# The promises and problems of purpose

*Olly Robinson*

**The questions of what** purpose is, and where it resides, underpin some of the basic problems of existence, and some of the most controversial debates in science. They are questions with ancient origins: Aristotle was convinced that the whole universe sparkled with purpose (telos), and that all things not matter how menial or insignific had a 'final cause' – an end towards which they tended o and which contributed toward at higher levels. Purpose i scheme was not extern by a creator, but rather w nature itself, like the p heart to pump blood is body.

The life sciences psychology have found is indispensable to Like Aristotle, Darwinia to admit that nature is purpose. Richard Dawk gave a talk entitled 'The Purpose' (search for the title to watch it) – he describes how random selection of natural sel leads to purposive adaptations. states that the physical features of organisms emerge from random mutations, but only those that have a purpose for their host are retained and become widespread. Therefore when we look to explain any part of an organism's physiology, we seek its purpose. For example; why do humans have an appendix? Recently that problem may have been solved; the appendix is a store of friendly bacteria that has the purpose of replenishing the gut when gastric illness may lead to a dangerous loss of such bacteria. If indeed a purpose has been found, then the mystery of the appendix has been solved. And that is the way with physiology; purpose is like the explanatory glue that holds organisms together.

With animal and human behaviour, purpose is even more central to scientific description and explanation. Even tiny creatures manage extraordinarily complex purposive actions. Monarch butterflies in Canada every September fly thousands of miles on a migration to a spot in Mexico. Every one of the millions who make it are doing it for the first time (they only live for seven months), and yet somehow instinctually head towards the goal of a tiny destination in the distant rainforest. This is only explicably by way of purpose and feedback loops that link perception and action in the service of a goal. In more complex animals and humans, purpose becomes more intricate; mice have been shown to show remark ight in purposive he capacity comes to *and* sidered and the book was effectively hushed up (although is now available on Amazon).

This taboo against cosmic purpose goes back to science's early years, when early scientists and natural philosophers decided to avoid final causes and to focus science only on physical and efficient cause. In the life sciences this purposeless project failed magnificently, and I can't help but wonder whether it is on the edge of failing in the physical sciences too. Gaia theory finds evidence of purposive processes operating in the biosphere as a whole, and increasingly the universe looks rather purposive too – the anthropic principle shows how scientific laws are fine-tuned in ways that are programmed for life. The implications of the anthropic principle are endlessly debated, but perhaps we should back up a bit… are not mathematical laws themselves a product of purpose, irrespective of their fine tunings? When a law is set in the human sphere, it is always the product of an aim. If we are going to use humanoid metaphors such as laws, principles and rules for the ordering structures of the cosmos, we may as well admit that they only work in the context of purpose. Or perhaps a change of language is needed.

Higher purposes and final causes were dropped by science in an age where they were central to theology. Purpose meant a designer God. But not any longer. We now know that in biology and psychology, purposes can be immanent to systems and organisms. When I purposively aim to buy water because I am thirsty, I am not commanded externally to do it – t is my own goal, which then creates pull on every molecule of my being achieve the purpose. I am thus totelic' to a degree. Perhaps that is case for the universe too; perhaps s autotelic. But why can't we see rpose in nature – surely for it to be empirical issue, it must be visible? ell, it seems to me that science is ull of invisibles, so that's no big issue. Like gravity or magnetism, purpose is only visible by its effects.

The Network is open to the idea that nature is purposive, hence it supports thinkers like Rupert Sheldrake who stick their head above the parapet by suggesting it might be. So perhaps it's time for us to turn the question of purpose back on ourselves: What is *our* purpose? What is our vision of the SMN's future, towards which we can galvanise our efforts? And what is our reason for pursuing it? Without such a statement, writ bold, we are in danger of going round in circles. I very much hope that soon the SMN will be able to publish a purposive vision for the organisation to our members, to show that we have a clear plan for positive development, with a timetable and set of milestones. It should be a way forward that ignites the passions of those who believe in our aims, which renews our core principles while striving to be more than we are now. Who knows, we may even be able to align ourselves with a cosmic purpose. Of course we will never know for sure if our own purpose contributes to something higher, just as the muscle cells in my fingers will never know that they are contributing to the purpose of writing these words. They just get the information and do it. They have no choice. We do.







# A State of Belief is a State of Being

*Charles Eisenstein*

*When students in a university classroom are invited to share anomalous stories, the 'skeptical' tactics used to debunk them seem reasonable at first, but eventually reveal a worldview that is cynical, arrogant, dogmatic, and unfalsifiable. Because any new evidence can, with sufficient effort, be made to fit a preexisting paradigm, belief is seen to come down to choice. Moreover, like most belief systems, the worldview of the Skeptic has an emotional component, long ago identified by Bertrand Russell and others as a meaninglessness or despair inherent in classical science. The choice of belief therefore extends beyond a mere intellectual decision, to encompass one's identity and relationship to the world. This approach conflicts with traditional scientific objectivity, which enjoins that belief be detached from such considerations. The relationship between observation and belief is more subtle than the traditional scientific view that the latter must follow dispassionately from the former. Indeed, the 'experimenter effect' in parapsychology, as well as mounting problems with objectivity in mainstream science, suggest a need to reconceive science and the Scientific Method in light of the crumbling of the assumption of objectivity upon which it is based.*

## Stories that don't Fit

Every semester back when I taught at Penn State, I conducted a rather unusual activity in my classroom. I asked my class - approximately 45 students representing a broad cross-section of the student body - to bring in a story that "doesn't fit into scientific reality." I told them it could be anything-a ghost story, something with alternative medicine, a UFO sighting, a dream that came true, an experience with a fortune teller or ouija board. . . anything. "If you've never had such an experience," I would say, "ask your friends and relatives." The justification I give them beforehand is that by considering what our culture categorises as "unscientific," we will shed light on what the adjective "scientific" means as well.

When they began sharing their stories in turn, I unleashed a little surprise. I debunked their stories as best as I possibly can, using all the weapons in the Skeptical arsenal. I explained their stories away as confabulation, hallucination, and selective memory. I appealed to coincidence. I contrived mechanistic explanations. I impugned their integrity or the integrity of their friends. I accused them of attention-seeking. I questioned their sanity. I implied they were on drugs, drinking too much, emotionally distraught, mentally unstable.

## Debunking Tactics

Let me share a few examples to give you a flavour for this exercise:

Michelle: "At 3:00 a.m., my mother woke up suddenly to see her mother looking over my brother's bassinet. She got scared from seeing such a thing, and when she looked back towards my brother, the image of my grandma was gone. My mom waited up all night worrying that something terrible happened. At 7:00 that same morning she got a call from her father saying that my grandma had passed away at 3:00 a.m. that night.

My debunking: "Your mother probably knew her mother was gravely ill, and was constantly worrying and obsessing about it, losing sleep (as you imply). In her distraught state, she even started hallucinating. It was just coincidence that your grandmother died around the time she had that hallucination. In fact, probably she didn't die at exactly the same time at all. The hallucination probably happened several hours or even days before her death, but for the sake of a dramatic story your family has remembered them as happening simultaneously. Probably your mother couldn't handle the intensity of the grief, so she created this story as part of her psychological mechanism of denial."

John: "In high school I had three pretty serious automobile accidents. Each time when I called home, my mother picked up the phone on the first ring and said immediately, 'Are you all right?' She only answered the phone like that those three times."

My debunking: "You are wrong, John, your mother answers the phone like that quite often, because she is a worry-bug who constantly imagines something terrible has happened to someone. So of course once in a while she gets it right, and those are the times you remember."

John: "No she's not, she's very sensible and down to earth."

Me: "You only think so because you've bought into it too and don't even notice anymore. You are probably emotionally dependent on your mother's overprotection. Poor baby, are you all right?"

Zack: "When I was around the age of twelve, I had a very memorable dream. I was a gold prospector during the gold rush. In the dream I had my land marked off with rope, all my tools together and I was mining at Pikes Peak in California. As the dream continued I went from prospector to having people mine for me. I was becoming more and more wealthy until one day an earthquake took my house and my family. I tried to rebuild but I couldn't. Everything in my life was beginning to fail. I couldn't understand why I was such a loser in life after all I had once

achieved. I then woke up in my bed; it was time for school. I slipped on my clothes after my morning preparations. Around lunch time I reached into my jacket pocket to find money for the lunch lady and felt an oversized coin. The coin was dated 1880 and was solid gold. To this day I don't know where the coin came from and why it ended up in my pocket." (Upon questioning, Zack added that it was a twenty-dollar gold piece in excellent condition. These are worth thousands of dollars today. How did such a thing get into a schoolboy's pocket?)

My debunking: "You had been interested in the Gold Rush, so as a joke, your dad or your uncle put that coin in your pocket. Your obsession with the Gold Rush also explains your vivid dream. Or maybe you had the gold piece and knew about it; actually you had it long before the dream, but remember finding it as after. Or, more likely still, Zack, you stole the coin from your dad's coin collection and felt guilty about it, so you made up a story about how it 'suddenly appeared' in your pocket. Come on, admit it!"

Chris was working as an emergency medical technician. Arriving at the scene of an accident, he was trying to decide which victim was the highest priority for treatment when a little girl tugged at his shirt and said, "Help my dad." Chris asked where her dad was and she pointed over the embankment into the woods. Scrambling down, he found a jogger, out of sight of the road, drifting in and out of consciousness - apparently when the two vehicles collided they also hit a jogger. Loading him onto an ambulance, Chris yelled to a police officer to watch out for his daughter, but he couldn't find her. A month later the man came to thank him and brought a cake. "How did you find me down there?" he asked. "Your daughter told me." "I don't have a daughter!"

My debunking: "Probably the girl was just a passenger in the car who saw the jogger get hit. She only called him daddy because she was disoriented from the accident."

One more example: Grandma's photo falls off the mantelpiece the moment she unexpectedly dies in another state.

My debunking: "It was just a sudden gust of wind. It was summer, right? Your windows were probably open. A photograph is not that heavy. Probably it wasn't the exact moment of her death. You just connected these two events in the human brain's natural proclivity to find patterns, to the point of projecting them onto random events."

If all else fails, there is always the file-drawer effect: "It was just coincidence. We never hear about the numerous times someone's photograph fell down and they were perfectly okay, or when someone has a dream that doesn't come true." Another all-purpose response that I like to use when the stories are simply impossible to explain away is, "You are making this up, aren't you Scott. You want us to think you are special, don't you?" But my favorite in the college classroom (for recent experiences) is, "Say, Bill, were you drinking a lot around that time?"

If it is a second-hand story, I can claim that the narrator was lied to, and that my judgment of the witness's integrity is better than his own. "Your grandmother is obviously mentally unstable, but you can't recognise it." With these techniques, I can explain anything.

## The Limits of Skepticism

As we go around the room, something rather unexpected happens. My first few explanations meet with general assent, judging from the heads I see nodding. (The response of the debunking "victim" is typically a dubious "I guess it could have happened that way", or a defiant, "You are wrong, I know it was real.") But after five or six stories, my efforts begin to seem contrived and my explanations decreasingly persuasive. The charges of selective memory, confabulation, attention-seeking, fraud, hallucination, coincidence and so forth – along with a little character assassination when necessary – appear perfectly reasonable at first, but soon it becomes clear that the debunker himself is blindly committed to his own dogmatic worldview that is impervious to any evidence.

Let me hasten to add that Skepticism and belief represent two poles that are both present, to varying degrees, in any real person. (Throughout this essay I use "Skeptic" capitalised to denote a confirmed unbeliever, as exemplified by organisations that call themselves "skeptical".) Even the most hardened Skeptic has moments when he believes someone just because what is said rings true. Meanwhile, the most fervent believer sometimes finds herself saying, "That couldn't have happened, there must be some other explanation." Curiously, as I listen to my students' stories, I often hear both voices at once. Part of me is amazed even as another part dismisses the story. That latter part always craves proof, more and more proof. No amount is sufficient to quiet that voice, because another interpretation is always possible. At some point a decision to believe is necessary. If I claimed I could control the flip of a coin, how many consecutive heads would it take to convince you? Ten? Twenty? That's a p-value of 0.000001, but it could still be coincidence, and conventions about p-values are no substitute for certainty. We can still choose to disbelieve. Or we can question the premises of the statistics. For the coin flipping, would you check my background to see if I were a trained stage magician? Would you examine the coin? Ask me to perform shirtless? Under video surveillance? And later, would you wonder whether you'd just imagined it? No amount of proof can quench the thirst for certainty.

The unfalsifiable world-view of the Skeptic extends far beyond scientific paradigms to encompass a very cynical view of human nature. The debunker must buy into a world full of frauds, dupes, and the mentally unstable, where most people are less intelligent and less sane than he is, and in which apparently honest people indulge in the most outrageous mendacity for no good reason. For the witnesses are, on the face of it, sincere. How can I account for their apparent sincerity? I have to assume either (1) that this apparent sincerity is a cynical cover for the most base or fatuous motives, or (2) they are ignorant, incapable of distinguishing truth from lies and delusion.

Most of the Skeptical materials I've encountered invoke "reason" as the highest principle of human thought, implicitly assuming themselves to possess this virtue in superior quantities. Behind most Skeptical explanations is the belief, "I am better (smarter, saner, etc.) than you are."

For example, when I offer a trivial mechanistic explanation of an anomalous event (a gust of wind), I am implying that the witness is too incompetent or stupid an observer to consider it.

When I appeal to selective memory or confabulation, I am implying that the witness's own mentation is out of touch with objective reality. . . but I wouldn't do that with my memories.

When I charge that the witness has been duped, I imply that he is incompetent and gullible, but that a rational, intelligent person like me would never be taken in by the fraud. I also imply that he is a poor judge of human character, unable to tell a conniving charlatan from a sincere person.

Many if not all of my explanations come down to one of the following:

"I am a better judge of human character than you are."

"You are missing an obvious explanation that I would have found if I were there"; in other words, "I am a better, more rational observer of reality than you are."

Similarly, "You are a very poor observer."

"You are mentally unstable; I would not be subject to such delusions."

"You are lying; you are a person of inferior integrity."

"It couldn't have happened because reality just is not like that" (Here I simply deny another person's experience. "I saw a UFO." "No you didn't!")

"The connections you draw are coincidence; the meaning you derive is your own projection." ("I know how reality works and you don't").

Clearly, beliefs about the nature of physical reality are connected to beliefs about human nature. These, in turn, determine how we relate to the world. Beliefs are not just thoughts floating around in the head, they are part of our embodiment and they manifest as actions. In other words, a state of belief is a state of being. The Skeptical versus the believing mindset can represent a choice between suspicion and trust, cynicism or sincerity. When we reject, even intellectually, that synchronicities have any meaning beyond what we project onto them, we are also rejecting that the events of our lives are meaningful. Do things happen for a reason, a purpose? Do we have a destiny? Is there a purpose to life beyond survival and reproduction, or its economic equivalent, the maximisation of rational self-interest? The Skeptical mindset says no.

The Skeptical mindset, which is the mindset of classical science, inevitably generates feelings of emptiness, loneliness, and meaninglessness. The traditional rationalist answer is that we just have to face up to it, and not delude ourselves with the comforting fantasies of religion. As Jacques Monod put it,

*"Man must at last wake out of his millenary dream; and in doing so wake to his total solitude, his fundamental isolation. Now does he at last realise that, like a gypsy, he lives at the boundary of an alien world. A world that is deaf to his music, just as indifferent to his hopes as to his suffering or his crimes."*[1]

The built-in arrogance of the Skeptical position is counterpart to an equivalent loneliness, which is implicit in the fundamental assumption of the religion of science-objectivity. We are discrete and separate observers in a universe of impersonal forces and masses. Along with loneliness comes powerlessness. Just as all life events are reducible to just so many generic particles and forces, so also is our power to affect the universe limited to the physics of F=MA. In the final analysis, you, my friend, are a mass. Thus it was that Bertrand Russell wrote,

*"Even more purposeless, more void of meaning, is the world which science presents for our belief. Amid such a world, if anywhere, our ideals henceforward must find a home. That man is the product of causes which had no prevision of the end they were achieving; that his origin, his growth, his fears, his loves and his beliefs, are but the outcome of accidental collocations of atoms; that no fire, no heroism, no intensity of thought and feeling, can preserve an individual life beyond the grave; that all the labors of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and the whole temper of Man's achievement must inevitably be buried beneath the debris of a universe in ruins - all these things, if not quite beyond dispute, are yet so nearly certain that no philosophy which rejects them can hope to stand. Only within the scaffolding of these truths, only on the firm foundation of unyielding despair, can the soul's habitation henceforth be safely built."* [2]

A firm foundation of unyielding despair. Remember, all of us harbor a little of both Skeptic and Believer inside us. An inchoate dread lurks within the most convinced proponent that says, "Maybe it isn't real. Maybe it was coincidence. Maybe I'm imagining it." It certainly lurks in me, fueling the hopeless quest for certainty. At bottom, perhaps the Skeptics are really seeking the same thing that psi researchers are - liberation from despair. I think deep down they wish to believe that life is more than, to quote Shakespeare, "a sound and a fury, signifying nothing." They would like nothing more than to confirm their intuition, which is universal to humankind, that our lives are purposeful and that life events have a meaning. But since any evidence can be interpreted either way if you try hard enough, the craving for certainty can never be met, at least not from the viewpoint of the objective observer. I once heard a leading Skeptic say that he would love to have incontrovertible evidence of life after death, but that unfortunately it just does exist. He'd welcome it though! And I think he was telling the truth.

## Belief vs. Unbelief

The evidence can always be interpreted either way. What my classroom exercise makes apparent is that this interpretation is not neutral, but represents a statement of who I am and how I will relate to the world. Embedded in the rationalist intuitions of classical science, we crave certainty. Scientific ideology, the ideology of objectivity, says that belief should follow evidence. That, indeed, forms the conceptual basis of the Scientific Method. The possibility that evidence follows belief is outside its grasp.

In the end, belief versus unbelief is a personal choice, an inescapably subjective creation of self and world from which not even Occam's Razor can save us. In fact, it can trap us. Because even though the "simplest" explanation for, say, a past-life memory might be, "He actually is remembering a past life," this answer calls into question the entire "cathedral of science" (to use Roger Penrose's phrase). The dogmatist asks, should we question the consensus of millions of brilliant, dedicated scientists developed over centuries, just to accommodate one little ghost story? Seen in these terms, the "simplest" explanation is that the subject is lying, deceived, deluded, unstable, stupid, or irrational. Preserving the cathedral of science can justify some very elaborate explanations, or more precisely, "explainings-away," of events that would on the surface seem to challenge it.

The inescapable subjectivity of choice illuminates a striking similarity linking debunking skeptics and psi researchers. While they disagree on the interpretation of the evidence for psi, they agree that the matter can be resolved through the objective methods of science. (The Scientific Method, which queries through experimentation a universe "out there," embodies objectivity. Moreover, the replicability requirement assumes that the experimenter is fundamentally separable from the experiment-another version of objectivity.) In their quest for proof, Skeptic and researcher alike buy into one of the key assumptions of classical Newtonian-Cartesian physics.

It is perhaps no accident that having bought into a classical paradigm which also happens to deny the existence of psi, psi researchers find the phenomena strangely elusive in the laboratory. A saying goes, "The master's tools will never dismantle the master's house." Could it be that the very attitude of doubt, the very suspension of belief inherent in a controlled experiment, dilutes the power of the focused intention under study? By holding belief hostage to evidence, might we be cutting ourselves off from a vast realm of experience?

There are frequent hints in the psi research literature that this is indeed the case.[3] Pioneer J.B. Rhine emphasised the importance of the "experimenter effect" as early as the 1940's.[4] When Marilyn Schlitz, a leading psi researcher, invited psi skeptic Richard Wiseman to attempt to replicate her results using the same protocol and apparatus, he got chance – nothing. Then they performed a joint experiment in the same laboratory – again, she got statistical significance, he got chance.[5] Then there are innumerable cases of psychics being suddenly unable to perform in a lab or on national television. When entering these climates of attenuated belief, abilities that were dramatic in so-and-so's living room fade into borderline statistical significance, or fail to operate at all. In a recent talk Edgar Mitchell described how Uri Geller's profound telekinetic abilities were much less pronounced in the lab; of course, everyone knows that he could not perform on the Johnny Carson Show.

## Experimenter Effects

As we might expect, the above-described phenomenon is open to two interpretations that equally fit the evidence. Obviously, if psi does not really exist, it should be much more difficult to prove under rigorously controlled conditions. It would be harder to cheat. To say that the presence of a skeptic renders psi ineffective is, from the skeptic's point of view,

an unfalsifiable proposition. To say that a particular person's ability only works at home is an unfalsifiable proposition - to anyone unable or unwilling to visit her at home. One might be able to verify it personally, but it cannot enter the literature of science. Similarly for an ability that only works under uncontrolled conditions - such an ability would be constitutionally impervious to the certainty that comes from control. And what of events that only happen when someone is alone and unmonitored?

In addition to the rather scattered evidence of an experimenter effect, many traditional paranormal techniques explicitly require an atmosphere of appropriate belief. To bend a spoon, you have to know that it will bend; to walk on water you have to know that you will not sink. The same principle seems to be at work behind the placebo effect, in which, notably, the physician's belief may be as important as the patient's (hence the necessity for double-blind, not just blind, studies). I am also reminded of a statement attributed to Cheng Man-ching, perhaps the 20th century's greatest Tai Chi master. When asked why none of his students of many decades came even remotely close to his level of attainment, he replied, "It is because you have no faith."

The experimenter effect and, more generally, the influence of a climate of belief upon measurable phenomena present a thorny problem for science, challenging not only its methods but some of its fundamental premises. At the same time, the principle of objectivity is crumbling from within science as well. In quantum mechanics, eighty years of interpretation has failed to resolve the measurement problem, while phenomena such as null measurements and the quantum Zeno effect demonstrate that observation can have a direct, intentional effect on measured reality. In neurology and psychology, consciousness is increasingly understood as an emergent phenomenon not localisable to a discrete observing "seat." Where is objectivity if there is no discrete subject? The contagion is affecting biology too, with the growing realisation that the phenotypic definition of an organism neglects symbiotic relationships essential to its viability.

The crumbling of objectivity, and with it the certainty implicit in the Scientific Method, poses an enormous challenge to science. Perhaps this explains some of the hostility of establishment science toward psi. On some level, people realise that the ramifications extend far beyond "does it exist or not?" Increasingly, though, science will find it impossible to sweep the "paranormal" under the rug, if only because the classical intuitions that it challenges aren't working very well anymore, even within the mainstream. The challenge, then, is nothing less than to reconceive what science is in the absence of objectivity as an absolute principle. The crumbling of objectivity need not herald the end of science as we know it, for there is a spirit of science prior even to objectivity. It is the spirit of intellectual humility, the willingness to hold lightly onto ones beliefs. And this humility is no less valuable when we recognise that evidence may, in part, reflect belief.

If a state of belief is indeed a state of being, then genuine progress in science advances not only what we know, but who we are. It is no accident that the first Scientific Revolution is associated with the intellectual movement known as the Enlightenment. Could the present revolution in science foretell an equally dramatic change in the human condition? On the individual level too, experiences of anomalous phenomena are traditionally associated with a spiritual awakening; I would hasard that many of today's psi researchers would also associate their entry into the field with some kind of personal transformation.

The notion of growth, in beliefs and in being, offers an alternative to the ideology of objectivity and to the myth of the Scientific Method. A vast body of literature has long recognised that the Method does not describe how individuals actually practice science. Today, with the crumbling of objectivity, its collective validity comes under question as well. My classroom activity suggests an alternative. When faced with two logically consistent interpretations of the evidence, I choose the interpretation that is more consistent with who I am, and who I wish to be. The intellectual humility so fundamental to science represents a willingness to grow into a new set of beliefs. A proliferation of anomalies, whether in science or in life, signals that the old set of beliefs isn't working very well anymore, and that it is time to grow. In my classroom, the web of ad hoc explanations, the discounting of obvious sincerity, the cynicism, arrogance, and despair, were associated with a state of being that is not me anymore.

Collectively as well, our culture is rapidly growing toward a new state of belief and a new state of being. The classical mindset of the discrete observer seeking, as Descartes so famously put it, to become lord and possessor of nature, is now obsolete. Rooted in the illusion of separateness, this mechanistic, materialistic worldview has brought us to the brink of ecological ruin, for it implies, to quote Herman Daly, that "the natural world is just a pile of instrumental accidental stuff to be used up on the arbitrary projects of one purposeless species."[6] Yet for several centuries now, our culture has been founded on the discrete and separate self of Descartes, which is also the economic man of Adam Smith, the phenotype of biology, the embodied soul of religion, and the neutral observer of science.

Faced with a convergence of crises, humanity is being led into a more intimate relationship with nature, more connected, the subject/object distinction less clearly defined. The catchwords of the new era, words like interconnectedness and wholeness, bespeak this shift, which pervades fields as diverse as ecology, quantum mechanics, and Bayesian statistics. We are not separate from what we observe; our facts are not separate from our beliefs; perception and reality are intertwined. As the Age of Separation draws to a close, the old dichotomies are crumbling: man versus nature, matter versus spirit, self versus other. Phenomena like the experimenter effect in psi are merely tiny harbingers of a vast Gestalt, and by pursuing their study, we step across the threshhold of a new state of belief and of being that will come to define 21st century science.

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# Coming to our Senses: in Praise of Embodied Experience

*Sue Bayliss, www.sulisconsulting.com*

*Sue Bayliss reflects on the wider implications of issues raised by Kate Anthony in her Beyond the Brain presentation – see report below.*

*"My belief is in the blood and flesh as being wiser than the intellect. The body - unconsciousis where the life bubbles up in us. It is how we know that we are alive, alive to the depthsof our souls and in touch somewhere with the vivid reaches of the cosmos."*
D. H. Lawrence

*"The body is the unconscious mind."*
Candace Pert, Molecules of Emotion.

*"..the human body is the best picture of the human soul."*
Wittgenstein

As a holistic psychotherapist interested in the messages from our bodies, I was intrigued to note my strong physical reaction to the talk on online therapy at the SMN summer conference. My insides started to churn and a feeling of mild nausea followed. I was surprised to discover later that several other women had responded in a similar way to the ideas that were being discussed.

The talk contrasted with the preceding presentation by Andrew Powell, warning of the dangers of 'techno-pathology' and calling us to connect with the soul rather than the ego. His metaphor of humanity speeding along on a runaway train of consumption was apt and moving.

Returning to online therapy; particularly discomforting for me (and others?) was the suggestion that the term 'real life' could be replaced by 'offline' to denote the experiences we may have whilst not engaging in some screen based technological activity. Online thus becomes the norm from which offline deviates. Food for thought, indeed. My experience that day caused me to reflect on why I consider embodiment so important.

In this article I want to make a plea for embodied experience and outline some of the dangers to self, soul and relationships that our techno-driven society presents. I am, of course, aware of the many benefits of technology and possess a smartphone myself (and am fighting the almost inevitable addiction that comes with it!) Today we have all experienced what YouTube, websites, online learning and Skype can provide, not to mention the ease and speed with which we can communicate through text and email.

But there is the darker side of technology to consider. Cyber bullying has resulted in young people taking their own lives, women who speak out receive rape and life threats via Twitter, beheadings can be watched on Facebook, children may be groomed through their mobile phones, video gaming based on shooting 'enemies' has been found to decrease empathy and increase aggression. In the playground boys force girls to see explicit pornographic images displayed on mobile phones. Online gambling facilitates the addicted gambler to engage in the habit at any time of day or night. Human cruelty is not new and will always be with us but there is more scope for people to reach others now through technology.

Rapport building between humans is a subtle dance of body language cues which are matched and mirrored unconsciously. Voice tone, intonation and timbre all play a part. Our deepest needs (as well as food, water and sleep), which are survival needs as a baby, are to be seen, heard and feel felt as neuroscientist Dan Siegel puts it. Babies confronted with the unmoving, unmirroring facial expression of a depressed mother soon become distressed. How can smiley face or other icons compensate for the bodily experience of human connection that has been with us all through our evolution? How can we feel the emotional safety we require for deep healing to take place when we have no access to physical presence? As a therapist, how can I feel the genuine empathy necessary for a working relationship without witnessing my client's suffering and relief? We know that mirror neurons facilitate our understanding of what is going on for someone else when we see their gestures and facial expressions. Online and telephone counselling is appealing to politicians and employers as it is so much cheaper than face to face.

Interestingly a successful programme in schools that teaches the development of empathic skills invites the kids to witness and learn to understand the wonderful body language dance that takes place between a (real) mother and her baby who take centre stage on a green rug in the classroom. Roots of Empathy, devised by Mary Gordon in Canada, has achieved some excellent results in the reduction of bullying and improved empathy in schools.

## Empathy on the Wane

Such programmes are needed as empathy is now in shorter supply than previously. A decline in empathy was recorded in college students in a study at the University of Michigan for the period of 1979 – 2009. A 48% decrease in empathy and a 34% decrease in the ability to see things from another's perspective were recorded among college students with the greatest decline taking place over the last decade. The study related this decline to the isolation involved in the use of personal technology and social networking sites. The more hours spent interacting with a screen, the fewer opportunities for learning to read and respond to the body language signals of other humans. Anthropologist Sarah Blaffer Hrdy believes that we humans developed our (previously) good empathic skills during our hunter gatherer times through shared care of infants who learned to relate to a variety of 'alloparents' within the extended family group. Ape mothers do not hand their offspring over to the care of others.

## Rewiring the Brain

What is now becoming clear is that the rapidly shifting attention that goes with the use of screen technology does not favour the development of emotions such as empathy and compassion which need to emerge from slow neural processes. Multitasking boosts levels of stress related hormones (cortisol and adrenaline) leading to expectations of (or even addiction to) constant stimulation as well as slowing down our thinking. According to a London study in 2005 workers distracted by email and mobile calls experienced a fall in IQ more than twice suffered by pot smokers.

Brains are being wired and rewired as a result of the frequent use of technology. Deep and creative thinking also suffers. The average American teenager was sending over 2,000 texts per month in 2009, whereas the average time spent reading print in the age group of 25 – 34 years in 2008 was 49 minutes per week. Maryanne Wolf of Tufts University has said:" the digital world may be the greatest threat yet to the endangered reading brain as it has developed over the past five thousand years."

Just when the idea of mindfulness is being promoted as a proven way of boosting mental health, so mindless behaviour can be observed daily as people are mentally absent, engaged on their mobile calls or texts to people whilst sitting in trains (oblivious of the needs of others in the carriage), having meals with their friends or 'attending' lectures. Presence, the greatest gift we can give one another, and vital for therapeutic relationships, is giving way to scattered attention.

## Technology and relationships

Thanks to the advancement of technology we can now witness the following behaviours that are damaging the trust necessary for successful relationships. Suspicious spouses or lovers check texts and emails belonging to their partners with possible unpleasant consequences. The insecure lover feels an almost constant urge to check their phone and Facebook page for messages. After a split, the rejected lover discovers their smiling replacement on their ex's Facebook page as well as photos of him or her enjoying a party or night out. A client of mine who broke up with a controlling boyfriend found that he had set up her new mobile on i-cloud and ensured he had access to all her communications! Controlling spouses or parents can use mobile phones to barrage their victims with texts and calls. Nowadays there is no need to find '50 ways to leave your lover' as with one text or email it is all over.







Onscreen pornography creates problems for real relationships as men start to lose their libido due to the addictive nature of the images they view. After a time only the most aggressive films can have the required effect, usually resulting in less loving interactions with spouses. They also find their flesh and blood partners less attractive in comparison to the women they are viewing. Young women today are asked to perform acts similar to those the men are viewing onscreen which causes them distress in many cases. In contrast, a practice such as tantra, enables the alignment of sensual pleasure with emotional management in service of spiritual growth, a profound experience of embodiment and the cultivation of compassion and love.

But perhaps it is easier not to find a real (offline) lover at all. Alternatives are available in the form of lifesize dolls and computer programmes that simulate a girlfriend. Sad, but not entirely surprising in our disembodied world. In Japan the word hikikomori denotes a new phenomenon whereby young males in their teens and twenties withdraw to a room in the family home and refuse to come out. They spend their time engaging with technology in almost total isolation. A Japanese psychiatrist estimates that around a million young people are affected. I have certainly come across young males and females plagued by anxiety in this country who prefer to stay in their techno - equipped rooms to the utter despair of their bemused parents.

## The Death of Solitude and the End of Participating Consciousness

For many young people being alone without the distraction of a screen provokes anxiety. When students at Yale were asked what place solitude had in their lives they seemed puzzled that anyone would want to be alone. They tend to use technology to stave off any encounters with solitude. As Berman notes: "The world of creativity, of imagination, of depth of the self, is closing down."

Solitude is not a problem if we can identify with our environment, our planet. In his book, *The Reenchantment of the World*, Berman describes how the Scientific Revolution swept away the last vestiges of a participating consciousness in the West that still exists today in some indigenous peoples. "Participation is self and not-self identified at the moment of experience. … and this identification is as much sensual as it is intellectual." If we no longer feel a connection to the earth, if it ceases to be sacred, then the potential for us to take control of it and exploit its resources is enormous as Bacon and Descartes rightly saw.

"(T)he notion of a value free science was part of a political and religious campaign to create a stable social and ecclesiastical order throughout Europe. What modern science came to regard as abstract truths, such as the radical separation of matter and spirit, or mind and body, were central to this campaign." With this historical view we can see the rise of modern technology as a further development on this path of denial of our full humanity.

It is sobering to realise that Morris Berman wrote the following passage in a book that was published in 1981 (*The Reenchantment of the World*), long before the arrival of smartphones, ipads and instant messaging. "Modern science and technology are based not only on a hostile attitude toward the environment, but on the repression of the body and the unconscious; and unless these can be recovered, unless participating consciousness can be restored in a way that is scientifically (or at least rationally) credible and not merely a relapse into naïve animism, then what it means to be a human being will forever be lost."

Iain McGilchrist writes in a similar vein in his ground breaking book, *The Master and His Emissary*: "And what has limited the power of both art and science in our time has been the absence of belief in anything except the most diminished version of the world and ourselves." Indeed he sees a return to being embodied as one of the ways to escape the dominance of the left brain hemisphere, to get out of the hall of mirrors that keeps us trapped. He quotes Max Planck:" Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of nature and therefore part of the mystery that we are trying to solve." This is the perspective of a participating consciousness, one that recognises that there is no true separation of subject and object, observer and observed, conscious and unconscious. Everything is connected.

In a world where the left hemisphere rules we would expect power and control to be important and a greater valuing of the mechanical than the living. Technology appeals to the left hemisphere as it is both mechanical and under our control. The right hemisphere connects us to our bodies and to other living beings. Peter Levine, a psychologist and NASA consultant, who has studied the effects of trauma over many years, writes: "The degree to which we cannot deeply feel our body's interior is the degree to which we crave excessive stimulation. We seek titillation, overexertion, drugs and sensory overload." He continues:" As a society, we have largely abandoned our living, sensing, knowing bodies in the search for rationality and stories about ourselves."

## Coming Home to our Bodies

As a therapist, I see people who have no idea what they really want, what makes their hearts sing or what to do for the best. They try to think their way through these issues but nothing satisfactory results. Until they allow themselves to feel their bodies and hear their messages they will not discover their deepest desires.

When people lose touch with their vital centre they may become depressed and anxious and / or develop health fears. A sports coach who kept pushing himself to work more hours regularly fell into a depression. After I taught him to 'make friends with his body', he stopped pushing himself and instead listened to his body's cries for rest and enjoyment, giving it finally what it had been asking for all along. He now enjoys his work and heeds his body's needs for recuperation and fun. His depression is a thing of the past. Illness can be viewed as an attempt by the body / unconscious to communicate with the unresponsive mind by means of symptoms, as Gabor Mate's excellent book, *When the Body Says No* documents.

We can access our 'inner wisdom' by tuning in to our hearts and guts. The heart's neurology is a kind of mini brain with over 40,000 neurons that function similarly to the head brain. Our guts, too, have much to tell us. It is now well known that emotional memories stored in our bodies, and can be triggered by touch or awareness. If more than 95% of our brain activity is unconscious, including the way our minds 'read' the messages of our bodies, then it would make sense to trust our body wisdom rather than the 5% (or less) of activity that we are aware of.

## Consequences of the Loss of an Embodied Self

The greatest threats to our security are perpetrated by those who have lost touch with the intelligence of their bodies. The spiritual teacher Richard Moss says that the distance between you and yourself is the same as the distance between yourself and others. Morris Berman again: "If you lose touch with yourself, with your own reality, then a huge abyss opens up in the center of your soul, and rather than sit with it, endure it, so you can find your way home, the temptation is to stuff it with systems and slogans."

Sue Gerhard in her book, *The Selfish Society* makes the link between emotionally deprived childhoods and the desire for power. Alice Miller's studies of Hitler and Stalin reveal the brutality of their upbringing and she holds the very harsh childrearing practices prevalent in Germany at that time largely

responsible for the ease with which Germans were hypnotised by Hitler. Our childhood experience will either encourage or inhibit our ability to fully inhabit our bodies, though we can learn to become more embodied through a range of practices and therapies. Cultures in which children are held, touched and carried for much of their babyhood and not forced to sleep alone tend to produce more securely attached and embodied adults. One of the effects of trauma is a tendency to shut down or misinterpret our bodily sensations.

We know from a range of studies that human touch or physical contact with animals brings down blood pressure and provides comfort. How sad that teachers, nursery workers and therapists are no longer allowed to touch their charges or clients. As a private therapist I have not stopped hugging clients who are crying (with their permission, of course) or before they depart if it seems appropriate. One person whose heart rhythm is ordered (coherent, as it is known) can positively affect the disordered heart rhythm of another person or group. The Institute of HeartMath has conducted extensive research into the heart brain connection and the impact of the electromagnetic field of the heart which can be measured at a distance of 12 feet away.

We have the choice to view our bodies as machines or as organisms imbued with intelligence, their messages to us necessary for our navigation through life. Iain McGilchrist comments:" The body has become an object in the world like other objects, as Merleau-Ponty feared." For women today the body is a commodity to be displayed to attract approval, a defensive measure in a society ready to judge a book by its cover, and much anxiety is associated with whether it looks right. Anorexia is the expression of an extreme disconnection from the body as our living home. Only by creating a relationship with our embodied self as a source of wisdom and intelligence can we resist the extreme pressures to view our bodies as shop windows or machines.

Descartes considered animals to be without souls and saw the people passing his window as robots, a typically schizophrenic view, but one that has greatly influenced our thinking in the West. Chief Seattle had already recognised the connection between animals and humans when he said. "If all the beasts were gone, we would die from a great loneliness of spirit, for whatever happens to the beast, happens to us. All things are connected. Whatever befalls the earth, befalls the children of the earth." The nineteenth century saw the removal of draft horses from city and country and the killing of nearly sixty million buffalo in the US. Morris Berman writes: "Organic life doesn't fit well into urbanized, technological societies, and the result is that it got removed from them, creating what John Berger calls "a new solitude". Nonhuman Otherness is not merely degraded now, but absent; and so, in a sense, are we."

The antidote is to embrace the view of our bodies that Clarissa Pinkola Estes advocates in her ground breaking work: *Women Who Run with the Wolves:*

*"In the instinctual psyche, the body is considered a sensor, an informational network, a messenger with myriad communication systems... In the imaginal world, the body is a powerful vehicle, a spirit who lives with us, a prayer of life in its own right....Like the Rosetta stone, for whose who know how to read it, the body is a living record of life given, life taken, life hoped for, life healed. It is valued for its articulate ability to register immediate reaction, to feel profoundly, to sense ahead. ...It speaks through the leaping of the heart, the falling of the spirit, the pit at the center, and rising hope.*

*The body remembers, the bones remember, the joints remember, even the little finger remembers...*

*To confine the beauty and value of the body to anything less than this magnificence is to force the body to live without its rightful spirit, its rightful form, its right to exultation."*

To close, I quote Peter Levine's 'definition' of embodiment: "The way we know we're alive is rooted in our capacity to *feel*, to our depths, the physical reality of aliveness embedded within our bodily sensations – through direct experience. This, in short, is embodiment." On a more poetic note, Mary Oliver expresses it perfectly:

### Wild Geese

You do not have to be good.
You do not have to walk on your knees
for a hundred miles through the desert, repenting.
You only have to let the soft animal of your body love what it loves.


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# Toward a New Conception of God

*Jacob Needleman*

*Jacob explores an immanent conception of God within human experience.*

In the present highly publicised debates about the nature and the existence of God, both sides tend to treat God as a purely external entity said to be accessible only by faith—faith, in this case, defined merely as belief unsupported by evidence or logic. Entirely missing from these debates is the idea of God as a conscious force within the human psyche which is accessible through deep self-examination. A study of the psychological disciplines at the heart of all the great spiritual traditions of the world shows us, however, that the process of precisely guided self-examination brings about a knowledge that is as rigorous and as supported by evidence as anything science has to offer. At the same time, this point of view redefines faith as a form of knowledge that is attained not only or not principally by intellectual means, but also through the rigorous development of the emotional side of the human psyche. Such emotional knowledge is unknown to the isolated intellect and has therefore been mistakenly labeled as "irrational."

This "new" idea of God proposes that all the characteristics traditionally attributed to the purely external God are, within the scale of the human psyche, also attributes of this inner force of consciousness. When this inner energy of higher consciousness is experienced, it then becomes clear that such an energy permeates the entire universe. In this way, it is through self-knowledge that the existence of an external God is verified and understood.

When I started my career as a professor of philosophy I was required to teach a course in the history of Western religious thought—much against my then existentialist and atheistic inclinations. In order to teach this course, I had to do a great deal of research in the writings within the Judaic and Christian traditions and I was astonished to find in those writings philosophical thought of great power and sophistication. These writings completely overturned all my opinions about what I had taken to be the irrationality or immaturity of religious ideas, opinions which were and still are fashionable in many intellectual and literary circles today.

## God and Inner Reality

But even so, somewhere in myself, I was still unconvinced—deep down I was still an atheist when it came to my personal, intimate feelings. It was only when I embarked on a personal work of guided self-examination that I experienced a glimpse of a reality that could be called "God." As my personal explorations continued, I experienced this quality of inner reality more and more and could no longer doubt that the meaning of God lay in this direction. At the same time, these undeniable experiences lit up and were in turn illuminated by all the philosophical and historical knowledge I had by then amassed and I began to understand in an entirely new way the teachings of both Judaism and Christianity as well as the teachings of Buddhism, Hinduism and Islam. I was again astonished that nothing of this understanding seemed to be in all that I had heard about religion and God when I was growing up and when I was being educated in some of the best universities in America.

Here are a few of the many spiritual and philosophical ideas that helped me to glimpse the deeper meaning of Judaism, Christianity and the religions of Asia:

- The idea that God needs man (Judaism) as a uniquely free being who is at the same time under supreme obligation.
- The idea that scripture is deeply allegorical and symbolic, with many levels of highly sophisticated philosophical and psychological meanings. Many of my former atheistic leanings were due to my literal interpretation of scripture, which in numerous places paints a horrific picture of a presumed just and loving God.
- The idea that Jesus Christ was a highly developed human being who was a great teacher and that the notion that he was also God needs to be taken in a much more nuanced way than was commonly presented. In Judaism, for example, a highly spiritual human being was often referred to as "son of God," without thereby implying in some simplistic sense that he was God Himself in the form of a human being.
- The idea that there exists such a thing as genuine mystical experience (as opposed to many self-deceiving claims throughout history) and that these experiences really validate through direct evidence the fundamental teachings of religion.
- The idea that all authentic religions, Western and Eastern and throughout the whole world and human history, converge in genuine mystical experience (which may also be called higher states of consciousness). The differences between religions are only differences involving the pathways that lead toward the practice of directly experiencing higher levels of perception and understanding. All religions are paths to a metaphorical mountain-top variously named Wisdom, enlightenment, self-realisation, the kingdom of heaven, righteousness, etc. Differences that lead to violence and persecution are based on a corrupted relationship to the teachings and practices of religion.

In fact, almost all of us have had experiences during our life when we sense with great clarity and power a tremendously heightened state of presence, of *being there*, an immediate and unforgettable sensation of *I am.* Perhaps it is a moment of great danger or even impending death, or a moment in a strange place or foreign country, or a moment of indescribable joy or a moment with no apparent cause at all when suddenly we are stopped within ourselves and feel our sense of identity more intensely, calmly and purely than anything our everyday life has to offer. Such moments occur more frequently, perhaps, in childhood. These great moments of pure presence are vividly etched in our memory as though they happened yesterday.

## Cultivating Spiritual Experience

Our culture does not know how to interpret these moments, these experiences. Maybe they are called "peak experiences" or "mystic moments" or "breakthroughs"—we lack any precise words for them. In fact, they are, so to say, "messages" from our genuine Self as though saying to us: "I am You. Let me into your life."

The work of cultivating such experiences until they become more accessible is part of the essential nature of genuine spiritual discipline. These are moments, at the very least, of approaching the experiential verification that there does exist something Higher within and perhaps also outside of ourselves. Moments at the very least of approaching what the religions call God.

Every human being is born with an intrinsic yearning to understand, to contact and, eventually, to serve something higher in ourselves and in the universe. Plato calls this yearning *eros.* It defines us as human beings—even more than our biological nature, our social conditioning or our ordinary reasoning capacity. Our modern world-view tragically misperceives and wrongly defines what it is to be human. We are conditioned by our society to believe happiness comes from pleasure, or from getting things or power over people or money or fame or even health and survival. None of these sometimes very good things can bring ultimate meaning to our lives. We are born to be deeply conscious, inwardly free and deeply capable of love. The longing for these things is the definition of what it means to be human. At the present moment in our culture this yearning for meaning and consciousness, this yearning to give and serve something higher than ourselves, is breaking through the hard crust of our widespread cultural materialism and pseudo-scientific underestimation of what a human being is meant to be, together with an equally tragic overestimation of what we human beings are capable of in our present everyday state of being.

Of course, many very serious people believe that God is a personal God, existing outside of themselves, with whom they can have an intimate relationship. And such belief when it is sincerely and deeply held by no means contradicts the central importance of inner experience of a higher power.

Spiritual experience will show that the conventional sharp philosophical and theological distinction between personal and impersonal God is a purely theoretical or even a merely verbal dichotomy not supported by actual experience. It is a fundamentally false dichotomy often introduced to distinguish the Judeo-Christian-Islamic God from the God of Asian traditions such as various forms of Hinduism which often speak of Brahman only as a supreme energy, rather than as a "person"—or Buddhism in many of its expressions which seem to deny not only the idea of personhood in God, but also the very existence of God and, for that matter, the very existence, or reality, of a personal human self. The higher energy of consciousness in an individual human being exhibits an incomparably intense quality of what one might call "I-ness". It is a profoundly *personal* force; it is I as I is never known in our ordinary everyday sense of identity. That is why this energy is called the Self, with a capital S in Hinduism. Similarly, but in inverse form, in Western religion, especially in its "esoteric" or contemplative forms, the experience of a personal God –Jahweh appearing to Moses, Christ appearing to St. Paul, Allah speaking to the Prophet —is a force inhabiting a material reality whether as a great voice or human messiah. This is clearly the case in individual experience—the personal contact with the true person within, the "golden person" of Hinduism, is more truly oneself than one's socially constructed self or ego.

Space does not permit even a few of the countless examples of the impersonal God being worshiped as a personal figure in the East or the personal God being worshipped as an impersonal energy as in the teachings of Jewish and Christian mystics. The main point to emphasise is that the highest or most real always has the character of I-ness whether it is understood as a cosmic reality defining the fundamental nature of the universe or as the true individuality within the contingent and fundamentally empty reality of the ego as understood in Buddhism. Buddhism concentrates on deconstructing the ego in order to allow the true infinitely personal energy of pure consciousness to shine through and inhabit human life.

There are a thousand aspects to this question which would take us into all the subtle and delicate human experiences and essential powerful ideas related to the idea of God that have been completely lost to view in the cacophony of simplistic argument and fanaticism that can characterise both sides of the atheism/fundamentalism debate.

But one thing more must be said. It is paradoxically both obvious and elusive, that great faith in a "purely" external God can only take place within a transformed human psyche. To have such faith –and space does not permit elaborating on the deeper meaning of this sometimes tarnished word—such faith can only be attained through a transformed relationship to one's own inner mind and emotional life. Therefore authentic faith in an external God is already evidence of inner work on oneself whether or not it is named as such. It is therefore erroneous and dishonorable to oppose the work of interior self-examination as somehow superior to profound faith in the universal, "external" God of love, justice and mercy in Judaism, Christianity and Islam. Of course, if one is comparing the deep self-examination of, say, the Hasidic Jew, the Christian monk in the deserts of North Africa or the Sufi in his spiritual brotherhood with naïve, sentimental or fanatical impulses that are given the name of faith, then of course, that is a wholly different conversation.

Spiritual experience will often also show that the inner God of higher consciousness is not simply a product or aspect of the individual person. It is experienced as more intimately "myself" than my ordinary sense of self while at the same time it is seen, with total certainty, as not "my own," but as a quality of reality itself beyond oneself and beyond man or any other separate entity in the conceivable universe. This touches on an extremely crucial point that we can only mention in passing: namely, that there are many, many ways leading to the mountain, but the work of climbing the mountain is very, very similar in each pathway. Religions that are strikingly different along the way to the mountain are even more strikingly similar in the ascent of the mountain.

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# Documentary on David Bohm

*F. David Peat*

*Film-maker Paul Howard, of Imagine Films (Ireland), and F. David Peat, physicist and writer, will be making a documentary on the Life and Ideas of Professor David Bohm, FRS. The film will be either 75 or 90 mins long and can be divided into three 25 min episodes or four 22.5 min episodes for television. The film will be funded in part by television channels in the UK and US with some additional funding via crowdsourcing. For more on crowdsourcing see below and* www.the*bohmdocumentary.org.*

David Peat was a friend and colleague of David Bohm and together they co-authored *Science, Order and Creativity* and were working on a second book *The Order Between and Beyond* at the time of Bohm's death in 1992. Peat is also author of the biography *Infinite Potential: The Life and Times of David Bohm.*

Paul Howard is a Film and Television Producer and Director of international repute. Recent productions include *Movie Talk, 21st Century Railways, Marsh To The Skies, Bloomsday,* and *The Irish In Hollywood.* Paul has also produced and directed and edited multi critically acclaimed documentaries and series for RTE, Channel 4, Channel 9 (Australia), Nomad Films International (Australia), all of which have covered most film genres including biography, natural history, wildlife, food, lifestyle and current affairs. Paul also worked extensively in Australia where he completed *Triumph of the Nomads*, a history of Australia prior to the arrival of the European and *The Pintubi*, a series about the last remaining tribe of Aborigines who roamed the outback of Australia up until 1935.

David and Paul plan to begin shooting in the spring of 2014 and the film will consist of narration, interviews, dramatic reconstructions, animation and will feature experiments based on Bohm's theories. Location shots will include Birkbeck College, as well as Bohm's home and his favourite walks in north London. In the US they will film his hometown of Wilkes Barre, Pennsylvania; Berkley, California, Princeton, including Einstein's home on Mercer Street (Bohm had a room in the house next door) and the Bailey Farms Institute where Bohm would spend a month each year during the 1980s.

While dealing with the history of Bohm's life it will also stress the current high level of interest in Bohm's ideas and the film makers hope to shoot some scenes at scientific meetings, showing discussions of Bohm's work and the interest in Bohm amongst a younger generation of physicists.

The film will explore Bohm's childhood, his feeling of discontent at the society around him and his fantasies of visiting distant worlds where the inhabitants would have attained perfection. It was also a time of boyhood experiments and a growing interest in science. Following his PhD, Bohm joined Oppenheimer's group at Berkeley where he made his reputation with his theory of plasmas in metals. From Berkeley he moved to Princeton and developed a friendship with Einstein who came to look on Bohm as his "spiritual son". At Princeton he wrote the book *Quantum Theory* in an effort to express Bohr's interpretation in as clear a way as possible.

After the book was published Bohm began to have doubts, feeling that Bohr had been guilty of a degree of mystification. He believed that what was called for was a "realistic" or "causal" interpretation of the quantum world and so began work on his Hidden Variable theory which he felt would create a great stir within the physics world.

The film will also explore the growing anti-communist feelings of that era to set the context in which Bohm was brought before the McCarthy committee but refused to answer specific questions. As a result he was arrested and sent for trial for contempt of Congress. Although he was acquitted Bohm was now labelled a fellow-traveller and was unable to obtain any university position in the US.

Bohm now faced exile in Brazil. His Hidden Variable paper appeared and to his great surprise it did not generate the controversy he had hoped for. Unknown to him Oppenheimer had called a meeting of leading physicists to discuss Bohm's theory. At the end of the meeting Oppenheimer announced "If we can't disprove Bohm we must all agree to ignore him."

From Brazil Bohm moved first to Israel and then Bristol University where he struggled to create a "new order" to physics, one he hoped would enable him to unify quantum theory and relativity. That new order turned out to be the Implicate and Explicate orders. Bohm also met Jiddu Krishnamurti, an encounter which was to have a great effect on his life. He became a trustee at Krishnamurti's school at Brockwood Park and engaged in a series of dialogues which were recorded, several of which were later published in book form.

From Bristol Bohm moved to Birkbeck College, London where he revived his Hidden Variable approach, this time modifying the Schrödinger Equation by introducing a new term, the Quantum Potential. Unlike other potentials whose effect depends on their strength, the Quantum Potential's effect depends on its shape or form. In short it expresses the experimental arrangement that surrounds an electron. In turn the electron has the ability to "read" this form and so has what Bohm termed "proto-mind".

In addition to his physics Bohm was also exploring other avenues such as language. Bohm felt that our subject-verb-object languages acted as a barrier in thought to a deeper understanding of the quantum world and so developed a verb-rich language he called the Rheomode. He also became concerned with what he saw as the fragmentation within knowledge and society and called for an approach of wholeness. He became interested in the connections, or rather the wholeness, of mind and matter. He also wondered that just as we have proprioception of our body (the ability to know where one's arm is in space without looking at it) would it be possible to develop a proprioception for thought.

Bohm had also developed an interest in a form of dialogue. In this around forty people meet in a leaderless group to discuss whatever comes up. After many such meetings a deep level of trust develops and the dialogue moves to a new level. Bohm believed that within such a dialogue people would come to experience how their ideas and beliefs are structured not only in the mind but as symptoms and sensations in the body. He also felt that dialogue could clear up what he felt was the "pollution" in our language. During this same period Bohm was working actively with his colleague, Basil Hiley using non-commuting algebras to investigate such notions as pre-space.

The documentary will also deal with the depression that dogged Bohm in the last years of his life and the ill health caused by his heart problems.

## Crowdsourcing

Crowdsourcing is an approach to funding that does not rely on one or two people giving large sums of money but rather upon a large number of people giving small sums, some as low as £10 or £20. It depends upon getting a message out using various social media and our website www.thebohmdocumenary.org. We will commence our funding program early in the New Year. For those of you who read this article please pass on the message and the web address. We are depending on your interest and generosity to complete this film.

*David Bohm, F. David Pleat and his wife Saral*









# Recent Developments in Science and Medicine

*Marilyn Monk*

## Bacterial infection of mosquitoes blocks transmission of dengue and malaria parasites

The dengue and malaria parasites are transmitted among humans by mosquitoes. Recently, it has been shown that if the mosquitoes are themselves infected with a parasite - in this case a bacterium, Wolbachia - then transmission of dengue and malarial parasites to humans is blocked. Infection with the Wolbachia bacterium is maternally transmitted in the mosquito population. The question is whether the bacterial infection is maintained in the mosquito population so that the control of dengue fever and malaria continues. The challenge is to find the right strain of bacteria to block transmission by the mosquito, and the right mosquito that will pass the bacterial infection to her daughters.

Hoffmann, O'Neil and colleagues (Department of Genetics, University of Melbourne) introduced Wolbachia into the dengue mosquito vector, Aedes aegypti, in Australia. The infected mosquitoes survived and transmitted the infection in the wild, thus demonstrating that Wolbachia infection could be a practical approach to dengue suppression over extensive areas.

Similarly, Wolbachia infection of the anophiline mosquito, Anopheles stephensi, blocks transmission of the malarial parasite, Plasmodium falciparum. Bian, Xi and colleagues (Michigan State University. USA) show that female mosquitoes infected with Wolbachia bacteria and bred with uninfected mates pass the infection on to their offspring, swiftly spreading the malaria-blocking bacterium to entire insect populations in the laboratory within eight generations. The strategy of Wolbachia infection of the transmitting mosquito could thus eventually control dengue and malaria. Field trials will be the next step.

### Reference

Hoffmann AA, Montgomery BL, Popovici J, Iturbe-Ormaetxe I, Johnson PH, Muzzi F, Greenfield M, Durkan M, Leong YS, Dong Y, Cook H, Axford J, Callahan AG, Kenny N, Omodei C, McGraw EA, Ryan PA, Ritchie SA, Turelli M and O'Neill SL.

Successful establishment of Wolbachia in Aedes populations to suppress dengue transmission. *Nature 476: 454–457 (2013)*

Bian G, Joshi D, Dong Y, Lu P, Zhou G, Pan X, Xu Y, Dimopoulos G and Xi Z.

Wolbachia invades Anopheles stephensi populations and induces refractoriness to Plasmodium infection.

*Science 340: 748–751 (2013)*

## Gut microbes and obesity

The importance of the billions of microbes in our gut, and the balance of the different microbial populations, is becoming increasingly evident for many of our bodily functions. In a recent paper, Everard, Cani and colleagues (Metabolism and Nutrition Research Group, Université Catholique de Louvain, Brussels, Belgium) have reported that the presence of one bacterial population - a mucin-degrading bacterium, Akkermansia muciniphila, residing in the mucus layer of the intestine - is inversely correlated with body weight both in rodents and humans. The intestines of obese humans and mice, and those with type 2 diabetes, have much lower levels of this bacterium. In addition, mice that were fed a high-fat diet, had 100 times less A. muciniphila in their guts than mice fed normal diets. Conversely, feeding obese or diabetic mice with the Akkermansia bacteria resulted in an improved metabolic profile associated with the increased abundance of the bacterium in the gut. High-fat diet-induced metabolic disorders were reversed and the intestinal level of endocannabinoids increased (thus providing greater control of blood-glucose levels and inflammation, and defence against harmful microbes in the gut). As a control, the researchers showed that treatment with heat-killed A. muciniphila cells did not improve the metabolic profile or mucus layer thickness, so live bacteria were required. These studies may open the way towards the development of a treatment that uses this human mucus bacterium for the prevention or treatment of obesity and its associated metabolic disorders such as diabetes and colitis.

### Reference

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Cross-talk between Akkermansia muciniphila and intestinal epithelium controls diet-induced obesity.

*Proc. Natl. Acad. Sci. USA 110: 9066-9071 (2013)*

## Foreign ladybird invades armed with biological weapon

The Asian harlequin ladybird, Harmonia axyridis, is threatening the life of indigenous ladybirds in many countries. Originally this foreign ladybird was brought to Europe and North America to control aphids. Now it is a serious pest outcompeting native ladybird species and even eating them! One reason foreign species represent a threat to local species is that they carry new diseases. Vilcinskas, Vogel and colleagues (Institute of Phytopathology and Applied Zoology, Justus-Liebig-University of Giessen, Germany) have shown that the foreign ladybird, Harmonia, carries a single-cell parasite, microsporidia, that causes it no harm but is deadly to the indigenous native seven-spot ladybird, Coccinella septempunctata. The microsporidian parasite, easily observed under the microscope, is present in the eggs and larvae of harlequin ladybirds in a dormant and apparently harmless state. But when injected into seven-spot beetles in the lab they die within two weeks. Parasites brought in by foreign species may also be involved in the disturbing decline of our bees. The dangers of foreign invaders bringing new diseases to indigenous populations have long been known. It brings to mind the introduction of new diseases, such as small pox, causing devastation to local populations following the European invasion of the New World.

### Reference

Vilcinskas A, Stoecker K, Schmidtberg H, Röhrich, CR and Vogel, H

Invasive harlequin ladybird carries biological weapons against native competitors.

Science 340: 862-863 (2013)

## Special nerves for itchiness identified

It has previously been thought that itch is a lesser stimulation of the same nerves which register pain. However, Mjshra and Hoon (Laboratory of Sensory Biology, National Institute of Dental and Craniofacial Research, NIH, Bethesda, USA) have recently found that a subset of special neurons expressing a specific protein are responsible for the transmission of the itch sensation from extremities to the brain. They screened for genes in sensory neurons that are activated by touch, heat, pain and itch. They found that one particular protein, called natriuretic polypeptide b, or Nppb, was expressed in only a subset of sensory neurons. Mutant mice lacking Nppb expression do not respond to itch-inducing agents but still respond to heat and pain. In addition, injection of the protein Nppb into either normal or the mutant mouse triggered frantic scratching. Neurons in the spinal cord bear receptors for the Nppb protein and blocking these receptors blocked the itch sensation but not heat and pain. Thus information about the itch sensation is transmitted along a distinct pathway. Hoon and Mishra, and others, also showed that another molecule previously implicated in the itch response, gastrin-releasing peptide, or GRP, could not be found outside the spinal cord. However, GRP is still involved in the itch response as it produces strong scratching responses when injected into mice lacking Nppb or its receptor. These results place GRP-releasing neurons downstream of Nppb in the transmission of the itch sensation. The neural pathways for itch in humans are similar, though not identical, to those in mice. The identification of a distinct neural circuit distinguishing itch from pain may lead to solutions to the common problem of itch associated with many conditions, including eczema and psoriasis.

### References

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The cells and circuitry for itch responses in mice.

*Science 340: 968-971 (2013)*

## After 36 years the Voyager 1 spacecraft has reached interstellar space

To read about the travels of Voyager 1 and 2 is truly inspiring. These great spacecraft explorers were launched in 1977 - their mission to go beyond our solar system into interstellar space with pioneering explorations of Jupiter, Saturn, Uranus and Neptune *en route*. These extraordinary space probes are under the management of Ed Stone who, for 36 years now, has led the team of scientists guiding the spacecraft through the solar system and deciphering the information they return to earth. The story is covered in detail by Alexandra White in Nature in May 2013 and there is also a lot of information accessible on the internet.

The two rockets were launched a few weeks apart – Voyager 2 on 20th August 1977 and Voyager 1 on 5th September 1977. They had different routes to follow and different tasks to perform. They both passed Jupiter in 1979, not the first spacecraft to do so but these spacecraft carried more sophisticated equipment. Thus they discovered plasma surrounding Jupiter's magnetosphere at hundreds of millions degrees Celsius, sulphur volcanoes belching from Jupiter's moon Io, and fractures in the icy surface of Jupiter's moon Europa (a possible clue to a subsurface ocean that could harbour extra-terrestrial life?). After Jupiter, Voyager 2 passed within 34 million miles of Saturn in 1981 photographing its moons, Rhea and Dione, discovering new 'shepherd' moons that herd the ice and dust in Saturn's outermost ring, and gigantic auroras around the planet's northern and southern poles.

After Saturn, Voyager 1 and Voyager 2 diverged. Voyager 1 headed towards the edge of the universe, the boundary with interstellar space, while Voyager 2 was directed past the other planets, Uranus and Neptune. In 1986, Voyager 2 discovered ten new moons for Uranus (photographing the innermost major moon, Miranda), and an odd magnetic field oriented far away from the planet's rotation axis. Continuing on to Neptune, Voyager 2 provided a composite image in 1989 showing the Great Dark Spot and other giant features in Neptune's atmosphere including violent atmospheric activity with winds of 2,100 kilometres per hour and huge storms.

Recently, Voyager 1 passed beyond the edge of our solar system. It is now generally agreed that it is in the space between the stars. Galactic cosmic rays, normally too weak to penetrate the heliosphere and enter the Solar System, have now been detected by Voyager 1. At the same time scientists have detected a change in orientation of the magnetic field under the influence of nearby stars. Interpretation of new data is complicated as the spacecraft enters a realm completely unknown to science.

Eventually, time will run out for these extraordinary spacecrafts. Both are powered by radioactive decay and on-board generators and their power is becoming depleted. By 2020, mission managers will start switching off scientific instruments, one by one. And by 2025, all the plutonium power will be gone, and the Voyagers' mission will be over.

In the meantime more surprises are expected.

### Reference

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Voyager: Outward bound.

*Nature 497: 424–427 (2013)*

## Designing leaves and flowers

Have you ever wondered how leaves and flowers know when and how to depart from the main stem as a plant grows and develops, and how they receive instructions to develop leaves and blossoms in their different and beautiful designs? It is thought that an underlying programme determines the different functions and shapes of all the plant organs but it is not known how the programme is modulated to create these differences. In order to shed light on this question, Sauret-Gueto, Coen and colleagues (Department of Cell and Developmental Biology, Norwich Research Park, Norwich, UK) have investigated petal growth and shape in Arabidopsis thaliana (a small flowering plant native to Europe and Asia and a popular model organism in plant biology and genetics). They label some of the cells in the growing petals, at various stages of development, with a dye called GFP (green fluorescent protein) and then follow the distribution of the label in the petal cells arising from these original labeled cells (clones) as the plant grows and the flower takes on its shape. The patterns they observe show that petals elongate in a polarity field and increasingly spread outward towards the distal end of the petal. They identify a role for a gene, called JAGGED, which promotes growth rate to spread the distal end of the petal by an interaction with auxin function. Previous studies of leaf development have shown a similar 'polarity field' along the leaf providing directionality in leaf development with specific growth rates parallel and perpendicular to this field giving rise to the leaf shape. By comparing their results with petals to those on leaf development, the authors show that plant organs share an underlying developmental framework that has evolved under different selective pressures to form unique structures. Simple modifications of this underlying developmental system thus generate distinct forms in leaves and petals.

### Reference

Sauret-Güeto S, Schiessl K, Bangham A, Sablowski R and Coen E.

JAGGED controls Arabidopsis petal growth and shape by interacting with a divergent polarity field.

*PLoS Biol 11: e1001550 Apr 30 (2013)*







## Pesticides threaten biodiversity

It is vitally important to know more about the effects on biodiversity of different agricultural pesticides and the range of concentrations which cause harm to different species of plants and animals. Beketov, Liess and colleagues (Department of System Ecotoxicology, Helmholtz Centre for Environmental Research-UFZ, Leipzig, Germany) analysed the effects of pesticides on stream invertebrates in Germany and France and in Victoria, Australia. The range of research areas was wide - 23 streams in the central plains of Germany, 16 in the western plains of France and 24 in southern Victoria, Australia. Streams were divided into three different levels of pesticide contamination - uncontaminated, slightly contaminated and highly contaminated. The research shows severe losses (up to 42 per cent) of species in highly contaminated streams, for example mayflies and dragonflies, at pesticide concentrations considered to protect the environment. It is not clear, however, whether the results represent loss of diversity on a global scale as the streams reported might be the most highly contaminated.

Another recent report concerns the effect of pesticides on our bees. Dave Goulson (University of Sussex, UK) is concerned with the environmental risk of accumulation in the soil of neonicotinoid insecticides killing soil invertebrates such as Eisenia foetida, a type of earthworm. Recently the European Commission has imposed a two-year ban on three commonly used neonicotinoids over concerns that they are killing bees. The chemical remains in the soil for several years and accumulates with repeated yearly use on crops such as maize and soya beans. Earlier studies also suggest that grain-eating birds such as partridges may die after eating seeds treated with neonicotinoids so there is more at risk here than our honey bees.

### Reference

Beketov MA, Kefford BJ, Schäfer RB and Liess M.

Pesticides reduce regional biodiversity of stream invertebrates.

*Proc Natl Acad Sci USA 110: 11039-11043 (2013)*

Goulson DJ.

An overview of the environmental risks posed by neonicotinoid insecticides

J Appl. Ecol. doi: 10.1111/1365-2664.12111 (2013)

## Predicting best treatment for depression - CBT or SSRI

Treatment of depression is a disheartening process. Less than 40 per cent of patients respond to treatment without recurrence. McGrath, Mayberg and co-workers (Department of Psychiatry and Behavioral Sciences, Emory University, Atlanta, USA) use neuroimaging (positive emission tomography, PET) to investigate metabolism in different regions of patients' brains in search of a biomarker that might predict which treatment for depression would have the better outcome, cognitive behavioural therapy (CBT) or drug treatment with escitalopram oxalate (a serotonin uptake inhibitor, SSRI).

Brain glucose metabolism was measured prior to CBT or SSRI treatment randomisation. Of 38 patients (men and women 18 to 60 years). 12 responded well to cognitive behavior therapy and 11 to escitalopram. There were 9 non-responders to cognitive behavior therapy and 6 non-responders to escitalopram. The neuroimaging identified involvement of the right anterior insula in discriminating the different responses to mode of treatment. Insula hypometabolism (relative to whole-brain mean) was associated with a good response to cognitive behavior therapy and poor response to escitalopram, while insula hypermetabolism was associated with a good response to escitalopram and poor response to cognitive behavior therapy. This study provides the first objective marker to guide initial treatment selection for depression – a positron emission tomography scan could predict whether a patient with depression will be more likely to respond to drugs or to cognitive behavioural therapy.

### Reference

McGrath CL, Kelley ME, Holtzheimer PE, Dunlop BW, Craighead WE, Franco AR, Craddock RC and Mayberg HS.

Toward a neuroimaging treatment selection biomarker for major depressive disorder.

*JAMA Psychiatry 70: 821-829 (2013)*

## Alcoholic relapse prevented by blocking memories of drinking

Relapse to alcoholic drinking is often stimulated by pleasant memories associated with drinking in the past. These learned associations can be very difficult to overcome. If these associated memories could be blocked at the time of their inception, relapse might be prevented. It is known that memories can be erased soon after they are recalled by a process dependent on protein synthesis, specifically, in the case of post-traumatic stress and drug addiction, the mTORC1 (mammalian target of rapamycin complex 1) protein pathway. Barak, Ron and colleagues (Department of Neurology, University of California San Francisco, USA) used a rat model to demonstrate the involvement of mTORC1 in alcoholic relapse and moreover prevented relapse by blocking this protein pathway. Rats offered the choice of 20 per cent alcohol or water chose to drink alcoholically. After seven weeks, alcohol was removed, and after another 10 days the rats were given a small alcohol taster as a reminder. The memories triggered by the smell and taste of alcohol involved activation of mTORC1 in amygdalar and cortical regions of the rat brain. If at the same time the reminder was given, the rats were treated with rapamycin (the inhibitor of a protein mTORC1) they did not resume alcoholic drinking and sustained a long-lasting suppression of relapse. This work raises the possibility that rapamycin or a related compound may be developed into an effective treatment for alcohol abuse.

### Reference

Barak S, Liu F, Ben Hamida S, Yowell QV, Neasta J, Kharazia V, Janak PH and Ron D.

Disruption of alcohol-related memories by mTORC1 inhibition prevents relapse.

Nat Neurosci 16:1111-1117 (2013)

## Levitation by sound

To levitate one must defy gravity. Electromagnetism can defy gravity and it has been known for some time that sound can do it too. Recently, Foresti, Poulikakos and colleagues (Department of Mechanical and Process Engineering, Eidgenössische Technische Hochschule Zürich, Switzerland) have designed sound producing platforms using piezoelectric crystals. When ascending sound waves bounce back from a surface above, an object, droplet, crystal, or wire, may be suspended in space where the ascending and descending sound waves meet (node points). By adjusting the position of the nodes, the researchers can manipulate and move an object between platforms without physical contact. This work on acoustic levitation in air may have a range of important applications including contactless droplet coalescence, solid liquid encapsulation, hazardous chemical handling and reactions, and contamination free sampling.

### Reference

Foresti D, Nabavi M, Klingauf M, Ferrari A and Poulikakos D.

Acoustophoretic contactless transport and handling of matter in air.

*Proc Natl Acad Sci USA 110: 12549-12554 (2013)*

## Modelling the coastline to resist climate change

Various aspects of the natural coast line protect people and property from the hazards of climate change such as extreme weather (storms and hurricanes), sea level rise and flooding, and damaged ecosystems. Coastal forests, intact coral reefs, sand dunes, wetlands and marshes are all natural protective barriers. Arkema, Silver and colleagues (The Natural Capital Project, Stanford University, California, USA) used five sea-level-rise scenarios to calculate a hazard index for every km of the United States coastline. They identify the most vulnerable regions where conservation and restoration of reefs, wetlands and vegetation, and building of sand dunes, have the greatest potential to protect coastal communities against climate change damage. Coastal defense planning is already underway in several areas such as New York and Louisiana, recently hit by hurricanes. Conservation-based protection strategies may be added where practical to engineered barriers in the future. Nature Conservancy scientists are already using the models underlying this study to rebuild oyster reefs off the coast of Alabama - a project that has trapped sediment and dissipated wave energy that normally would have eroded the shore.

### Reference

Arkema KK, Guannel G, Verutes G, Wood SA, Guerry A, Ruckelshaus M, Kareiva P, Lacayo M and Silver JM.

Coastal habitats shield people and property from sea-level rise and stormJournal name:.

*Nature Climate Change 3: 913–918Year published: (2013)*

## Blood markers predict suicide risk

Suicide claims the lives of over a million people per year and is a leading cause of death amongst psychiatric patients. However, suicide may be preventable if risk could be determined and acted upon. Le-Niculescu and colleagues (Department of Psychiatry, Indiana University School of Medicine and Indianapolis Medical Center, USA) have identified differential gene expression in blood samples from patients with bipolar disorder and compared samples of those with thoughts of suicide with those who had exhibited no such thoughts. In this way, they were able to identify a number of markers that potentially predict whether suicide is a risk in individual patients. (Note that the psychological assessment did not directly ask about suicidal thoughts which some individuals may deny or choose not to share.) The molecular approach used to identify differentially expressed genes, Convergent Functional Genomics (CFG), integrates multiple independent lines of evidence to reduce false-positive and false-negative results. Specific gene expression levels of candidate blood biomarkers identified in bipolar patients were examined in the bloods of actual suicide victims available from coroner investigations. In this way, the researchers found that 6 out of the 41 most correlated expressed genes associated with suicide ideation showed a significant difference. The most significant biomarker, identified as spermidine/spermine N1-acetyltransferase 1 (SAT1), also correlated with the number of hospitalisations of bipolar subjects. A similar, though weaker, pattern was observed in psychosis (schizophrenia/schizoaffective disorder) patients. In addition to SAT1, three other biomarkers (PTEN, MARCKS and MAP3K3) were identified that showed similar but weaker correlations with suicide risk. This approach, using two simple measures for anxiety and mood, and SAT1 blood expression levels, will help to predict future hospitalisations and suicide risk.

### Reference

Le-Niculescu H, Levey DF, Ayalew M, Palmer L, Gavrin LM, Jain N, Winiger E, Bhosrekar S, Shankar G, Radel M, Bellanger E, Duckworth H, Olesek K, Vergo J, Schweitzer R, Yard M, Ballew A, Shekhar A, Sandusky GE, Schork NJ, Kurian SM, Salomon DR and Niculescu AB.

Discovery and validation of blood biomarkers for suicidality.

*Mol Psychiatry Aug 20. doi: 10.1038/mp.2013.95. [Epub ahead of print] (2013)*

## Sinking land due to fish farming causes rising sea levels

We are used to being concerned about the effect of rising ocean level, as well as warming and increasing acidification, on fish populations. Now we are being alerted to the need to be concerned about the effects of fish farming on ocean levels. Higgins, Syvitski and colleagues (Department of Geological Sciences, University of Colorado, Boulder, Colorado, USA) have used satellite-radar surveillance of the Yellow River delta in China to chart the land subsidence caused by extensive aquaculture over a period from 2007 to 2011. The data show subsidence rates in the area of the fish farms as high as 25 cm per year, probably due to ground water pumping. This sinking of the land mass is equivalent to 100 times the rate of global average sea level rise (around 3 millimetres a year) caused by warming water and melting ice. Similar sinking of land mass due to groundwater pumping has been seen in Bangkok. Deltas can also sink due to sedimentation when new sedimentation is prevented by dams or diversion of water for irrigation. The Yellow River shoreline has receded by 7 kilometres over the last two decades. Sea walls have been built to stop this erosion but until now little attention has been paid to the vertical subsidence occurring due to aquaculture. Asia produces 89 per cent of the world's farmed fish and shrimp. It is vitally important to be aware of the impact that this kind of aquaculture can have on local sea-level rise.

### Reference

Higgins S, Overeem I, Tanaka A and Syvitski JPM.

Land subsidence at aquaculture facilities in the Yellow River delta, China.

*Geophys Res Lett 40: 3898–3902 (2013)*

## The earth's habitable lifetime

For a planet to support life, it is generally agreed that we need water and a temperature not too hot nor too cold. These conditions are not static in a solar system. The luminosity of a typical star increases as its composition and chemical reactions evolve over billions of years, pushing the habitable zone (HZ) for a particular planet outward. The habitable zone lifetime, defined by boundaries encompassing conditions that will support life, may include or exclude planets during the lifetime of the star. The other important consideration is the length of time required for the evolution of complex life within the habitable zone time period. Rushby, Watson and colleagues (School of Environmental Sciences, University of East Anglia, Norwich, UK) estimate the evolution of the habitable zone lifetime of our earth to be between 6.3 and 7.8 billion years and our earth is now about 70 per cent through this time period and will continue to be habitable for about another 2 billion years. The authors used their approach to also determine the habitable zone lifetimes of 7 confirmed HZ exoplanets (extrasolar planet, or a planet outside the Solar System) and 27 unconfirmed Kepler candidates (Kepler is a space observatory launched by NASA to discover Earth-like planets orbiting other stars). This work identifies planets outside our Solar System with long 'habitable periods' – i.e., the best places to look for life. Climate dynamics such as atmospheric composition and volume will also be important. Interestingly, just as our sun brightens and the Earth becomes too hot for life, Mars will be entering the habitable zone in our solar system.

### Reference

Rushby AJ, Claire MW, Osborn H and Watson AJ.

Habitable Zone Lifetimes of Exoplanets around Main Sequence Stars.

*Astrobiology 13: 833-849 (2013)*







# Expansive Nature Experiences and the Mystical: A Personal View

*Matthew Colborn*

*The author describes his own personal experiences with nature, dubbed Expansive Nature Experiences (ENE) and discusses their affinities with Extrovertive Mystical Experiences. It is suggested that ENEs are a more common, dilute version of a full-blown mystical experience. Explanations are surveyed, from the transpersonal to the neurobiological. Then the health and ecological benefits of inducing ENEs are examined, and related to recent findings concerning Attention Restoration Theory and exposure to the natural world. The author concludes by suggesting that these experiences suggest an animistic reading of nature, and remains agnostic about whether they point to a transcendental reality.*

It's early August, and I'm standing on the sea shore, looking over the North Sea. A cormorant glides parallel to the deep, blue water, the sun shines overhead and the sky is blue. I've taken off my shoes and socks, and am wading in the cool water. At my feet, in the shallows, little fragments of red and green seaweed float, hugging the tide-line. The water's pretty clear and between waves, I can see the sandy bottom. A flock of sanderling follows the surf, scurrying away whenever there's a wave, and at one point, a small flatfish, probably a dab, zooms away, heading for deeper water. I turn and stare far out to sea, and that's when it happens.

Something deep within relaxes, and my consciousness seems to expand towards the horizon. Everything holds fascination, from the gulls bobbing over the sea to the sand clouding underwater at my feet. Worries recede, and I feel a deep and increasing sense of unity with the seascape before me. My surroundings feel alive, and shot through with mood and purpose, but it's the sea that dominates. Its might is palpable, even though it's wearing a benevolent face. And at the periphery of consciousness, still held at bay by errant thoughts, hovers a greater feeling of sheer awe.

## The Expansive Nature Experience

I've experienced this state of consciousness repeatedly within a natural setting, or even when contemplating living things in captivity. It's happened in the woods near my home, amongst deserts and mountains, at an aquarium, or when contemplating the sky at night. Over the years, I've found that these very personal experiences have a range of features, which include;

- A sense of expansiveness.
- A slackening of the barrier between self and the world.
- Deep relaxation.
- Deep absorption or interest or even a sense of intoxication with the natural world.
- A strong sense of *mood* within the landscape.
- A sense of purposiveness within nature.
- A sense of the truth of a strongly *animistic* as opposed to a *mechanistic* interpretation of the Cosmos.

Related experiences have long been reported by many different people from very different cultures and in widely separated times and places, and labelled in various ways. My own personal label is Expansive Nature Experience (ENE), which captures a sense of the main features. ENEs overlap with a family of Exceptional Human Experiences that have been noted by various researchers, including Maslow's Peak Experiences, meditative and other absorptive states and even Edward O. Wilson's 'biophilia.' In this article, I'd like to focus on their relation to what have been dubbed *Extrovertive Mystical Experiences*.

ENEs can be seen as a dilute version of full-blown mystical experiences, which Paul Marshall acknowledges share much with everyday experience. He characterizes Extrovertive Mystical Experiences as combining 'a sense of unity, deepened knowledge, sense of reality, altered time-experience, light, bliss and love.' Shared features include an elevated consciousness of the cosmos, indescribable feelings of joyousness, a unifying vision or sense of the unity of the universe and, especially important for me, a strong sense of beauty. So if Extrovertive Mystical Experiences differ in degree and not in kind from the ENE, it seems appropriate, in my view, to consider whether they share a common source.

## Explanations

There have been a range of explanations offered for Extrovertive Mystical Experiences, some of which are naturalistic, and tend to look at brain-processes, others of which have emphasised their transpersonal nature. Bucke, for example, posited a cosmic consciousness, Inge and Underhill spoke of the presence of God in creation, whereas Otto posited an innate knowledge of a spiritual reality in the world. More recently, Stephan Harding has interpreted mystical feelings in nature in terms of 'encounters with Gaia.' Sir Alister Hardy suggested that the 'transcendental element…is fundamental: the feeling that there is a spiritual reality that appears to be beyond the conscious self with which the individual can have communion in one way or another….'

More recent explanations have tended to focus on the brain. Researchers like Michael Persinger have attempted to explain these sorts of feelings as directly related to Temporal Lobe Epilepsy, and have even claimed to generate them in the lab. D'Aquili and Newberg, meanwhile, carried out SPECT/

PET neuroimaging studies that showed the blocking of activity in the Orientation Association Area (OAA) in the Posterior Superior Parietal Lobes (PSPL) during meditative experiences, in addition to increased activity in brain areas associated with attention. The authors claimed that these sorts of findings can explain a whole range of mystical experiences in terms of a state of consciousness they call Absolute Unitary Being (AUB).

Although I find the neurobiology interesting, I would suggest that brain studies on their own cannot fully answer questions about the origins, significance and ultimately the validity of these experiences. Whilst I'm willing to consider the possibility that there was decreased activity in my PSPL when I stared out to sea on that day, it seems to me that neuroscience is more or less impotent to answer the question of whether this strong sense of unity with nature is actually *true*. William James made a similar point over a century ago, when he observed that the biological origin of a state of mind on its own cannot allow us to determine whether it's true, useful or fruitful. James suggested instead that such experiences need to be judged in terms of *immediate luminousness*, *philosophical reasonableness* and *moral helpfulness*. We also need to ask whether these experiences can contribute to a healthy life.

## The Benefits of the ENE

Firstly, it's important to establish that these experiences are not pathological. Persinger's attempts to identify mystical consciousness with epilepsy have been significantly criticised in recent years to the point that some have claimed that there is *no* credible evidence of any generalized association.

Beyond this, it's never seemed plausible to me that these experiences are anything other than healthy. They can be distinguished from unhealthy 'highs' like alcoholic exuberance because they tend to occur in a state of deep relaxation and do not end in a reactive 'low.' Secondly, whilst cognition tends to scatter in unhealthy highs (as in the manic phase of bipolar disorder), the situation's very different in the ENE, which carries with it a deep calm and stability similar, in my experience, to a deep meditative state.

This latter point flags a key therapeutic feature of these experiences, and of contact with natural settings in general: attention restoration. Eva Selhub and Alan Logan suggest that today many of us are suffering from Directed Attention Fatigue, partly because of the character of modern work, and partly because of the ubiquity of electronic media. This idea stems from William James' distinction between voluntary attention, which requires effort, and involuntary attention, where one effortlessly focusses on something with intrinsic interest. Selhub and Logan note that office work tends to involve voluntary attention that requires sustained, fatiguing effort. Even worse, they suggest that our electronic media promote continuous, forced, voluntary attention, leading to stress, depression and anxiety.

Natural settings can help to reverse this trend because they provide a space to heal attention fatigue. Citing Stephen Kaplan's Attention Restoration Theory, Selhub and Logan note that immersing oneself in nature directs attention away from fatiguing voluntary attention, promotes intrinsic fascination, engages the mind significantly and finally, can fulfil a person's intentions and activities without struggle. All of these features seem directly relevant to promoting the ENE state of being.

ENEs surely need to be fostered. Firstly, as we've seen, there are demonstrable health benefits and secondly, it is through such experiences that we have a real chance of creating lasting change in our culture in the direction of sustainability and environmental protection. This is important because it seems to me that the standard ways of presenting environmental problems – from species loss to global warming – are often unflaggingly negative and rely on guilt to work. How much better, and healthier, to foster a love for the natural world via direct experience?

## A Spiritual Reality?

And finally, what is the ultimate implication of the Expansive Nature Experience? What does it say about the cosmos in which we live? For me, anyway, these experiences call into question the assertion that we are alienated individuals, living in a pointless, mechanistic Universe that is devoid of purpose. These experiences, subjectively at least, suggest that the environs of the Earth are shot through with a vitality that seems immanent within a myriad of organisms and natural processes.

As for sensing the *divine* in reality, I remain agnostic, and cannot say whether these expansive feelings truly point to the transcendental, although I respect the views of those who have reached that conclusion. I do feel sympathy with William James' thoughts at the end of *Varieties of Religious Experience*, where he suggests that mystical experience points to 'something more,' beyond the manifest world. There are times, contemplating nature, when I feel this myself, but I do not possess the confidence to say exactly what that 'something more' might ultimately be. But whatever the truth, these experiences remain of huge personal importance, and for me, at least, illuminate aspects of nature that would remain otherwise invisible.

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# Beyond the Brain X, Latimer House, August 2013

*Liz Archer*

*The 10th Beyond the Brain conference took as its theme Shifting Consciousness: Mind, Self and Brain in the 21st Century. This meeting was organised jointly between SMN and the Institute of Noetic Sciences, and marked the 40th anniversary of both organisations.*

The meeting opened on Friday evening with a brief video greeting from Peter Fenwick, who could not be with us because he was in Scotland celebrating his 50th wedding anniversary! Bernard Carr spoke of the overlapping aims of the SMN and IONS, and how both organisations are concerned with understanding consciousness but have taken different approaches to investigating it. Marilyn Schlitz reminded us that both SMN and IONS had emerged out of the founding of the Society for Psychical Research, and of the need to bring discernment to our investigations of consciousness. Our aim must be to find ways of changing our worldview so that we can create a world that is more just and more in balance with our environment.

**David Lorimer** then spoke on the subject "Prospects for a Paradigm Shift". He discussed the tension between differing views of consciousness, and how it raises questions about the nature of science, the nature of consciousness itself, and how consciousness relates to the brain. The last of these is the 'hard' problem for science today. The belief that the brain generates consciousness is a central tenet for science[1], and many scientists assume that, in time, we will have a material explanation for precisely how the brain it does so. But huge changes are occurring our wider understanding of human consciousness, and David cited Al Gore's concept of "Earth Inc." and global mind, and Anne Baring's recent book The Dream of the Cosmos as examples. Two sciences of consciousness appear to have emerged; firstly, consciousness within science (objective, experimental, rational, outside-in, third person); and secondly, science within consciousness (subjective, experiential, intuitive, inside-out, first person). He regards both sciences as valid but also incomplete.

David believes that understanding death is pivotal to understanding the nature of consciousness, and anomalous events such as NDEs challenge conventional thinking. 'Normal' science attempts to assimilate new data into its existing explanatory framework, and status or 'authoritative' opinion may be (mis)used within science to determine what is acceptable. Tensions can arise between 'informed' and 'uninformed' opinion, and he quoted Peter Fenwick's comment that anyone talking outside their own field ends up talking rubbish! Peer pressure and fear of rejection have become part of the politics of knowledge, and contentious areas of work, such as psi research, may prove to be career limiting. As a result, young students tend not to be exposed to this kind of material. David then raised the important question of how best we can work to engage young people, who he feels are genuinely interested in these issues.

The first speaker on the Saturday morning was **Mario Beauregard** from the University of Montréal. He took has as his subject "The Elemental Psyche: a post-materialist perspective". Mario is the author of two important books on consciousness, The Spiritual Brain and his more recent book Brain Wars. He described how the metaphysical beliefs underlying classical science have impeded the development of mind sciences and the study of spirituality. The materialistic, reductionist and deterministic nature of classical science impacts our understanding of the relationship between psyche and brain. Science views experience as an electrochemical process within the brain, and asserts that the psyche cannot affect brains, bodies or the physical environment. Mario went on to describe research which he believes demonstrates the power of intention to modify neurobiological responses. His first study involved male student volunteers, who were shown erotic film clips as their brains were scanned. Under normal conditions this produced activation of the limbic system, but after mindfulness training the activity of the limbic system shut down. In another study he asked students to retrieve happy and sad memories; brain scans showed activation of serotonin in the limbic system in response to the happy memories, and reduction on recalling sad memories.

What is clear is that the brain is 'plastic', and that mental training will affect neurons, neural connections and the development of networks within the brain. Mario spoke of the remarkable power of placebo to change activity in the brain and body, and how meditation enhances attention, improves emotional regulation and the development of compassion. Neurofeedback enables us to control body functions not normally under voluntary control, and work in psycho-neuro-immunology has shown that mental activity can affect both the immune system and the control of genes. These techniques have proven benefit in the clinical setting.

Mario went on to discuss *psi* research. Since the effects shown in individual tests are small, it takes meta analyses of multiple studies to show the true magnitude of the results. Such analysis of studies of telepathy under Ganzfeld conditions[2] have produced statistically highly significant results (Dean Radin talked about this in more detail), and the PEAR[3] studies demonstrated the power of human consciousness to alter the output of random generation machines. Other studies have shown that consciousness can interact with living systems at a distance. Most significant of all, though, are reports of NDEs and OBEs occurring while a subject is clinically 'dead'. When the heart stops, EEG activity ceases and the brain