 7th century, redacted in the 15th century. And the rituals in this work are almost identical to those of 18th century grimoires, such as *The Lesser Key of Solomon.*[169] Examples of protective equipment common to all three books include the protective floor circle and the lamen (a metal plate worn around the neck, inscribed with particular symbols). All three texts use the same Hebrew god names, names of previous magicians, angel names, ritual purity rules, fasting requirements, and allusions to King Solomon. So it's not in doubt that this rigorous sequence of operations for manipulating spirits (a.k.a. 'the Solomonic method') has been transmitted mostly unchanged throughout hundreds of years. An easy explanation would be that even a slight alteration causes the method to fail, or even endanger the life of the magician. Like a family recipe for a pie being passed down from generation to generation, the essentials that make the pie tasty remain unchanged, but everyone give it their own personal twist, a new mix of spices or different style of pastry crimping.

The second peculiarity is magical syncretism. The rituals in the PGM mention deities from both Greek and Egyptian pantheons, as well as many Hebrew names for God, and some Christian names only used in gnostic cults, often all in the same ritual. These deities belong

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167 Betz, Hans Dieter, ed. *The Greek Magical Papyri in Translation, Including the Demotic Spells: Texts v. 1*. 2nd ed. edition. Chicago: University of Chicago Press, 1997.

168 Skinner, Stephen. *The Magical Treatise of Solomon or Hygromanteia*. Translated by Ioannis Marathakis. Llewellyn Worldwide Ltd, 2012.

169 Peterson, Joseph H. *Lesser Key of Solomon: Lemegeton Clavicula Salomonis, Detailing the Ceremonial Art of Commanding Spirits Both Good and Evil*. Edited by Joseph H. Peterson. Illustrated edition. Red Wheel/Weiser, 2001.

to different belief systems, none of which are logically coherent with each other. For example, you can't invoke the Abrahamic God, who specifically tells you there are no other Gods, and then also claim authority from Osiris. It makes no sense, unless you don't care about the belief systems themselves because you'll say whatever is necessary to obtain the desired results. In other words, if you can compel spirits by threatening them with the names of these deities, who cares about the underlying theology? Magic is, if nothing else, pragmatic. For example, incantation bowls were popular defences against demonic influences from the sixth to eighth centuries. Originating from Mesopotamia, these ceramic bowls would be decorated usually with Jewish Babylonian Aramaic prayers and buried under the entrance to a home for protection. At least 10% of these bowls are written in a pseudo-script designed to look like Aramaic to the illiterate customer.[170] But it didn't matter as long as it looked the part. These incantation bowls, even those filled with genuine Jewish prayers, have been found under homes known to have been inhabited by non-Jewish families. Because magic has always been about doing whatever works.

That doesn't mean magic actually works, just that people thought it did. And the point of me mentioning these peculiarities is to show that people really did, and still do, strongly believe magic works. I therefore cannot ignore the spiritual encounters of these people any more than I can discount the stories of Everett in the Amazon rain-forest, so we must investigate further. If nothing else, magicians may teach us about traits of spirits that we can use to test our theory.

Stephen Skinner is an academic who studies the history of Western esotericism and has written many books on the subject. He is most well known for bringing Feng Shui to the attention of the Western world.[171] And he defines magic as follows:[172]

> Magic is the art of causing change through the agency of spiritual creatures rather than via directly observable physical means: such spiritual creatures

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170 Hunter, Erica C. D. Incantation bowls from Babylon and Borsippa in the British Museum. *ISIMU*, 1999, v 2, p 165-172

171 Skinner, Stephen. *Feng Shui*. First Edition. Parragon Plus, 1999.

172 Skinner, Stephen. *Techniques of Graeco-Egyptian Magic*. Golden Hoard Press Pte Ltd, 2014.

> being compelled, or persuaded to assist, by the use of sacred words or names, talismans, symbols, incense, sacrifices and *materia magica*.

He describes it as a technology with a coherent system of rules, and a cursory read of any grimoire will show you why—these books are obsessive about the proper way to do things. You may disagree with Skinner's definition of magic, which has always been a tricky thing to delineate from religion, for example, but we shall return to this knotty subject later. What makes Skinner's writings interesting is that he is also a practitioner of magic, who speaks in depth about his own experiments. He's gradually come to believe that spirits are external intelligences, and has made a number of personal observations on the nature of these mysterious entities. So let's examine them and see if they can be explained by our IIT explanation for spirits, or whether we must concede that spirits are actually celestial creatures from another realm.

The Traits of Spirits

1. Lowly intelligence

The first observation is that spirits think very differently to the way we do. The classic story of the genie who grants wishes, but not in the way you were expecting, is a descendent of Arab tales about trickster *Djinn*. In many tales, genies act like the programmer in the popular geeky joke:

> A wife asks her husband, a programmer, "Could you please go shopping for me and buy one carton of milk, and if they have eggs, get 6?"
>
> A short time later the husband comes back with 6 cartons of milk and his wife asks, "Why did you buy 6 cartons of milk?"
>
> He replies, "They had eggs."

The programmer in the joke is often substituted for a philosopher or mathematician because the punch-line derives from the application of the logical IF statement. To somebody who doesn't understand the joke though, it's easy to see how the husband could be judged as

antagonistic or even deceptive. Accordingly, the general tendency of spirits to deceive humans is well popularised. In the classic German legend, Doctor Faustus makes a pact with a demon named Mephistocles, which goes about as well as expected in the earlier versions (19th century authors added a redemption arc). But 'demon' is a loaded term, implying malice from the outset. Skinner's view is more nuanced:

> They have no understanding of truth or falsity. Demons are often accused in the grimoires of lying to the magician, but maybe Iamblichus had a better understanding of the situation when he said they cannot distinguish truth from falsehood.

The Iamblichus he refers to, if you're unaware, is one of the three major philosophers of early Neoplatonism, along with Porphyre of Tyre and Plotinus. The work quoted from is *De Mysterii,*[173] written in the third to fourth century, in which Iamblichus explores the theologies and rituals of the Egyptians. The full translated quote is this:

> …there exists a certain class of powers in the cosmos - limited, devoid of judgement and highly irrational, which are capable of receiving and obeying rational instruction from another, but neither has any understanding of its own nor distinguishes what is true or false or what is possible or impossible. It is such a class that is at once stirred up and startled when threats are brandished at them, since, it seems to me, it is in their own nature to be led by appearances and to be influenced by other things through a foolish and unstable imagination.

Incidentally, this is why Skinner reckons spirits can be threatened with the names of different deities, even when such threats are theologically incoherent. It also explains rituals whereby one pretends to be a more famous magician or, indeed, an actual deity (hence why some magicians don capes and crowns for their rituals). And it also explains why spirits can be compelled by fake threats of punishment that the

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[173] Iamblichus. *Iamblichus: On the Mysteries*. Translated by Emma C. Clarke and John M. Dillon. Bilingual edition. Atlanta: Society of Biblical Literature, 2003.

magician clearly isn't capable of accomplishing. Spirits are just too foolish to tell the difference, and aren't in a position to verify any threats.

If spirits are, in reality, lesser subunits of consciousness, this becomes trivially easy to explain. We all know how challenging it is to do, say, a complex mathematical calculation when half-asleep. And sleepiness is likewise a barrier to following complex instructions. For example, when you're half-unconscious in the middle of the night, your spouse is more likely to succeed by shouting 'roll over' than whispering, "you appear to have edged over onto my side of the bed, and I'm a little deprived of space, so I'd be grateful if you could budge over slightly."

'Truth serum', a.k.a. sodium pentothal, works on the same principal: concocting a lie is far more mentally taxing than telling the truth.[174] Sodium pentothal is just a general anaesthetic, so if you give it at the right dose, you can theoretically make somebody drowsy enough they can't lie, but not so drowsy they can't answer your questions. I say 'theoretically' because, in this scenario, answers do not necessarily correspond with reality. Sedated people, rather than think for themselves, tend to pick up on cues, fabricate memories, and babble aimlessly. Listen to a sleep-talker for any length of time and you'll see: hilarious gibberish, albeit gibberish that vaguely passes as a reply to whatever you say. In the end, a state of extreme suggestibility is not conducive to reliable interrogation, which is why statements under the influence of drugs aren't acceptable in a court of law.[175]

So that's that: spirits are too low a state of consciousness to tell the difference between what's true and false, like a human in a trance of suggestibility, or a burbling drunkard.

2. Limited ability

One of the features that the spirits of the grimoires seem to have in common, Skinner reports, is their limited ability:

They are allocated one function. Typically, in the

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174 Vrij A, *et al.* Outsmarting the liars: toward a cognitive lie detection approach. *Curr Dir Psychol Sci.* 2011;20:28–32.

175 Math SB. Supreme Court judgment on polygraph, narco-analysis & brain-mapping: a boon or a bane. *Indian J Med Res*. 2011 Jul;134(1):4-7.

> grimoires, demons have one or two specialised functions, so that one who satisfies lust cannot be constrained to help a huntsman, or find gold, for example.

This requires little analysis to explain. The perceived 'functions' i.e. range of behaviours of a smaller network of neurones are going to be less diverse than the functions of a greater network of neurones.

3. Primary sense of smell

Skinner has often wondered about the sensory capabilities of spirits, as one might wonder about any other creature's abilities. He's observed they appear to have a dismal sense of sight, but an exquisitely sensitive sense of smell, to the point it seems to be the primary way they interact with our world.

For this reason, incense is a critical ingredient of the Solomonic method, and every spirit has a particular incense they'll respond to. We find this theme running throughout history. Burning a specific blend of eleven spices (the *Ketoret*) was an important component of worship in biblical Judaism,[176] and much ink has been spilt in debating the exact formula. The *Zohar* specifically states the scent warded off the The Other Side.[177] Older still, we read in *Gilgamesh*,[178] that when the wise Mesopotamian hero, Ut-napishtim, made an incense offering, "The Gods smelt the pleasant fragrance, The Gods like flies gathered over the sacrifice." On the other side of the world, the act of burning White Sage (or other herbs) and wafting the smoke around the room, known as 'smudging', is the method by which Native Americans banish spirits. And in South Asia, burning turmeric is commonly believed to ward off *Bhootas*.[179] More pleasingly, incense is still used to calm the spirits of the dead at Buddhist funerals. But incense can be more powerful still. The Chinese Emperor Wu of the

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176 Exodus 30:1

177 Vayakhel 219

178 Dalley, Stephanie, trans. *Myths from Mesopotamia: Creation, The Flood, Gilgamesh, and Others*. Revised ed. edition. Oxford: OUP Oxford, 2008. Page 114.

179 Crooke, William. *The popular religion and folk-lore of northern India, Volume 1*, A. Constable & Co.,1896, p. 237

Han dynasty is said to have been given *Hangonko* (literally, *'s*oul-returning incense'), as a gift from a Taoist sorcerer, in order to bring back the spirit of the Emperor's favourite concubine, Lady Li.[180] The story's ending is not a happy one. Similar stories appear in the literature of Japan's Edo period.

So why do spirits respond so strongly to smells? Again, this is trivially easy to explain under an IIT explanation for spirits.

We can divide the cerebral cortex into different parts based on evolutionary age. The newest part is 'neocortex', which has six layers. The oldest is termed 'paleocortex', which has only three layers. Crucially, the main components of the human paleocortex are the olfactory bulbs and the pyriform cortex, which are both responsible for our sense of smell (olfaction). This is important because the pyriform cortex therefore interfaces directly with the limbic system (often called 'the reptilian brain' in pop science), which includes the hippocampus and amygdala. Yes, the sense of smell is the only sense that plugs directly into those ancient regions of the brain responsible for memory and fear, respectively. This intimate relationship between smell and emotion explains why odour-evoked memories tend to be more evocative and emotional than memories triggered by any other stimuli.[181] They also tend to be memories from earlier in life e.g. long-forgotten moments of childhood.

If spirits are just independent subunits of lesser consciousness then, we'd predict that the sense of smell is exactly what would stimulate them most effectively.

4. Ritual requirement for fasting and abstinence

The Solomonic method for summoning and manipulating a spirit usually includes a requirement to abstain from food and sex for a few days (if not longer) prior to the start of the ritual. The fasting requirement also exists in many shamanic rituals across the world.[182]

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[180] Toriyama, Sekien. *Sekien Toriyama's Japandemonium Illustrated: The Yokai Encyclopedias of Toriyama Sekien*. Annotated edition. Mineola, New York: Dover Publications Inc., 2017.

[181] Herz RS. The Role of Odor-Evoked Memory in Psychological and Physiological Health. *Brain Sci.* 2016 Jul 19;6(3):22.

[182] Winkelman, Michael J. *Shamanism: The Neural Ecology of Consciousness and*

For example, Nepalese shamans must fast for seven days to serve as a vehicle for a God.[183]

These shamans demonstrate how useful fasting is for inducing altered states of consciousness, which as we have mentioned, would make it more likely for a spirit to manifest.

5. Ritual requirement for human participation

Skinner has reported in an interview that he once tried playing a tape recording of somebody reading the incantations required for a ritual, and it didn't work.[184] He says there seems to be something important about the human voice. The magician must speak the incantations themselves or the spirits don't react. He doesn't know why.

If we take the IIT view that spirits reside within your own brain, no further explanation is necessary. Speaking words out loud is a better way to influence one's own subconsciousness. This is why prayers and incantations are common to all spirit communions the world over. If spirits were external intelligences, the thing carrying the message wouldn't matter. If I play a tape recording of somebody calling your name, you'll still come running, as much as if I wrote you a letter with the same request.

6. Ritual requirement for Consecratio

The first step in the Solomonic method is *Consecratio*, in which the magician consecrates their tools, thereby 'activating' them. This typically involves prayers and sacrifices. The most important thing to consecrate is the protective circle to be drawn on the floor around the magician, a practice which dates back to ancient Mesopotamia. Skinner has also identified a reference to the protective circle in the ancient Indian epic, the *Ramayama*. It's an amazingly common technique across many cultures. One of the most prolific modern magicians, Jake

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Healing. Westport, CT: Praeger Publishers Inc, 2000.

183 Peters L. Ecstasy and healing in Nepal: An ethnopsychiatric study of Tamany shamanism. *Other Realities.* 1981. 4:37–54.

184 Skinner, Dr Stephen. 'Glitch Bottle Podcast. #058 - Solomonic Fundamentals with Dr. Stephen Skinner.' Glitch Bottle podcast. 7 November 2019. https://www.glitchbottle.com/podcast?offset=1622290163237

Stratton-Kent, wrote:[185]

> Making sacred space is among the most primal of rituals, such intentional actions are as worthy of the term psychoactive as any substance.

This is consistent with Stratton-Kent's ideas on the nature of spirits, for when asked what a spirit 'is' in an interview,[186] he answered:

> I find a 'psycho-linguistic' model provides a possible 'scientific' explanation. With leanings toward Chomsky & Monod; no Cartesian dualism involved! Language is the vehicle of consciousness and culture, and has always been deeply linked to magic.

I therefore needn't say anything else, except to make one remark: if spirits really are external intelligences from another realm, as Skinner suspects, they can't be especially powerful if you can frustrate them by drawing a circle on the floor. You can't even block a lion that way, and lions seem considerably less dangerous than demons. It only makes sense if the physical circle is just an aid for the imagination, another way of influencing your subconsciousness. In other words, *Consecratio* is evidence that spirits reside in the brain, as posited by our integrated information theory of spirits. Ceremonial magic is brimming with symbolism and correspondences within correspondences,[187] which only makes sense in this context.

Obtaining Results

So the observations of magicians have indeed helped us to identify extra features of spirits. That was useful. We are now left with only one problem: if spirits are internal, how do magicians achieve results that are external?

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185 Stratton-Kent, Jake. *Geosophia: The Argo of Magic. Vol. 1.* Scarlet Imprint. 2010.

186 The Blog of Baphomet. 'An Audience with Jake Stratton-Kent'. *The Blog of Baphomet* (blog), 28 November 2015. https://theblogofbaphomet.com/2015/11/28/an-audience-with-jake-stratton-kent/.

187 Richardson, Alan. *Magician's Tables: A Complete Book of Correspondences*. Octopus Books, 2006.

During interviews, Skinner says that the one thing that most causes him to suspect that spirits are external entities, is that he gets results which can't otherwise be explained if spirits are entirely internal.[188] For example, he might gain information he didn't know and couldn't already have known, or he might achieve a result so spectacularly fast and dramatically that no natural explanation would suffice.

On the first draft, I quoted two of Skinner's stories which he often gives as examples, and then I started to describe a few possible explanations. But I now think this kind of 'debunking' is a waste of time, and I also don't wish to rip into personal experiences that are clearly precious and meaningful to the man, because that'd be needlessly disrespectful.

The fact is, every person who practices magic today probably has similar personal experiences which confirm the effectiveness of magic for them. I can't go through them all. But I can provide my own list of three simple criteria for judging such experiences:

1. Was the result specifically predicted in advance of the experiment? If a person asks for £2.50 and £2.70 flies through their window, that is an example of a reasonably successful prediction. If a person asks for wealth, and their business makes 25% more profit in the next financial quarter, that is less persuasive as it was not specifically predicted and may have happened anyway. Think SMART goals.
2. Was the result confirmed by an independent adjudicator? The magician, and any co-magician, are inevitably biased. Somebody who does not believe in the effectiveness of magic must independently confirm the result, and rule out a natural explanation. This is why I can never rely on a story told by a magician, however persuasive and specific. I was not there. I've often witnessed in medicine how one tiny piece of information, not revealed by a patient until the last minute, might unify all of their problems into a single diagnosis. And without that crucial, incidentally offered, piece of information,

[188] Skinner, Dr Stephen. 'LlewellynCon2021: Dr. Stephen Skinner Discusses Whether Magick Is Spirit-Based or in Our Head'. Llewellyn Worldwide, Ltd., 15 August 2022. https://www.llewellyn.com/videos/video/96.

somebody else might've come to a completely different, incorrect, diagnosis.

3. Was the result replicable? As in any scientific experiment, the result must be replicable by performing the experiment again. We must exclude the possibility that a result was due to random chance as much as we can. This is something missing from most magical accounts.

In summary, if magicians wish for magic to be thought of as a science, they must start treating it as such. Scientific principles do not go out of the window just because subjectivity is involved. Subjectivity is an inherent part of human experience, and is always in the mind of any scientist. We should ignore the common refrain that 'magic doesn't work like that.' The grimoires themselves indicate how stupid spirits are, so why not give them a simple, easily followed, instruction? The simpler the instruction, the simpler to decide whether the result is significant. I've never seen a magician use any statistical tests to decide on the significance of their result, so improving that would be a good start. There's no reason these tests can't be done. I suspect the reason that nobody has, is because most people are doing this stuff for self-gain, not to probe the secrets of the universe.

If you're now wondering why I don't do it myself, it's because I don't believe in any of it. I work full time and I'm not willing to put my free time and money into something that, not only do we have no evidence for, but would require everything we know about the universe to be wrong. The burden of proof lies with the other party. I would, however, love for this stuff to be real because it's interesting and weird, hence why I enjoy writing about it. But that's not a reason to believe in it. As Nobel-prize winning physicist, Richard Feynman, said, "The first principal is that you must not fool yourself, and you are the easiest person to fool."

I can't help but provide an anonymous example. Only one, I promise. Here's someone's reply to a Reddit user asking, "What's the fastest a spell ever manifested for you, and why do you think it manifested so quickly?[189]":

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[189] 'What's the Fastest a Spell Ever Manifested for You, and Why Do You Think It Manifested so Quickly?' Reddit Post. *R/Occult*, 16 July 2024. www.reddit.com/r/occult/comments/1e4bxjc/whats_the_fastest_a_spell_ever_manifested_for_you/.

> Quickest spell that worked was with the Goetia spirit, #71/Prince Seere.
>
> The first time I conjured this spirit, I was in need of money to pay an important bill, for $100. I set up my altar, and conjured the spirit. My boyfriend at the time, was in the living room.
>
> The conjuration lasted 30 minutes. (Done using the Conjurations from the "Lemegeton.")
>
> As I was thanking the spirit for its assistance, the doorbell rang. I walked over to the front door and yelled, "Who is it?" (as I wasn't expecting any visitors... it was an art studio.) A voice from the other side of the door yelled out, "Fedex." So I opened the door, and signed for a Fedex letter.
>
> Inside the Fedex envelope was a check written to me, for $100. It was sent with a card from my uncle, for no special reason. The card read, "Love you. Thought you could use this."
>
> I showed the check to my bf (another Magician), and we just stood there staring at the shipping slip.
>
> The letter had been sent 24 hours *before* I did the ritual. I hadn't spoken to my uncle in a couple of years when this happened.
>
> Spirit Seere is famous for acting "instantly"... and he certainly delivered. Figuratively and literally.
>
> Long story short. I did a ritual, and 30 minutes afterward, got a letter answering my request. Never heard anything like this before.
>
> This is a true story, and I still have the letter. And yes, I was able to pay the bill.

My first thought on reading this reply was, “Wow. That’s exactly what I’d said was needed as proof, isn’t it?” And then I looked again. The uncle in the story says, “Thought you could use this.” Why write that? If all references to magic were erased, we would, without a second thought, have assumed the uncle was implying they knew about the debt. Most tellingly, there’s no explanation of what the debt is for, or to whom the debt is owed, so we can’t judge how likely it was for the

uncle to have caught wind of it. Last, starting his letter with 'love you' implies, at least to me, that the uncle wishes they could see that relative more often, and is hoping the surprise gift will inspire a visit. And indeed, we are told, "I hadn't spoken to my uncle in a couple of years." I have my own grandparents who never stop asking me to visit them so I can smell such connotations a mile off.

As I said, I've seen no evidence that magic works, at least not the type that relies on the manipulation of spiritual entities. Why do I say that? Weren't spirits implicit in Skinner's definition of magic?

I've already alluded to the fact that Skinner's definition is not universally agreed upon. Most magicians call his type 'ceremonial magic', 'high magic' or 'theurgy'. This contrasts with 'low magic', which typically does not involve consorting with spirits, at least not in as brazen a way. Low magic was, and is in many places still, the type practised by 'cunning folk', your stereotypical witches or wizards, shamans or ju-ju men, living on the outskirts of society, or maybe at the top of the social hierarchy depending on the community, who pass the wisdom down from generation to generation, rather than learning it in books.

Cunning Folk

I therefore cannot talk about magic without at least mentioning folk practices. If these produce reliable results, perhaps I'll have to eat my words, and start thinking up alternative explanations for everything. What practices come under folk magic? Here's a non-exhaustive list:

- **Herbalism.** Medicine for amateurs. It sometimes works, but why take St. John's Wort, an antidepressant of an unspecified and unregulated formulation, when you can just take a precise dosage of fluoxetine or citalopram (which works via the same mechanism) and know exactly what you're getting. However, it's easy to understand why people would've preferred herbalism to medicine in times when a doctor would instead have chosen some horribly painful procedure without

anaesthetic, and probably one that'd make you feel worse off e.g. scarification.

- **Psychological trickery.** Similar to the pseudo-science of 'neuro-linguistic programming', a mental sleight-of-hand. For example, you may have seen a viral photograph of a 1980's witchcraft compendium,[190] in which the author advises, 'You may fascinate a woman by giving her a piece of cheese.' I can personally vouch for the effectiveness of this tactic, but it's not what I would call 'magic'.
- **Astrology.** The idea that the movements of the stars influence who you fall in love with, what occupation you choose, and so on. When we didn't understand the nature of stars and nebulae, plausible. But in the age of high-tech astronomy and astrophysics, astrology is difficult to stomach. Cold reading is a better explanation for the perceived accuracy of the horoscope— the Barnum effect. However, many grimoires use astrological principles too: every spirit is said to have its own special hour and day in which it can be contacted. For example, a Saturnian spirit is best contacted on Saturday. If that sounds strangely coincidental, let me assure you it's not: our names for the days of the week are a remnant of astrological belief. Sunday = day of the sun. Monday = day of the moon. Tuesday = day of Mars. Why not Marsday? The Romance languages provide the answer. Tuesday in French is *Mardi*. We hence see how the Romance languages, being direct descendants of Latin, better reflect the ancient Roman gods who lent the planets their names. So why Tuesday? The Roman historian, Tacitus, thought the Germanic god, Tiw, was the barbarian equivalent of Mars since they were both gods of war in their respective pantheons.[191] Mars's day became Tiw's day in English, which was shortened to Tuesday. This practice of seeing foreign mythologies through the lens of Roman religion is known as *interpretatio romana*. Interesting historical

[190] Paulsen, Kathryn. *The Complete Book of Magic and Witchcraft*. Penguin Books USA, 1980.

[191] Tacitus, and H. Mattingly. *Agricola and Germania: Tacitus*. Edited by James Rives. Illustrated edition. Penguin Classics, 2010.

trivia aside, the question we should answer is why spirits might have a temporal association in this way. Multiple explanations: (1) they don't and it makes no difference, (2) the planets exert a force on our lives not yet known to science, or (3) the planets are red herrings and the relevant cycles are inherent to time itself or some other natural cycle. This makes most sense given that only the hour and day seem to matter in the grimoires, with no references to the constellations or houses of conventional astrology. But if we believe our integrated information theory of spirits, the best answer is likely (4) the perception of time is an important element of consciousness. Our circadian rhythm (i.e. the brain's internal 24-hour 'clock') shapes our lives: different levels of wakefulness are intimately linked to different phases of consciousness, as we have already discussed. A study of brain-injured patients suggested these circadian rhythms might even be a prerequisite for consciousness.[192] And if different scents can trigger different spirits, it stands to reason that anything else affecting consciousness at a deep level should also display the same potency.

- **Charms, amulets, and talismans.** These often owe their power to different spirits, usually angels, and are therefore adjacent to classical high magic but don't involve the Solomonic method. I won't get into the difference in definitions between these things because it won't end up being relevant.
- **Divination.** Any attempt to predict the future. Most well known are the practices of tasseography (i.e. reading tea leaves) and scrying (i.e. gazing into a crystal ball, mirror, or a jar of urine). Depending on who you ask, these are either a form of extrasensory perception or a way of gaining information from spirits. For example, as already mentioned, necromancy was originally the practice of divination by contacting the spirits of the dead. I should also mention that scrying is often used as shorthand for the 'Armadel' method of

[192] Blume C, Lechinger J, Santhi N, *et al*. Significance of circadian rhythms in severely brain-injured patients: A clue to consciousness? *Neurology*. 2017 May 16;88(20):1933-1941.

high magic, beloved by Stratton-Kent who believed it predates the Solomonic method. Briefly, the Armadel method (named for its originating grimoire)[193] involves summoning an intermediary spirit into your scrying glass, who fetches other spirits for you.

- **Curses and protection from curses.** This usually relies on sympathetic magic or high magic.
- **Love binding.** Methods for causing infatuation. Also usually relies on sympathetic magic, and sometimes high magic.
- **Recovering lost or stolen objects.** Usually done either by scrying, sympathetic magic, or high magic.

What's this 'sympathetic magic' I speak of? Sympathetic magic is the practice of using objects or actions resembling a desired influence, to cause the desired influence. The best example in popular culture is the so-called 'voodoo doll'. You create a doll, label it with the name of an enemy, then set it on fire. A more benign example would be a 'green witch' labelling her plants with the names of her friends. When one of the plants lilts, she knows to ring the associated friend and ask how they're doing. She'll always discover this friend is going through a difficult time and needs support, because almost everybody always is. And this will reinforce her belief. Sympathetic magic is one of the oldest forms of magic attested, as evidenced by prehistoric rock art.[194] It usually involves animals and plants. For example, the Bellacoola people (natives of British Columbia) believe that a baby girl will grow up to be industrious if the limbs of a recently deceased beaver were applied to her.[195] Across the Atlantic, in the ethnographic museum of Split, Croatia, one can learn of folk slavic beliefs about pregnancy clearly based on sympathetic magic. If a rabbit runs in front of a pregnant woman, the child will have bulging eyes. And if a pregnant woman craves your food, you should hand it over lest their baby

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193 Mathers, Samuel Liddell MacGregor. *The Grimoire of Armadel*. Samuel Weiser, 1995.

194 Keyser JD, Whitley DS. Sympathetic Magic in Western North American Rock Art. *American Antiquity*. 2006;71(1):3-26.

195 Smith HI. Sympathetic Magic and Witchcraft among the Bellacoola. *American Anthropologist*, vol. 27, no. 1, 1925, pp. 116–21.

develop a birth-mark in the shape of the food.

Whole systems of magic revolve around the sympathetic principle, such as the 'Rootwork' practised in African American communities,[196] in which magical properties are attributed to herbs, roots, minerals, animal parts, and bodily secretions. Even a person's footprint is game, for use in 'foot track magic'. Note that rootwork is heavy with syncretism, often being integrated with the Solomonic method among others.

The sympathetic principal is sometimes adopted in my own profession. In the early nineteenth century, a German physician, named Samuel Hahnemann, was despairing of his colleague's bloodletting practices. Wanting a more pharmaceutical approach, he therefore introduced the idea that 'like cures like'. In his own [translated] words:[197] "it is necessary to choose in each case a medicine that will excite an affection similar to that against which it is employed." For example, red onion makes your eyes water, so its diluted extracts are used to relieve symptoms of allergies in homeopathy. Yes, if you haven't gotten it by now, I've been describing the invention of homeopathy. Doctors have studied homeopathy enough to know it doesn't work.[198] So we've no reason to believe sympathetic magic is anything other than a placebo effect— the power of positive expectations. And negative expectations can even result in measurable harm, known as the nocebo effect.[199] This is more than enough to explain the effects of curses.

It's worth mentioning that many people now believe in a different abuse of magical thinking, called 'manifestation', first popularised in Rhonda Byrne's *The Secret.*[200] This is the belief that if you are positive enough, want something enough, believe it's going to happen enough, it'll manifest automatically. The underlying 'theory' is either that

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196 Harry Middleton Hyatt. *Hoodoo Conjuration Witchcraft & Rootwork*, 1970.

197 Hahnemann, Samuel. Translated by Charles H. Devrient. *The Homœopathic Medical Doctrine: Or, 'Organon of the Healing Art'*. W.F. Wakeman, 1833.

198 Ernst E. A systematic review of systematic reviews of homeopathy. *Br J Clin Pharmacol.* 2002 Dec;54(6):577-82.

199 Planès S, Villier C, Mallaret M. The nocebo effect of drugs. *Pharmacol Res Perspect.* 2016 Mar 17;4(2):e00208.

200 Byrne, Rhonda. *The Secret*. Simon and Schuster, 2006.

human intention has real power, or that the universe gives to those who ask (a 'law of attraction'). For other justifications, think Wheeler's 'It from Bit', or the *Kybalion*'s 'All is mind', as already discussed. Unfortunately, manifestation suffers the same problem as homeopathy: it's placebo. We know because people who believe in it are statistically no more successful than those who don't, and on the contrary, are more likely to experience bankruptcy.[201] I'm sure that having a positive attitude to life is helpful, but it shouldn't be so positive you think you're invincible.

In summary, cunning folk use a mixture of herbal medicine, sympathetic magic, and occasionally a crude form of ceremonial magic. We haven't found evidence of unexplained phenomena here, so let's move on.

[201] Dixon LJ, Hornsey MJ, Hartley N. "The Secret" to Success? The Psychology of Belief in Manifestation. *Pers Soc Psychol Bull.* 2023 Jul 8:1461672231181162.

CHAPTER SIX

Implications

In which we make testable predictions, based on an integrated information theory of spirits

1. Antipsychotics

If spirits run on the same neural networks as the rest of our consciousness, they should be susceptible to the same medications. If we therefore take a spirit medium, shaman, or ceremonial magician, and feed them antipsychotics, would that suppress spirit manifestation? It certainly does for psychosis, but as we have seen, mediums are usually mentally healthy, so would we see the same effect?

At least one study has already showed success in treating healthy individuals experiencing auditory verbal hallucinations.[202] In other words, mentally healthy people who hear voices (but have no other problems) stop hearing voices when prescribed antipsychotics. This would only be useful evidence for our theory, however, if we

[202] Shan P, Zhuo C, Ma X, *et al*. Treatment of auditory verbal hallucinations with atypical antipsychotics in healthy individuals: an artificially controlled post-treatment report. *J Int Med Res.* 2020 Apr;48(4):300060519875830.

suspected these 'voices' were synonymous with spirits. We will discuss voice-hearing in psychotic as well as non-psychotic people in further detail.

2. Sedatives

As a counterpoint, could we increase the frequency of spirit manifestation by administering sedatives? Imagine we run the Hampton Court experiment again, but we give half of the participants a low dose of diazepam and the other half, a placebo. Would we see a significant difference in reported paranormal experiences?

If we classify dreams and spirits in the same family as discussed before, evidence already supports the idea. Pregabalin is an anticonvulsant that reduces the excitability of neurones, making it useful for treating epilepsy, anxiety, as well as sleep disorders. However, a strange side effect of inducing deep sleep this way is an increase in the incidence of lucid dreaming,[203] a kind of hallucinatory dreaming in which the person knows they are dreaming.

We may also find corroborating evidence in existing accounts of spiritual encounters. For example, when we read the account of British anthropologist, Edith Turner, how are we to explain the spirit form she, along with multiple people, saw during a healing ritual in Zambia?[204]

> I saw with my own eyes a giant thing emerging out of the flesh of her back. It was a large gray blob about six inches across, opaque and something between solid and smoke. [footnote: I believe that if I had tried to touch the gray form, my fingers would have gone through.]
>
> I was amazed, delighted. I still laugh with glee at the realization of having seen it, the *ihamba*, and so

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[203] Haas MF, Latchman J, Guastella AM, *et al*. Lucid Dreams Associated with Pregabalin: Implications for Clinical Practice. *J Pain Palliat Care Pharmacother*. 2022 Sep;36(3):194-199.

[204] Turner, Edith. "A Visible Spirit Form in Zambia." *Being Changed by Cross-Cultural Encounters: The Anthropology of Extrodinary Experience*, edited by David E. Young and Jean-Guy Goulet, University of Toronto Press, 1994, pp. 71–96.

> big! Everyone was hooting, and we were all jumping with triumph.

This occurred after deep engagement with the natives and the ritual's requirements, which included imbibing an unspecified 'leaf medicine' that made her 'momentarily dizzy'. Recalling her experiences elsewhere, she writes more about the effects of this medicine:[205]

> Each drank a cupful of the leaf medicine; a cup was handed to me and I drank the liquid, which tasted pleasantly of fresh leaves. Immediately, my head fired up and swam. The drink contained no alcohol, but I felt the same recognizably loosening effect as before. Nevertheless I went on writing my field notes with no change in legibility.

Whatever the ingredients, a sedative effect was clearly apparent, which is consistent with an IIT explanation for spirits.

3. Oneirogens

An oneirogen is a psychoactive drug that induces a dream-like state of consciousness. We have already mentioned pregabalin as an inducer of lucid dreaming, but we know of other, more potent, oneirogens. Mirtazipine is an antidepressant known to cause nightmares.[206] This is interesting to us because, as well as being used for depression, mirtazipine is commonly employed to help anxious patients sleep, since its most common side effect is drowsiness. But the British National Formulary lists 'sleep disorders' as a common or very common side effect of mirtazipine— it's more often reported anecdotally than in the medical literature, as with most unusual side effects. In the medical literature however, the best known oneirogen is galantamine, normally used to treat Alzheimer's disease. A double-blind, placebo-controlled study found a dose-responsive association

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[205] Turner, Edith, et al. "The Second Ihamba: The Performance for Meru." *Experiencing Ritual: A New Interpretation of African Healing*, University of Pennsylvania Press, 1992, pp. 128–58.

[206] Dang A, Garg G, Rataboli PV. Mirtazapine induced nightmares in an adult male. *Br J Clin Pharmacol.* 2009 Jan;67(1):135-6.

with the frequency of lucid dreaming.[207] In other words, the higher the dose, the higher the probability of having a lucid dream. So how does it work? Galantamine is an inhibitor of the enzyme that breaks down a neurotransmitter called acetylcholine. Levels of this neurotransmitter are normally highest during wakefulness and REM sleep (the stage of sleep in which dreaming is most frequent), so we know it's important for sleep regulation. In contrast, acetylcholine levels drop off during sleep deprivation,[208] which happens to be another cause of hallucinogenic experiences,[209] occurring during wakefulness and hence occasionally mimicking a spiritual encounter. With all of this in mind, we may draw a link between oneirogens and sedatives, with theoretically similar implications.

Another possible oneirogen is DMT, which we've already discussed in chapter two. People who use DMT report the same experiences independently, and the most well known type is an interaction with other apparently intelligent entities. These entities are frequently described as fractal and machine or clockwork-like in appearance, earning them the nickname of 'machine elves' (coined by the ethnobotanist, Terence McKenna). Recall that Strassman found up to 50% of users reported such experiences. A more recent (2020) study (n=2561) explored DMT entity experiences in more detail.[210] The majority of participants reported that the entity initiated the encounter and most communication was one-way only. More pertinently for us, the entities were most commonly described as a 'being' (60%), 'guide' (43%), 'spirit' (39%), 'alien' (39%), 'helper' (34%), 'angel' (16%), or 'elf' (14%). The vast majority (96%) appeared to be intelligent and

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[207] LaBerge S, LaMarca K, Baird B. Pre-sleep treatment with galantamine stimulates lucid dreaming: A double-blind, placebo-controlled, crossover study. *PLoS One.* 2018 Aug 8;13(8):e0201246.

[208] Bowers MB, Hartmann EL, Freedman DX. Sleep Deprivation and Brain Acetylcholine. *Science.* 1966. 153(3742):1416-1417.

[209] Waters F, Chiu V, Atkinson A, Blom JD. Severe Sleep Deprivation Causes Hallucinations and a Gradual Progression Toward Psychosis With Increasing Time Awake. *Front Psychiatry.* 2018 Jul 10;9:303.

[210] Davis AK, Clifton JM, Weaver EG, *et al*. Survey of entity encounter experiences occasioned by inhaled *N,N*-dimethyltryptamine: Phenomenology, interpretation, and enduring effects. *J Psychopharmacol.* 2020 Sep;34(9):1008-1020.

conscious. As to whether participants perceived these entities were real or not, 81% thought they were more real than everyday waking consciousness as it felt during the experience, and 65% felt the same after the experience. Participants were also asked where they thought the entities really existed: 49% believed they existed within another dimension or reality, 1% thought they existed within the normal everyday world, and 26% believed both of these ideas. Only 9% believed the entities existed completely within themselves. And 72% believed the entity continued to exist after the encounter.

Belief alone is not proof of anything— people may believe all sorts of ridiculous falsehoods. The qualitative descriptions of these entities do however show us how real they are to the people experiencing them, as real as any other spiritual encounter we have explored throughout this book. So why might DMT produce such striking experiences? A 2019 study measured the EEG changes of people given DMT and found an increase in delta and theta waves combined with a collapse of alpha and beta waves, relative to control participants not given DMT.[211] The emergence of delta and theta waves, particularly in the temporal lobe, is classically associated with REM sleep.[212] The researchers therefore theorised this pattern may indicate when the brain is switching from processing externally-generated information (e.g. sight and sound) to processing internally-generated information (e.g. dreams). Whatever is going on then, it seems the DMT experience is mechanistically, as well as subjectively, similar to the state of dreaming.

4. Bell-ringing

If we're able to induce a spirit manifestation, whether that be a felt presence or something audiovisual, can we switch it off by ringing a bell, that favourite tool of Catholic exorcists? Ideally, we'd run a

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[211] Timmermann C, Roseman L, Schartner M, *et al.* Neural correlates of the DMT experience assessed with multivariate EEG. *Sci Rep.* 2019 Nov 19;9(1):16324.

[212] Carhart-Harris R. Waves of the unconscious: The neurophysiology of dreamlike phenomena and its implications for the psychodynamic model of the mind. *Neuropsychoanalysis.* 2007. 9, 183–211.

randomised controlled trial of Catholic exorcism methods with three groups: a control group where the exorcist performs the usual process but without a bell, a group where a bell is shown but not rung, and a group where the bell is rung. Then we'll know whether the bell makes a difference, and why. There's probably enough possessions that the Catholic church could do it themselves without having to induce anything at all. Trials have been performed before,[213] but not on a large number of people. There would also be difficulty in confirming who is and isn't a fraud, making large numbers even more important.

5. Interviews

You can test the theory yourself if you have any acquaintances who claim to have seen ghosts, or any other spiritual encounters. Ideally, the interview should take place immediately after the experience though, to reduce the risk of recall bias. Asking one specific question is all that's needed. Much to my amazement, I received the perfect opportunity myself, which will be useful in demonstrating what I mean.

On 19th July 2024, I hit the paranormal jackpot. I was leaving work, still in broad daylight, and ran into one of the oculoplastics consultants. She asked me if I was on call this weekend. I said no. She replied that she thought she may as well ask since I was there. Then we went our separate ways. A brief enough conversation, but then I noticed one of my colleagues staring at me, his mouth hanging open, looking like he'd seen a ghost. This is chiefly because he had: what he'd seen was a small girl in a pink dress waiting patiently between me and the consultant. He'd thought it must've been the consultant's daughter, until he'd turned away, the girl had vanished, and he realised that nobody else had been aware of her. "David, something really weird just happened: I think…I've just seen a ghost."

You can bet I leaped on the chance to interview him. Basics first: he has no past medical history and takes no regular medications, being a fit and healthy twenty to thirty-year-old male. He has always believed

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[213] Kaptchuk TJ, Kerr CE, Zanger A. Placebo controls, exorcisms, and the devil. *Lancet.* 2009 Oct 10;374(9697):1234-5.

in ghosts, and has seen them many times before. Not only that, but he has a significant family history of paranormal experiences, and grew up hearing about family ghost experiences as a child. I kept asking him for details of the ghost and received the same answer: a girl in a pink dress, standing between me and the consultant. When pressed, he described her hair as 'mousy', but couldn't recall any more visual details. No, he'd never seen this particular ghost before. No, he'd never seen any ghost in the eye hospital. In fact, he hadn't seen any ghost at all in many years. He looked shell-shocked and I had no reason not to believe him. Nobody at work knew anything about my interest in spiritual encounters at this time, and every reason to believe I'd be the type of person to viciously mock such a fanciful story. But my colleague was clearly so shocked he couldn't help but express himself.

Note that the current favourite theory of psychologists for explaining hauntings, the Lange-Houran theory discussed in chapter one, cannot explain this incident. No priming had occurred. Nobody had mentioned ghosts. He'd never heard about or seen a ghost in this building. He had prior beliefs about ghosts, but these only appear to have influenced his interpretation of the vision. Perhaps somebody else would have interpreted the girl as an angel, for example. He had no prior beliefs about a specifically young female ghost haunting this vicinity.

I did not expect the answer I received to my next question: "Did you hear what me and the consultant were talking about?"

"No."

I stood dumb-founded. "You didn't hear anything at all."

"No. I was looking down at my phone to check the time, and I could see the child, and I just thought it was the consultant's daughter. When I looked up, she was gone."

My conversation with the consultant was brief and not particularly information-dense. My colleague was standing right next to me. So the fact he could recall none of the conversation demonstrates that he was not fully aware of his surroundings; a mild kind of trance. It seems he'd zoned out while checking his phone, as people often do. When he'd regained full consciousness, the ghost had disappeared, and that's when he became spooked. This is exactly what my question had been designed to probe: how present was my colleague during this ghost encounter?

Upon hearing this answer, I became excited, because this is all consistent with an IIT explanation for spiritual encounters. Of course, the next thing I did was rush home to write all of this down so that I wouldn't forget any details. I'm still disappointed I didn't get to see a ghost though.

Dissociation

As my colleague showed, trances are common. If you've ever day-dreamed, or had your eyes glaze over during a boring meeting, you too have experienced a trance state of dissociation. What is not as common, apparently, is the propensity for spirits to rise up during such a trance, or else everyone would've seen a ghost at some point. This tells us the propensity to slip into a trance is not the same thing. Theoretically, any momentary gap in an otherwise continuous consciousness should allow a lesser consciousness to predominate as, for example, when your attention shifts from one scene to another. This probably explains why ghosts are often seen as fleeting glimpses in the corner of the eye.

But zoning out is probably the easiest way to achieve the requisite state. In other words, the first question you should ask somebody who has just seen a ghost: **"Did you hear what I just said?"**

People often don't know when they've just been in a dissociative trance. This explains why children more frequently report spiritual encounters than adults: they day-dream (technically called 'transient dissociative episodes') more often,[214] and find it more challenging to distinguish between fantasy and reality.[215] My wife found this particularly difficult as a child. She was what many would describe as 'away with the fairies', but also disturbed many an adult by, for example, reporting strange men standing in the corner of an empty room, or telling somebody in detail about their dead relative, whom she'd never met or heard about. Fortunately for me, she no longer

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214 Putnam FW. Dissociative disorders in children: behavioral profiles and problems. *Child Abuse Negl.* 1993 Jan-Feb;17(1):39-45.

215 Zisenwine T, Kaplan M, Kushnir J, *et al*. Nighttime fears and fantasy-reality differentiation in preschool children. *Child Psychiatry Hum Dev.* 2013 Feb;44(1):186-99.

experiences anything like this, at least not to the same extent.

Looking backwards to chapter two, you'll recall we discussed the idea that extreme focus in the form of meditation might be required for spirit perception. More specifically, we thought clairvoyants might be hyper-focusing on stimuli that the average person was missing. It's interesting to note we have now reached the exact opposite conclusion: dissociation is more likely to be helpful, and is probably what Edith Turner was pointing to by describing the leaf medicine's effect as 'loosening'. Dissociation is defined as the lack of integration of thoughts, feelings and experiences into consciousness and memory.[216] So is there evidence that clairvoyants are making use of dissociative states? If you've seen any representation of a seance, you'll instantly recognise a dissociative state, perhaps with the stereotypical eyes rolling upwards. But yes, mediums have been shown to exhibit more dissociation symptoms than the average person, albeit not enough to pass the threshold of mental illness.[217]

Distinguishing between dissociative trances and dissociative mental illness is vital. One of the key features of dissociation is an apparent detachment from reality, as a state similar to dreaming except the person is awake. You may remember from chapter one that the other mental state described as being a detachment from reality is psychosis. Their main difference: psychosis is typically a more alien, uncontrollable, and less dream-like experience. However, psychosis and dissociation have an interesting symptom in common: voice-hearing.

Voice-hearing

Known as 'auditory verbal hallucinations' in the literature, voice-hearing was historically thought of as a psychotic phenomenon. For example, anthropologists used to consider shamans as universally

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[216] Giesbrecht T, Lynn SJ, Lilienfeld SO, *et al*. Cognitive processes in dissociation: an analysis of core theoretical assumptions. *Psychol Bull.* 2008 Sep;134(5):617-647.

[217] Wahbeh H, Radin D. People reporting experiences of mediumship have higher dissociation symptom scores than non-mediums, but below thresholds for pathological dissociation. *F1000Res.* 2017 Aug 10;6:1416.

schizophrenic, and the practice of shamanism as just a culturally acceptable way of including schizophrenic people within society. This all changed in 1976, when Jane Murphy, a Harvard professor of anthropology, published a groundbreaking essay on her experiences living with the Egba Yoruba people in Western Nigeria, and the Yupik people on an island in the Bering Sea.[218] In both instances, despite the geographical disparity, she found that people delineated between being 'crazy' and being a shaman. Voice-hearing on its own was not sufficient to get yourself tagged as mentally ill. It soon became recognised that shamanism was not the same as schizophrenia at all.[219] We now think of voice-hearing as more of a dissociative phenomenon, the alien voices probably being unrecognised parts of the self's main voice.

Studies have estimated the prevalence of voice-hearing in the general population as 10—15%.[220] Nobody is quite sure what this implies about the relationship between voice-hearing and psychosis, but it's clear that voice-hearing is not uncommon among non-clinical, 'mentally healthy' people lacking other features of psychosis. Not only that, but significant differences have been identified: non-clinical voices tend to be fewer in number, shorter in duration, less disruptive to life, easier to suppress, and less emotionally negative.[221] But the regions of the brain activated are not significantly different between clinical and non-clinical voice-hearing.[222]

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218 Murphy JM. Psychiatric labeling in cross-cultural perspective. *Science*. 1976 Mar 12;191(4231):1019-28.

219 Noll R. Shamanism and schizophrenia: A state-specific approach to the "schizophrenia metaphor" of shamanic states. *American Ethnologist.* 1983 *10*(3), 443–459.

220 Sommer IE, Daalman K, Rietkerk T, *et al*. Healthy individuals with auditory verbal hallucinations; who are they? Psychiatric assessments of a selected sample of 103 subjects. *Schizophr Bull.* 2010 May;36(3):633-41. Erratum in: *Schizophr Bull.* 2014 Sep;40(5):1182-3.

221 de Leede-Smith S, Barkus E. A comprehensive review of auditory verbal hallucinations: lifetime prevalence, correlates and mechanisms in healthy and clinical individuals. *Front Hum Neurosci.* 2013 Jul 16;7:367.

222 Diederen KM, Daalman K, de Weijer AD, *et al*. Auditory hallucinations elicit similar brain activation in psychotic and nonpsychotic individuals. *Schizophr Bull.* 2012 Sep;38(5):1074-82.

To complicate matters, psychosis is not the only clinical route to voice-hearing. Parkinson's disease, temporal lobe epilepsy, dementia, and illicit substances (e.g. cannabis and cocaine) may all cause similar auditory hallucinations. Most interestingly for us, however, is the association with hypnagogic and hypnopompic experiences (again taking us back to chapter one).[223] Although the voices of hypnagogic/hypnopompic hallucinations occur during sleep or half-asleep phases of consciousness, they tend to be markedly similar in content and form to the kinds of voices heard while fully awake.[224] Perhaps this indicates a shared underlying mechanism. Perhaps it doesn't. The only way to know for sure is, of course, to investigate the mechanism.

Functional MRI studies of schizophrenic patients reporting auditory verbal hallucinations have shown abnormal activity of the frontal cortex and temporal cortex, two regions of the brain critical to the experience of inner speech.[225] Furthermore, the pattern of activity seen was extremely similar to that in healthy volunteers imagining somebody else talking to them. But in the schizophrenic group, the left hippocampal region was activated, which usually indicates the encountering of an unexpected stimulus.[226] These findings are consistent with the hypothesis that voice-hearing results from a disruption of normal cognitive processes, namely the loss of ability to recognise one's internal speech or thoughts as their own— a dissociative phenomenon. Other neuroimaging studies have shown that several regions of the brain may form the network responsible for

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223 Watson D. Dissociations of the night: individual differences in sleep-related experiences and their relation to dissociation and schizotypy. *J Abnorm Psychol.* 2001 Nov;110(4):526-35.

224 Jones SR, Fernyhough C, Larøi F. A phenomenological survey of auditory verbal hallucinations in the hypnagogic and hypnopompic states. *Phenomenol. Cogn. Sci.* 2010. 9, 213–224.

225 Shergill SS, Brammer MJ, Williams SC, *et al.* Mapping auditory hallucinations in schizophrenia using functional magnetic resonance imaging. *Arch Gen Psychiatry.* 2000 Nov;57(11):1033-8.

226 Stern CE, Corkin S, Gonzalez RG, *et al.* The hippocampal formation participates in novel picture encoding: evidence from functional magnetic resonance imaging. *Proc Natl Acad Sci U S A.* 1996;938660- 8665

this self-monitoring.[227]

This interested Juan Gomez-Molina, an independent researcher in neuroscience and engineering, who'd developed a topological hypothesis for the connections in the cerebral cortex.[228] To simplify his hypothesis: during the alert state of the cortex (as opposed to sleep or relaxed states), functional connections will always exist between any set of activated cortical modules. A breakdown in this network should therefore cause a disease of "functional disconnection." Gomez-Molina later hypothesised that in schizophrenia, the abnormal inactivation of speech processing pathways (observed in the neuroimaging studies described above) triggers a disruption of connectivity that allows the abnormal activation of other regions, snowballing into independent neural networks.[229] In this view, the activation of these independent neural networks are responsible for the "division of the consciousness."

Let us speculate, therefore, that a subset [at least] of these 'voices' are, in fact, the independent lesser consciousnesses we have identified as spirits, able to surface during the breakdown of a person's usual overall consciousness. We certainly wouldn't be the first to speculate thus.

It appears that the neuroscientists may have cracked the auditory component of spiritual encounters. Unfortunately, the visual component remains a puzzle, for visual hallucinations are not usually seen in psychosis, and are more indicative of organic, neurological disease such as dementia. Our integrated information theory of spirits demonstrates its worth here, being a more general solution to the problem of spiritual encounters. It properly explains the significance of the independent neural networks posited by Gomez-Molina, and their relation to a person's usual state of consciousness.

Since the nature of consciousness is the key, we might speculate

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227 Liddle PF, Friston KJ, Frith CD, *et al.* Patterns of cerebral blood flow in schizophrenia. *Br J Psychiatry.* 1992;160179- 186

228 Gomez JF, Lopera FJ. A topological hypothesis for the functional connections of the cortex. A principle of the cortical graphs' based on the neuroimaging. *Med Hypotheses.* 1999 Sep;53(3):263-6.

229 Gomez JF. Disconnected networks during auditory hallucinations and dreams: a topological problem for neuroimaging? *Arch Gen Psychiatry.* 2002 May;59(5):468-9; author reply 469.

that a fuller understanding of consciousness, a more complete integrated information theory, could shed light on other unexplained features of psychotic disorders. But we can think bigger. Perhaps such an understanding, a general solution, could predict the hallucinations and/or spiritual encounters of a non-human consciousness.

Non-human consciousness

We may propose that any large conscious system of integrated information can be broken into smaller conscious systems of integrated information. Isn't that contradictory? By the definition of 'integrated' in this context, actually breaking the system into two parts terminates the overall consciousness or it wasn't really integrated enough to be conscious in the first place. Every part must be causally linked to every other part, as much as possible, because subjective experience is unified. But the brain can be divided into functional subunits, as any anatomy textbook will show you. Not all of those parts seem to contribute to the overall consciousness. For example, we know that the cerebellum can suffer a number of injuries without the person's consciousness being affected, yet the cerebellum is massively connected to the rest of the brain. The explanation for this lies in the organisation of these different networks. Studies have demonstrated that the cerebellum comprises several modules which process input mostly independent of each other.[230] IIT therefore assigns the cerebellum a relatively low Φ, even though it's tightly connected to the cerebral cortex, a system with a high Φ.

Most importantly, the organisation of these conceptual structures can vary. The integrated information system with the highest Φ can grow, shrink, and split— remaining the arbiter of conscious experience as long as it's the local maximum of Φ. We have already discussed the importance of connectivity within the cerebral cortex. In the real world, our nervous systems are always changing their activity in response to stimuli by reorganising their network structures. We call

[230] Apps R, Hawkes R, Aoki S, *et al*. Cerebellar Modules and Their Role as Operational Cerebellar Processing Units: A Consensus paper [corrected]. *Cerebellum.* 2018 Oct;17(5):654-682. Erratum in: *Cerebellum*. 2018 Oct;17(5):683-684.

this neural plasticity and we've known about it since the 1900s.[231]

It's therefore reasonable to suppose that any system of integrated information could theoretically be split into smaller systems of integrated information with lower but still significant values of Φ. Under circumstances already discussed, these smaller systems may take precedence, at which point we experience the phenomenon of spirits. Conclusion: all conscious systems are susceptible to spiritual encounters. In this view, spirits can be thought of as inherent artefacts of consciousness. We'd therefore predict that all conscious animals, from wasps to whales, are capable of being haunted. And if a true artificial general intelligence is ever programmed, we should expect it to 'hallucinate' spirits as well.

You may have heard about the hallucinations of the latest crop of artificial intelligences (AIs), such as large language models like ChatGPT (OpenAI), so I should clarify what computer scientists are talking about here. When ChatGPT fabricates information and produces false outputs, that's what the AI wranglers are calling 'hallucinations'— a generated statement of belief in the absence of, or presence of a contradictory, justification.[232] But psychiatrists define a hallucination as the perception of a stimulus in the absence of a real stimulus. Large language models don't perceive things, since they're glorified predictive text algorithms, so their hallucinations are more similar to what psychiatrists call 'confabulations', which are rather confusingly considered a subtype of hallucination by computer scientists. In other words, when ChatGPT 'hallucinates', it is simply failing to predict a suitable response to an input. So future AIs might hallucinate like humans do, but today's AIs cannot (at the time of writing). The best Turing test then: seeing spirits.

Other trances

It's worth noting that the trance of dissociation isn't equivalent to other trance states, such as the state of suggestibility induced by

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231 Sharma N, Classen J, Cohen LG. Neural plasticity and its contribution to functional recovery. *Handb Clin Neurol.* 2013;110:3-12.

232 Ji Z, Lee N, Frieske R, *et al*. Survey of Hallucination in Natural Language Generation. *ACM Comput. Surv.* 55, no. 12 (March 2023).

hypnosis.[233] Putting aside the obvious subjective differences, hypnosis is associated with increased activity of the brain's frontal lobe, whereas the dissociative trance is associated with decreased frontal activity.[234] If you're knowledge of neuroanatomy is rusty, allow me to jog your memory. The frontal lobe is responsible for executive function: attention, problem-solving, planning, emotional regulation, and other higher-order thought processes. Meditation is associated with increased frontal activity.[235] As speculated previously, this means it may be an opposite state to dissociation.

We may therefore predict, tentatively, that spiritual encounters are less likely to occur in a state of meditation. This would be easy to test. Take two groups of people to a notoriously haunted location in the middle of the night. Ask one group to meditate (ideally having practised beforehand) and the other group to just sit there. Both groups should keep their eyes open. If the theory is correct, we should find that meditation is protective.

The other implication is that hypnosis may not allow us to replicate spiritual encounters as much as we'd like, since the hypnotic state appears more similar to meditation in those neuroimaging studies. However, the nature of the hypnotic state remains controversial.

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233 Bell V, Oakley DA, Halligan PW, *et al*. Dissociation in hysteria and hypnosis: evidence from cognitive neuroscience. *J Neurol Neurosurg Psychiatry.* 2011 Mar;82(3):332-9.

234 Peres JF, Moreira-Almeida A, Caixeta L, *et al*. Neuroimaging during trance state: a contribution to the study of dissociation. *PLoS One.* 2012;7(11):e49360.

235 Wang DJ, Rao H, Korczykowski M, *et al*. Cerebral blood flow changes associated with different meditation practices and perceived depth of meditation. *Psychiatry Res*. 2011 Jan 30;191(1):60-7.

Conclusion

To finish this book is to re-examine the promises I made in the introduction. Hopefully you now agree that tales of spirits are ubiquitous around the world.

Psychologists have perennially chalked up such tales to functional quirks common to every human brain. We saw how this is a good explanation for many spiritual encounters: cases of mistaken identity or mental trickery. But we also saw how the commonly proposed scientific theories of the paranormal can't explain a number of accounts. So we tried and failed with standard physics. In particular, the electromagnetism theory of spirits took a heavy beating. We then delved into the realm of the non-physical— theories of mind and consciousness— eventually landing on the current favourite within the world of neuroscience. By tinkering with integrated information theory, we identified, at last, a solution: spirits are not inherent properties of the human brain, but of consciousness itself.

Spirits are renegade, lesser subunits of consciousness, part and parcel of a person's overall general consciousness, and only take precedence when that general consciousness is attenuated, usually via a trance of dissociation. When these spirits emerge during sleep, perhaps we call them dreams. But they're always present on the underside of awareness, even if quiescent. They are like carp hovering over the silty bottom of a frozen-over lake, sluggish, barely perceptible below the surface. And when the lake thaws, the fish begin to wake.

As every lake has different species of fish, so every consciousness has its different varieties of spirits. And like a salmon changes its

colours with the season, so might any given spirit change its appearance depending on the context. If two different shoals of fish are compatible and lively enough, they might even temporarily merge into a larger shoal, as seen in group spiritual encounters (hypothesised to be a result of mirror neurone interactions). I'm really pushing the fish metaphor to its limits now.

The reality is, we're probably talking about independent neural networks within the human brain, which is itself one large neural network constantly adjusting its organisational structure throughout life. Disruptions of larger integrated networks probably allow these smaller independent networks to predominate, maybe even bringing them into existence in the first place. The individual neurones themselves probably don't 'care' about the overall network structure any more than a piece of lego cares whether it's part of a toy duck or a scale-model of the USS Enterprise. As far as integrated information theory is concerned, it all comes down to neural topology. And this goes hand in hand with corresponding altered states of consciousness (whether achieved through ceremonial magic, hallucinogens, or simple day-dreaming), which are well known and studied.

In addition, we've predicted how toying with states of consciousness, either ritually or pharmacologically, may allow us to switch on and off the perception of any underlying spirits. And we've discussed how spirit perception may even correlate with specific signs on electrodiagnostic testing.

Conclusion: an integrated information theory of spirits best explains the phenomenon of spiritual encounters. And hopefully you now agree. So next time you hear a ghost story, be sure to ask what the person was doing at the time. Were they fully awake and engaged with their surroundings? And if you are, like me, lucky enough to meet somebody who has just encountered a spirit, be sure to ask that golden question: 'did you just hear what I said?' Whenever you find yourself in the dark, alone and terrified, remember: it's not places, but people, that are haunted. And if threatened by a witch-doctor, threaten them back— their internal spirits are probably more developed than your own, and therefore more bothersome. Better still, consider taking decisive action. One of the most infamous magical duels ('the Battle of Blythe Road') ended when the poet, William Yeats, kicked Aleister Crowley down the stairs. Disclaimer: please don't kick anyone down

the stairs.

So if, like any of the people in this book, you happen to visit the Piraha people in the Amazon rain-forest, or apprentice yourself to a juju man in Zambia, or even embark on a ghost-hunt in Hampton Court, don't bother taking a bible or an EMF meter. What you need instead is an EEG headset and a packet of incense. Happy spirit hunting!

About the Author

David Maskill has an MbChB and MRes in Medicine from the University of Leeds. A Fellow of the Royal College of Ophthalmologists, he has published research in journals like the *British Journal of Ophthalmology* and presented at international conferences, as well as winning multiple academic awards. In his free time, he enjoys learning ancient languages, playing piano, and writing sci-fi short stories. He also runs a YouTube channel exploring topics in natural history and medicine.

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