**The Cosmology of Conscious Mental States**

Chris King Genotype 0.0.15 5-13 - 10-17

**Abstract:** We explore the diversity of mental states, and examine to what extent these are both a product of specific known brain processes and yet may access a complementary aspect of existence to the cosmology of the physical universe and its natural biosystems, potentially giving mental states an existential cosmological status. The case is made that the cosmology of mental states reflect a deeper physical principle connecting quantum entanglement with the brain wave processing evolved in higher organisms to solve the computational intractability of open environmental dilemmas, which go beyond Bayesian statistics and causal prediction, into multiple nested Schrödinger cat paradoxes, hinting at a meta-evolutionary paradigm of conscious cosmological integration.

**A Natural Classification of Mental States**

Human conscious experience involves a spectrum of mental states surrounding the everyday waking condition. Some of these are biological, associated with essential processes, including reflection, reminiscence and daydreaming associated with the so-called default network (see fig 2), the dreams and nightmares of REM sleep, and ‘out of
the body’ (OBE) experiences associated with hypnagogic states. Others are culturally-based associated with devotional practices, including meditation, prayer, religious vision and spiritual contemplation. Still others are pharmaceutical, associated with changes of subjective consciousness induced by psychotropic substances, such as psychedelics and dissociatives, either synthetic molecules, or associated with certain plants or fungi. Finally we have a number of pathological states involving extreme medical conditions, from schizophrenia and dementia to epileptic seizures, particularly in the temporal lobes, and the near death experiences (NDE) associated with heart attacks, drowning, and severe trauma, such as traffic accidents.

While some have a natural origin in circadian rhythms, and others a cultural origin, others still a chemical origin and yet others a medical origin, all of them arise from specific brain states physiologically, which, despite their different origins, fall into a natural classification. However this doesn’t mean brain physiology is all there is to mental states. Indeed our description of reality and the physical world is founded first and foremost on our subjective conscious mental states, whose actual basis remains the most confounding and unfathomed question facing the scientific description of the natural world. We may thus find in the diversity of mental states clues to the existential cosmology of the conscious universe - hence the title of this article.

All mental states, from natural to cultural, are accompanied by specific physiological changes to the brain, which are signature of the state concerned. This applies equally to drug-induced states and states which people may associate with higher spiritual practices or religious experiences, showing these too can be seen to have a biological

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Fig 2a: Dreaming is conventionally associated with periods of REM, or rapid eye movement sleep in which the EEG closely resembles waking brain waves, rather than the slow, high amplitude waves of deep sleep, but the above EEG portraits show that dreaming is more closely associated with high frequency activation of key hotspots involving visual and other areas in a manner that can occur in both REM and NREM sleep (Siclari et al. 2017).

**The Physiology of Mental States**

All mental states, from natural to cultural, are accompanied by specific physiological changes to the brain, which are signature of the state concerned. This applies equally to drug-induced states and states which people may associate with higher spiritual practices or religious experiences, showing these too can be seen to have a biological
The transition from wakefulness to the onset of light and deep non-dreaming (non-REM) sleep, interspersed with phases of dreaming or REM sleep, occurs naturally in waves over the night’s slumber. While the electrical activity of the EEG of non-REM sleep shows theta spindles and deep slow delta waves, different from the high frequency, low amplitude, beta activity of waking attention, the beta EEG of dreaming sleep is remarkably similar to the waking brain. Dreaming phases lasting up to 30 minutes indicate phases of dreaming experience last a similar time to their subjective experience. Brain scans of the metabolic activity of the dreaming brain using PET and fMRI show an active brain with increased activity in visual areas and reduced executive control in frontal areas, consistent with the rich visual experiences and lack of full voluntary control over the events in dreams.

These changes are driven by major ascending neural pathways from the brain stem to the cerebral cortex, and other descending pathways, which together mediate major changes in alertness and attention, facilitated by specific neurotransmitters and receptors. The reticular activating system contains pathways mediating full arousal. In the waking condition, both the cholinergic acetylcholine and adrenergic norepinephrine pathways are active. In non-REM sleep, norepinephrine and serotonin ascending pathways are active. At the onset of dreaming these go silent and acetylcholine pathways in the pons become active, having the effect of shutting down brain stem centers facilitating motor activity, putting the dreaming subject into a state of atonia, or sleep paralysis, preventing them acting out their dreaming experiences, except for the rapid eye movements for which REM is named. This also has the effect of making the dreamer often feel transfixed in their dream, while at other times feeling they are floating or flying. The exotic, intensely perceived and bizarre mental states accompanying dreams and nightmares are thus clearly related to fundamental physiological changes orchestrated by brain stem centers in interaction with the entire cerebral cortex.

While many theories have been proposed for the function of dreams, particularly in relation to the reencoding of hippocampal memories into compactified strategically effective forms in the cortex, the extreme variation of REM and of sleep duration in different mammal species and the ambiguity of studies of sleep deprivation leave the purpose and existential status of dreaming still awaiting a full explanation.

Key psychotropic agents also act on specific neuroreceptors, inducing physiological changes in brain dynamics by altering the receptor-mediated activation of excitatory or inhibitory neurons. For example, psychedelics, are believed to act as super-agonists of the 5HT2a serotonin receptor, setting off a different form of activation from serotonin itself, in which a push-pull coupling with a second receptor mGluR2, for the principal excitatory neurotransmitter glutamate, alters the stability of excitation in such a way as to evoke the ‘fractal’ instabilities associated with the kaleidoscopic visions of the psychedelic state. Both of these receptors are slow acting G-protein-linked ‘metabotropic’ receptors whose changes in dynamics are measured in hours – the life of the drug effect. They do not directly cause changes in ion flow, but trigger a protein cascade altering long term dynamics. Other psychotropics, from cannabinoids to datura-containing deleriants such as scopolamine, are positive agonists, or negative antagonists, of other key receptors, respectively the anandamide CB1 cannabinoid receptor and the muscarinic acetylcholine receptor.
Fig 2b: Physiological underpinnings of a variety of brain states. (a,b) fMRI and PET scans of REM (dreaming) sleep show increased occipital (visual) activity and reduced prefrontal (executive) function, with an EEG similar to the waking brain (Braun). (c) Sleep phases of REM and non-REM sleep alternate in waves. The EEGs are on a time scale of seconds, the sleep waves in hours. (d) Sleep phases are driven by ascending serotonin and nor epinephrine pathways from the Raphe nucleus and Locus coeruleus. (e) The default network associated with worry and recollection of events to prepare for the future shows depression of activity during task performance and increase during rest (Raichle et al, Raichle & Snyder, Mason et al, Fox D, Horovitz et al, Buckner et al, Marshall). (f) There are believed to be two attention systems in the human brain (Fox et al.) a bilateral dorsal attention system (blue) involved in top-down orienting of attention and a right-lateralized ventral attention system (red) involved in reorienting attention in response to salient sensory stimuli. (g) Zen meditation studies (Pagnoni et al, Ritskes et al) in which subjects are asked to switch from a verbal task to contemplation show transient activity consistent with the default network which is more quickly suppressed by experienced meditators more effectively inhibiting verbal thought. (h) Carmelite nuns entering oneness with God show fMRI activations in areas in specific frontal, parietal, temporal and basal areas consistent with directed control (Beauregard & Paquette). (i) Tibetan Buddhists performing compassion meditation for other people’s suffering show specific activation in limbic regions including cingulate cortex and insula, consistent with an empathic response to another’s pain (Lutz et al 2008). (j) PET study of psilocybin taken orally shows frontal activation by comparison with a resting state (Vollenweider et al). (k) fMRI study during the 12 minutes after intravenous administration of psilocybin shows reduced activity in medial frontal cortex (mPFC), posterior cingulate cortex (PCC) and other areas (Carhart-Harris et al 2012a, Lee & Roth) suggesting suppression of the default network as the effects come on. (l) Increases in activity associated with autobiographical memories on psilocybin right over placebo (left) (Carhart-Harris et al. 2012b). (m) Increases in IMRI in frontal and paralimbic brain regions in an ayahuasca session (Riba et al 2006). (n) Above ketamine induces a decrease in ventromedial frontal cortex (blue) and increased activity in mid-posterior cingulate, thalamus and temporal cortical regions (yellow-red) consistent with its dissociative effects. Below inhibition of ketamine activity by lamotrigine, a sodium channel blocker that decreases glutamate release (Deakin et al). (k) Three areas involved in Theory of Mind and religious notions top to bottom (Kapogiannis et al. 2009): (1) Experiential knowledge vs (2) Doctrinal knowledge. (3) God’s love vs anger (4). God’s lack of involvement (5,6).

By contrast, ketamine acts to block the pore in a fast acting glutamate NMDA ionotropic receptor, directly altering ion flow and excitability in target neurons, resulting in global changes in excitability which appear to dissociate the subject from their bodily sensations, so that, while remaining technically conscious, they become relatively oblivious to an operation being performed on them and at the same time experience dislocated out of the body experiences, some of which have profound impressions,
similar to classic near death reports.

In fact the situation is vastly more complicated than this description. Psychedelics, for instance, activate a broad spectrum of many serotonin (5HT), norepinephrine and other receptors, to varying degrees, in a manner similar to pressing a large number of keys on a polyphonic keyboard, resulting in a variety of simultaneous effects, from sensory hallucinations to anxiety reactions. Paradoxically, agonism of the 5HT1a receptor in the psychedelic tryptamines silences the Raphe nucleus responsible for serotonin innervation of the cortex (Braden, Nichols 2011), as occurs in REM sleep, resulting in a close parallel with the dreaming state. In addition, a given receptor type can have differing actions depending whether it is on an excitatory e.g. pyramidal cell, or an inhibitory interneuron, so a psychotropic agent may have simultaneous excitatory and inhibitory effects on different cells, or on distinct brain regions.

Still other psychotropics such as the releasing agents methamphetamine and MDMA and reuptake inhibitors such as fluoxetine (prozac), principally affect the transporters that carry neurotransmitters to the synapse and remove any excess after release, inhibiting re-uptake or causing reverse dumping, rather than activating or de-activating receptors directly, as agonists and antagonists do.

Nevertheless psychotropic drugs and sacramental species act on brain dynamics broadly through the same receptors and some of the same pathways we saw driving natural changes in the sleep wakefulness cycle. This involvement of sappy neurotransmitter molecules in what would otherwise be electro-chemical neurodynamics is very ancient, and key neurotransmitters, from serotonin to cyclic-AMP, trace their evolutionary origin right back to chemical signaling in single celled eucaryotes and have similar or parallel function in diverse animal groups, from arthropods to vertebrates, acting on major modes to keep neurodynamic function biologically attuned to the survival of the organism.

Many spiritual practitioners and religious believers consider their experiences to be states of attainment far beyond mere physiology, requiring devoted concentration and higher forms of consciousness, as different from lowly dissipated drug experiences as gold is to lead. However research exploring states of meditation and religious devotion show that these states fall into a physiological spectrum as clearly as natural and pharmaceutically induced states do.

When it comes to the investigation of mental states associated with spiritual and religious practice using brain scans, we find clear physiological indicators related to the particular practice engaged by the subject. By contrast with the rich and bizarre nature of dreaming, mental states associated with prayer and meditation tend to involve focused control and suppression of the wandering mind through limiting the verbal thought process, or one-pointed concentration. While these mental states are highly varied, they share common features of intentional control of the mental process. Zen meditators in fMRI studies show more rapid and complete suppression of the mind-wandering of the default network (Pagnoni et al), with increased activity in the prefrontal cortex and basal ganglia and decreased activity in the occipital (visual) cortex and anterior cingulate processing emotion (Ritskes et al). In EEG studies they showed a significant increase in frontal alpha and occipital beta power, whereas an average increase of theta power was observed in controls, indicating loss of concentration
Huang et al. Consistent with one-pointed concentration, Zen meditators recalled more subliminal messages than controls (Strick et al).

Tibetan Buddhist meditators in PET and fMRI studies have increased blood flow in the cingulate, inferior and orbital frontal cortex, dorsolateral prefrontal cortex and thalamus (Newberg et al 2001, Hanky). EEG studies show greater activation in attentional regions, including fronto-parietal, cerebellar, temporal, para-hippocampal, and posterior occipital, possibly due to the attended spot (Brefczynski-Lewis et al). They have also been found to enter high-amplitude gamma-band oscillations with high phase-synchrony during meditation, consistent with a one-pointed concentration with heightened attention (Lutz et al 2004). By contrast, compassion meditators under PET show similar activations to a person feeling empathy for a person in pain (Lutz et al 2008). In a more recent fMRI study contrasting “focus-based” and “breath-based” practice, in the first, blood flow increased in the medial prefrontal cortex and left caudate, but decreased in parietal and occipital regions. The second induced activation in several limbic structures and the left superior temporal cortex (Wang et al).

Investigation of Transcendental meditators by PET (Newberg et al 2006b) also found bilateral prefrontal activation associated with relaxed attention on the mantra, other increases in frontal, occipital and parietal areas and a decrease in the thalamus and hippocampus. An fMRI study centered on the capacity of the relaxed state to be helpful in dealing with an induced painful stimulus saw reductions in the prefrontal cortex, anterior cingulate cortex, and thalamus (Orme-Johnson et al), and has been suggested to be linked to hormonally induced increases in the inhibitory neurotransmitter GABA (Elias et al). Catholics observing a Marian image saw increases in the ventrolateral prefrontal cortex and brain stem leading up to the thalamus (Wiech et al).

Brain studies of Carmelite (Beauregard & Paquette) and Franciscan nuns (Bielo) in professed ‘union with god’, which they admitted was difficult to achieve in a noisy MRI tunnel, show different structured activations, with increased activity in the caudate nucleus associated with learning, memory and falling in love, the insula processing body sensations and social emotions, the inferior parietal processing spatial awareness in contradiction to the Zen studies, the medial orbito-frontal and prefrontal cortices dealing with emotional and executive decision-making, and the middle of the temporal lobe. Most prevalent brain waves were long, slow alpha waves such as those produced by sleep, consistent with a relaxed state.

By contrast with the prefrontal control evidenced in Buddhist meditation, during speaking in tongues, by Christian women who had practiced glossolalia for more than 5 years, there was a decreased blood flow in the frontal lobes bilaterally and in the left caudate, indicating relaxation of executive controls (Newberg et al. 2006a).

In comparing these highly varied and contradictory results, one can conclude that claimed states of higher spirituality are varied products of different forms of concentration, which share the feature of overall focused control, but otherwise look like distinct humanly-generated states of mind, rather than convergence on the ‘divine’. One thus needs to consider the possibility that the profound transformations of the cortical dynamic induced both by dreaming and by psychotropic entheogens may give rise to every bit as deep a potential for exploratory existential processes, which might
nevertheless be enhanced by contemplative repose.

Moreover, certain pathological states, such as temporal epilepsy (TLE), are associated with states of religious fervor bordering on the mystical and become experiences which the patient, while suffering from the effects of such seizures, regards as having overwhelming significance, which they are reluctant to part from. In one subject’s description “Triple halos appeared around the sun. Suddenly the sunlight became intense. I experienced a revelation of God and of all creation glittering under the sun. The sun became bigger and engulfed me. My mind, my whole being was pervaded by a feeling of delight” (Naito and Matsui).

Another account adds further features: “Every time I have a gran mal seizure I have a "vision/hallucination" of me walking with god. He's showing me my city and everything is destroyed. He speaks, but after I come out of my seizure I can't remember what he says. I feel like if I could only remember I could save the world. When I have a partial it's a feeling of déjà vu about a dream I've had. But I don't remember ever having this dream if that makes sense. I love the feeling I get from my seizures just not the convulsions and the aftermath. In fact I wish I could touch someone while having my visions and they could experience them. I guarantee you they would come out of it with a tear in their eyes and thanking me for the experience” (Mojeaux).

The incidence of these states caused the neuroscientist Vilayanur Ramachandran to coin the term the ‘god spot’ for the region of the temporal lobe bordering on the limbic emotional system amygdala, suggesting that stimulation of this region could cause both the intense significane and meaning of temporal excitation and the ecstatic fulfillment of positive centers in the amygdala, whose function is to do with orienting to intense emotional conditions, from flight and fight to peak fulfillment. Neuroimaging studies of individuals suffering from schizophrenia with religious delusions similarly found over-activation of the left temporal lobe during religious delusions (Puri et al). Kapogiannisa et al. (2009) propose an integrative cognitive neuroscience framework for understanding the cognitive and neural foundations of religious belief. Their analysis reveals 3 psychological dimensions of religious belief (God’s perceived level of involvement, God’s perceived emotion, and doctrinal/experiential religious knowledge), which functional MRI localizes within networks processing Theory of Mind regarding intent and emotion, abstract semantics, and imagery, well-known brain networks, thus supporting theories that ground religious belief within evolutionary adaptive cognitive functions.

Déjà vu is a common feature of TLE episodes. I also have natural déjà vu experiences of dreams, some of which I have had, but others of which seem to be illusory. Such impressions are also a prominent feature of my sacred mushroom experiences. Another parallel is the ‘flying dream paradox’ - levitating with great intentional effort in deep dreaming and turning to others present to show off my newly gained powers, only to find they cannot see, hear or touch me - having suddenly become a kind of dreaming ghost.

However religious conservatism, as opposed to the visionary state, may be a product of social evolution, as the moral deity inhibits intra-social conflict through fear of an omniscient god’s or other believers punishment, combined with frank repression of the infidel, resulting in inter-social dominance, permitting larger human groups to remain stable and to become dominant over their neighbors - a far from holy outcome!
On a slightly different tack, several researchers have drawn attention to the idea that genetic differences in neurotransmitter dynamics could underpin human religiosity, in particular the generalized monoamine transporter VMAT2, which is essential for carrying dopamine and serotonin to the synapse. Dean Hamer in “The God Gene” suggested that genes expressing higher levels of the transporter resulted in spiritual individuals favored by natural selection because they are provided with an innate sense of optimism, the latter producing positive effects at either a physical or psychological level. The dopamine receptor DRD4 (Comings et al) and various other receptors have likewise been cited as enhancing a measure of spirituality called ‘self transcendence’.

Intriguingly, removal of tumors from two brain regions, the left inferior parietal lobe and the right angular gyrus, was also associated with immediate increases in self-transcendence (Weaver). Significantly these regions are involved in processing one’s body image, so the loss of function could well evoke feelings of spiritual merging. The questionnaire tapped into three main components of self-transcendence: losing yourself in the moment, feeling connected to other people and nature, and believing in a higher power. Examples include: "I often become so fascinated with what I'm doing that I get lost in the moment - like I'm detached from time and place" and "I sometimes feel so connected to nature that everything seems to be part of one living organism."

Out of body experiences or OBEs also have direct physiological correlates. Many of the reported experiences appear to arise from hypnagogic states, when a person is on the borderline of sleep or partially awakening from REM sleep, but are still in a state of sleep paralysis, leading to the impression of floating, while perceiving they are able to witness their body from a distance.

My most classic OBE was practicing for lucid dreaming by trying to look at the backs of my hands in a dream. Many times I had awakened realizing I had seen my hands in a dream, for example climbing ladders, and not registered. Eventually one night I looked at my hands in a dream and made the connection. This set off an immediate and powerful reaction. I found my consciousness split in three, one self was lucid dreaming, but lost in the dream universe. I looked up at the deep blue sky and realized it was not the ordinary sky of the waking world and no galaxy out there was the one I had come from. I became desperate to find my way back to life. I was standing in bright daylight on a promenade by the ocean. I saw a woman with dark eyes staring at me. I walked up to her, grabbed her by both shoulders and stared down deep into her dilated pupils, silently begging to know how to find the way back, but she just stepped back and shook her head smiling. No way back to Ixtlan! At the same moment a blast of sea breeze hit me. I was wearing a light Indian shirt and I could feel every one of the droplets of spray that hit me lucidly with crystal clarity. At the same time the gust was a force like a levitating tornado sending me shooting up faster and faster in some other space. However again at the same time, I realized I was bumping on the ceiling of my bedroom, reassuringly witnessing my body asleep in the bed below, saying to myself silently "It's all okay! You are down there sleeping peacefully on the bed!" Afterwards I realized all these experiences had started simultaneously and ended simultaneously. I had been in three places at once!

The brain is richly endowed with mirror neurons which are essential in our social function and cause us for example to get shivers down our spine when we see someone else get injured. Several studies, including under MRI brain scans, have confirmed that
the temporo-parietal junction, one of several regions involved in helping to integrate visual, tactile and proprioceptive senses with the signals from the inner ear that give us our sense of balance and spatial orientation has altered function when experiments are performed to simulate out of body experiences which are perceived to result in a full or partial OBE by the subject. Various forms of experiment where the subject receives tactile stroking while watching a mannequin which has camera-mounted eyes relayed to goggles worn by the subject can cause such brain areas to integrate these perceptions into an OBE (Ananthaswamy 2013).

We finally come to the physiology of NDEs or near death experiences. Many people undergoing cardiac arrest, suffering extreme trauma, such as a car accident, in which they have become comatose, or in drowning, report experiences involving one or more of a spiraling tunnel, often with light at the end, a sense of ‘telepathic’ communication with a higher conscious being, who may at the same time be themselves, a sense of leaving their body and perhaps seeing departed friends or relatives or seeing their own body being resuscitated, and a sense of being drawn back to life rather than departing to the realm of death, before coming back to consciousness. These experiences are often reported as life-changing and have become the subject of intense debate between people who believe it is evidence of a conscious afterlife and skeptics who see it as an hallucinatory physiological phenomenon. Some people have even reported seeing objects like shoes in inaccessible places which later proved to be there, stoking ideas that such experiences possess super-natural powers, however events of this type such as Maria’s NDE are so rare that there remain only a handful of such accounts. British psychiatrist Peter Fenwick who set up messages in inaccessible places to test this hypothesis in such patients has found no confirmation of the effect (Ebbern et al), nor has a review of research studies into NDEs (Mobbs and Watt).

Beauregard (2012) describes an iconic account concerning a woman who was operated on for a brain stem aneurism by being chilled to the point of cardiac arrest, her blood drained from her body to avoid a hemorrhage, and her EEG going into flat line for a full hour. She recalls floating out of the operating room and traveling down a tunnel with a light. She saw deceased relatives and friends, including her long-dead grandmother, waiting at the end of this tunnel. She entered the presence of a brilliant, wonderfully warm and loving light, and sensed that her soul was part of God and that everything in existence was created from the light (the breathing of God). But this extraordinary experience ended abruptly, as Reynolds’s deceased uncle led her back to her body—a feeling she described as “plunging into a pool of ice.”

The difficulty with assessing NDE reports is that they only come to light after the person regains consciousness, so we don’t really know exactly when they occurred or whether they occurred in the deepest phases of coma or in the transition zone back to consciousness. Under cardiac arrest the loss of blood rapidly causes the EEG to fall to a flat line. If consciousness is simply suspended at this point the subject might experience a continuous transition from the onset phase to the recovery phase accompanied by the NDE experience in transition, a little like the rebirth process in the Bardo Thodol or Tibetan Book of the Dead.

Significantly, both psychedelics and dissociatives induce experiences sharing many common key features with NDEs, including the tunnel, experience of clear light communion, out of body perceptions and a sense of transformative meaning. The work
of Griffiths et al shows the spiritual rejuvenation experienced by ordinary people under psilocybin is lasting and beneficial. Similar improvements have been found in the terminally ill. The fact that so many of the key elements are shared strongly indicates the NDE is a natural physiological manifestation of the way the brain processes consciousness under the kinds of close encounters with death we are dealing with, including any or all of deprivation of oxygen, or glucose, changes in neurotransmitters such as norepinephrine (Mobbs and Watt), and other stresses including those resulting in neuronal hyper-excitation.

Fig 3: The active EEG continues for 30 sec in ketamine anesthetized rats subjected to cardiac arrest. Gamma power (lower left) and coherence (lower right) become accentuated during this phase (Borjigin et al).

A key experiment in 2013 (Borjigin et al) studied rats with implanted electrodes placed under anesthesia using ketamine and then subjected to cardiac arrest intracardiac injection of potassium chloride solution. The recordings showed brain activity following cardiac arrest for around 30 secs with heightened gamma power and coherence implying the brain following cardiac arrest can indeed invoke the kind of active brain states humans claim to have experienced under such circumstances, laying to rest the notions that cardiac arrest is a flat-line state and that the NDE phenomenon is an artifact of other brain states during recovery. Of course the one compounding factor is that the rats were both on ketamine and under cardiac arrest adding insult to injury! In another study (Kroeger et al) after tiny bursts of activity we found in a heart patient put into flat-line to avoid brain damage in a heart attack, cats deeply anesthetized to flat line were found to have small spikes coming out of their hippocampal areas, suggesting low level decentralized brain activity (although not necessarily accompanied by consciousness persisted.

My most recent sacred mushroom experience came on with a symphony of shrilling vibrations that, as they overtake me, spiral me into the visions. It is a synesthesia, which is sensitive to my mental awareness, listening and looking, so I can enter the existential kaleidoscope and fall into the ‘other’ reality beyond. Visions come and go of impossible experiences I know I have had and witnessed first-hand yet know I could never have happened. As Maria Sabina says: "And you also see our past and our future, which are there together as a single thing already achieved, already happened . . . I saw stolen horses and buried cities, the existence of which was unknown, and they are going to be brought to light." Mushrooms have given me extraordinary visions whose significance I still ponder to this day. I had a horrific vision that my firstborn daughter would be doomed to an obstruction to her fertility. Then years later, her first offspring was born
with Downs syndrome. My impression from inside these experiences is that all conscious life is interconnected across space-time and that the sacred mushroom brings us closer to unraveling the bundle of life that locks us into our personal egos, so that for a minute, or an hour or two, we can see, through the disembodied eye, the way the universe perceives disincarnately and ever-compassionately of the mortal coil. It is a feeling that gives great reassurance to the travails of life. At the peak I feel as if I am suspended in a state of light-induced electrocution, searingly high and at the same time utterly pure. As I sit breathless in the living room, non-ordinary reality comes bursting out of my sub-conscious and across my peripheral vision so I feel as if I am simultaneously in about five places at once. Next morning I am fresh and clear in the sparkling sunshine. A new man in a world reborn with the youthful freshness of a new day, my creativity and sense of emergence rekindled. "But I, I am lord of two ways. I am master of up and down. I am as a man who is a new man, with new limbs and life, and the light of the Morning Star in his eyes." D H Laurence The Plumed Serpent.

After the first few minutes of my ketamine experience struggling not to swallow the bitter insufflated substance for fear of nausea, I realize I am entering a state of peace. The anesthetic effect is taking me deep into a reverie through what has become a kind of yogic breathing. I fall deeper into the dissociated state and I realize that it is an experience of simply awesome depth. A depth so inscrutable, you are touched by it, swept into silent awestruck oblivion - but still conscious - still there - still aware - somewhere in the aether, as the void breathes its delicate structured emptiness. I continue to recognize the depth and mystery of what I am witnessing. But then things take a more sinister turn. My mind is becoming memory-less. It's as if all my brain and memory circuits are reprogramming themselves and all the needles are beginning to point every which way. I know it's going to be alright, but it sure feels as if I am going to be stark staring mad forever. So I decide just to ride with the experience and then suddenly its as if the dials have connected to the master index of all my life experiences, and here they are, flashing before my eyes, just as they say about someone who is drowning, but its not just my life experiences, but the very peak experiences, like the chain of the Himalayas. I realize I am looking back down on them in the same way Moses might look down on his life and the life of everyone from the mountain top, and that all the experiences of my life are coming into one cosmic focus of meaning and destiny. At this point I suddenly realize that everything I have ever done and everything I will ever do has been brought to this very moment of truth and this very experience, and it is 'God', and my destiny coming to its true destination at this point, which is beyond time and space, coming from the very beginning, and for ever. I have this overpowering feeling of having been taken so far it is the full age of the universe and I have so far to get back to the land of the living. It is the same thing I have read about where one feels one is uniting with the universal self and could go with it or return to the incarnate world of individuals. But at the same time it is the universal mind coming to know and understand itself. At this point it seemed almost as if my life was now over. I had made the connection which gave my life its central meaning and though I might in future do nothing else and maybe I would never be able to come to this point again, my life had meaning in giving ultimate meaning to the totality witnessing and knowing itself.

Even though NDEs may be physiological, this does not mean these experiences are just hallucinatory, or in any sense unreal. On the contrary, dreaming experiences, and many psychedelic and dissociative experiences, as well as NDEs, share a fundamental feature that the subject experiences them as veridical realities that they have actually
seen in the same way as a waking person experiences the real world around them. They are not imagined, but perceived with the full integrity of perception of existential reality and occasionally do subsequently appear to correspond to physical events and realities.

We thus need to come to terms with a fundamental question: “What is the existential nature of conscious experience?” Is it merely an internal model of reality constructed by the brain, having no status above an epiphenomenon, a mere shadow constructed by a biological brain, or is it a fundamental component of the cosmology of the conscious universe?

**Subjective Consciousness – What are Mental States For?**

Subjective consciousness poses the deepest dilemma for the scientific description of reality. While we have discovered the Higgs boson and are tantalizingly close to decoding the theory of everything orchestrating both large-scale cosmology and the fundamental forces of nature and have decoded the human genome and the molecular basis of biological organisms, we still have no idea of how the brain generates subjective consciousness, or even how or why such an elusive phenomenon can come about from the physiology of brain dynamics.

The problem is absolutely fundamental because, from birth to death, the sum total of all our observations of the physical world and all our notions about it come exclusively through our subjective conscious experiences. Although neuroscience has produced many new exciting techniques for visualizing brain function, from EEG and MEG to PET and fMRI scans, which show a deep parallel relationship between mental states and specific modalities of brain processes, these go no way in themselves to solving the so-called ‘hard problem of consciousness research’ – how these purely objective physiological processes give rise to the subjective effects of our conscious experiences. Philosopher Jerry Fodor famously complained that: “Nobody has the slightest idea how anything material could be conscious. Nobody even knows what it would be like to have the slightest idea about how anything material could be conscious” (Deacon).

![Fig 3: Existential reality presents as a complementatory paradox. While we acknowledge our subjective consciousness is somehow a product of our biological brain, which is in turn a fragile product of physical forces on a cosmological scale, all our experiences of reality, including our perceptions of the physical world, as well as dreams memories and reflections, come exclusively and totally from our subjective consciousness. This suggests that existential cosmology is a complementarity between subjective consciousness and the physical universe, in which both are fundamental.](image)

Although, from a commonsense point of view, we are forced to acknowledge that our conscious life is dependent on or fragile biological brain and that we will pass out and lose consciousness if we are struck on the head or sever our blood supply, really all our experiences of the physical world come as consensual subjective conscious experiences of the world shared by sentient beings.
Indian philosophy declares that consciousness is more fundamental than the grosser accumulations of physical matter, essentially because it is only through subjective consciousness that the physical universe becomes manifest.

This leads to another critical question: “Why did nervous systems evolve subjective consciousness?” If nervous systems are able to fully provide adaptive solutions simply as heuristic computers, there is no role for extraneous brain functions that simply add a subjective shadow reality with no adaptive function and presumably a physiological cost. A digital computer is a purely functional entity, even when processing probabilistic optimizations, so has no role for a subjective aspect, no matter how complex it becomes.

The fact that animals share physiological properties, which, in humans, are accompanied by subjective consciousness, implies that subjectivity is a critical survival attribute, which has been reinforced by natural selection. Its key role has to be anticipating threats to survival and key strategic advantages. Problems of strategic decision-making in the open environment are notorious for being computationally intractable because of super-exponential runaway in calculation times, as exemplified in the traveling salesman problem, whose calculation time grows with the factorial of the number of cities involved.

All animal nervous systems appear to work on a common basis of edge-of-chaos excitation that arose in excitable single cells before multi-celled organisms evolved. Vertebrate brains have a common mechanism of massive parallel processing using wave phase coherence to distinguish ground noise from attended signal, accompanied by transitions from the edge of chaos to an ordered outcome, in diametric opposition to the ordered serial and digital processing of classical computers.

Fig 4: In the veridical way existential reality is generated, subjective experience is primary. In the consensual overlap of our subjective experiences we gain a common experience of the physical world, which we then interpret as containing biological brains, which may also be able to have subjective experiences. However, attempted construction of reality from the physical universe and its brains remains incomplete because there is no explanation of how the brains can also have subjective conscious experiences – the hard problem of consciousness research.

The organization of the cerebral cortex and its underlying structures, consist of a series of microcolumns acting as parallel processing units for an envelope of featural characteristics, from the focal line orientation and binocular dominance of visual processing and tonotopic processing of sounds through somato-sensory and emotional representations, including those of the body, to abstract spatial, temporal and semantic features, leading to the strategic executive modules of the prefrontal cortex and our life aims and thought processes. Attempts to find the functional locus of subjective
consciousness in brain regions have arrived at the conclusion that active conscious experiences are not generated in a specific cortical region but are a product of integrated coherent activity of global cortical dynamics, in which the cortical modules we see activated in brain scans correspond to the salient features of conscious experience we witness subjectively.

This implies that the so-called Cartesian theatre of consciousness is a product of the entire active cortex and that the particular form of phase coherent, edge-of-chaos processing adopted by the mammalian brain is responsible for the manifestation of subjective experience. This allows for a theory of consciousness in which preconscious processing e.g. of sensory information can occur in specific brain areas which then reaches the conscious only when these enter into a wave synchronous neuronal activity integrating the processing. Three regions associated with global workspace have been identified as key participants in these higher integrative functions, the thalamus which is a critical set of relay centres underlying all cortical areas and possibly driving the active EEG, the lateral prefrontal and the posterior parietal (Bor).

Baars’ global workspace approach (1997, 2001) suggests that consciousness is associated with the whole brain in integrated correlated activity and is thus a property of the brain as a whole functioning entity rather than a product of some specific area, or system, such as the supplementary motor cortex (Eccles, Fried et al, Haggard). Furthermore, the approach rather neatly identifies the distinction between unconscious processing and conscious experience in terms of whether the dynamic is confined to local or regional activity or is part of an integrated coherent global response. It is also consistent with there being broadly only one dominant stream of conscious thought and experience at a given time, as diverse forms of local processing gives way to an integrated global response. A series of experiments, many by teams working with Stanislas Dehaene, involving perceptual masking of brief stimuli to inhibit their entry into conscious perception (Sergent et al, Sigman and Dehaene 2005, 2006, Dehaene and Changeux, Del Cul et al 2007, 2009, Gaillard et al), studies of pathological conditions such as multiple sclerosis (Reuter et al, Schnakers), and brief episodes in which direct cortical electrodes are being used during operations for intractable epilepsy (Quiroga et al) have tended to confirm the overall features of Baars’ model of consciousness based on the global work space (Ananthaswamy 2009, 2010). EEG studies also show that under diverse anesthetics, as consciousness fades, there is a loss of synchrony between different areas of the cortex (Alkiire et al). The theory also tallies with Tononi’s idea of phi, a function of integrated complexity used as a measure of consciousness (Barras, Pagel).

Although subjective consciousness involves the entire cortex in coherent activation, brain scans highlight certain areas of pivotal importance, whose disruption can impede active consciousness. These include prefrontal cortex executive functions, spatial integration in the parietal, and the central information pathways of the thalamus.

When we turn to self-consciousness, and the ongoing notion of ‘self’, which is the shadowy actor-agent behind all the manifestations of conscious states, we find a close association between the default circuit activated in idle periods, believed to be adaptively envisaging future challenges, and brain regions involved in our sense of self.

These include the medial prefrontal cortex and the cingulate cortex and neighbouring
precuneus. The default network encompasses posterior-cingulate/precuneus, anterior cingulate/mesiofrontal cortex and temporo-parietal junctions, several of which have key integrating functions.

The ventral medial prefrontal (Macrae et al.) is implicated in processing risk and fear. It also plays a role in the inhibition of emotional responses, and in the process of decision-making. It has been shown to be active when experimental subjects are shown experiences which they think apply to themselves. The changes in Phineas Gage when a tamping iron destroyed his left prefrontal lobe (O'Driscoll & Leach), leading to him becoming a side-show attraction, show how such damage can lead to subtle changes of personality and difficulty in making constructive life decisions, even when localized prefrontal damage does not significantly affect classical IQ tests.

The precuneus (Cavanna & Trimble) is involved with episodic memory, visuospatial processing, reflections upon self, and aspects of consciousness. Adolescents have the same activations as adults in the medial prefrontal when they think about themselves, but less in the precuneus than if they were thinking about a third party, suggesting their theory of mind/self is active but still under development (Zimmer).

The insulae are also believed to be involved in consciousness and play a role in diverse functions usually linked to emotion and the regulation of the body's homeostasis, including perception, motor control, self-awareness, cognitive functioning, and interpersonal experience. The anterior insula is activated in subjects who are shown pictures of their own faces, or who are identifying their own memories, and uniquely in a woman subject who experiences watching other people being touched, as if she herself is being touched, suggesting it plays a critical role in the sense of self. The temporo-parietal junction is known to play a crucial role in self-other distinction and theory of mind. Damage to this area, or electrical stimulation of it, has been implicated in producing OBEs.

The mind is naturally partitioned between features we usually assign to be external, such as visual and auditory, and those that usually function as part of our bodily sensations and reactions, such as somatosensory, emotional and motor – those we associate with ‘self’. Self also has a specific relationship with voluntary motor activity. All
intentional actions lead both to direct motor outputs and to systems that monitor these actions so we have an integrated sensory-motor experience of action.

Nevertheless the relationship of ‘self’ and our body image can become dissociated in bizarre and disquieting ways, which show us that the ‘self’ is very much a dynamic representation in the brain. Amputees sometimes suffer a phantom limb, feeling a limb is still sometimes painfully present, possibly due to new circuits invading the brain areas that previously served the limb. Conversely, people with body integrity identity disorder and xenomelia seek to cut their limbs off because of the oppressive feeling that one or more limbs of one's body do not belong to one's self. Again this may have a physiological basis in cerebral anomalies in the body image map. An even more convoluted form of ‘self’ dissociation, apotemnophilia, involves sexual arousal based on the fantasy of becoming an amputee. Schizophrenics likewise can become catatonic and refuse to move, believing their limbs are under the control of unseen forces and people with certain forms of cortical injury suffering hemispatial neglect refuse to recognize that one side of their body is their own and, depending on the extent of damage, may completely neglect the left-hand side of their entire sensory and attentional left field without even recognizing half of reality is missing.

We have seen already that OBEs are a function of changes in the way we integrate experiences, and that OBEs can be induced by tricking the brain into perceiving an external sensation as being part of ‘self’, e.g. through combining visual experience of another person being touched with somatosensory impressions of being stroked.

![Fig 6: Top right: Activation of left frontal and right parietal areas involving mirror neuron activity (Iacoboni). A set of brain areas to do with both empathy and one’s reactions and behavior in relation to others associated with ‘reading the minds’ of others (Motluk) has been discovered in the form of ‘mirror neurons’ which, although they may be in areas we usually associate with motor function, intentional action or even the expression of language, contain a population of neurons which react in the same way when the same action is being performed by another individual. Lower right: Response to an unpleasant experience, in the amygdala, differs between men, who respond in the right amygdala and are drawn to central features, and women who respond in the left amygdala and remember more of the context (Cahill). Left: Forms of hemispatial neglect.](image-url)
In a more general way we can see that the nature of ‘self’ and hence of self-consciousness is both a function of social interactions with others (Bond), and is also a ‘sense’ we attribute to others, both in terms of our mirror neurons, which provide direct sensations of what others might be feeling, and in terms of our intuitive assessment of others ‘self’-assumptions. Social emotions such as admiration or compassion, which result from a focus on the behaviour of others, tend to activate the posteromedial cortices, important in constructing our sense of self (Immordino-Yang et al.), something Antonio Damasio calls the “social self”. One can thus see that our personal idea of self is part of a larger adaptive strategy – an intuitive ‘theory of mind’ to understand self-organized behavior in others, something essential for our social survival. People can sustain up to five or six successive layers of indirected attribution of mind - “I think that he believed she was intending to go to the movies with him” - similar to their digit span.

This social idea of ‘self’ also shows differences across cultures (Brealey). Researchers examining autobiographical memory, have found Chinese people's recollections are more likely to focus on moments of social or historical significance, whereas people in Western countries focus on personal interest and achievement. This is similar to the sex differences in response to an unpleasant experience in the amygdala, which differs between men, who respond in the right amygdala and are drawn to central features, and women who respond in the left amygdala and remember more of the context (Cahill). Both these show us that the 'geography of the self' varies from culture to culture just as it does between the sexes. Intriguingly, babies as young as seven to fifteen months appear to be able to intuitively sense false beliefs in others, suggesting this kind of circuitry has an innate basis (Onishi & Baillargeon, Kovàcs et al.).

Research is now beginning to suggest there may be two forms of ‘theory of mind’, one fast and intuitive, developing almost from birth, and the other more complex and based on using experiences in life to provide more finely attuned adaptive responses (Weir). People diagnosed with Asperger's syndrome, a high-functioning form of autism, show they have the explicit system, yet they fail at non-verbal tests of the kind that reveal implicit theory of mind (Senju et al.). Evidence for a social theory of mind is also reflected in the relationship between social network size, orbital-prefrontal cortex volume and theory of mind performance (Powell et al.). Studies using transcranial magnetic stimulation implicate the right temporo-parietal junction in enabling mental states perceived in others to participate in making moral judgments (Young et al.). A study of people with right parietal damage likewise found them to have enhanced spirituality consistent with a cortical lateralization notion of the right parietal dealing with ‘self’ and the left with ‘other’, with decreased right function leading to ‘self-transcendence’ (Johnstone & Bodling).

We thus come full circle to the dual problems of space-time anticipation and the notion of ‘free-will’ – can subjective conscious experiences actually lead to changes in physical outcomes by affecting the outcome of our biological brain states?

Many scientists tend to a classical view of physics and a reductionistic assumption that all human activity must be a product of brain function alone and that any notion of free will, in which subjective consciousness can act to induce a change in outcomes of objective brain states is delusory. This flies in direct contradiction to our subjective feelings that we are autonomous beings with voluntary control over our fates. To claim
otherwise in all honesty leads to a catatonic outcome where no purely conscious volition can lead in any way to an active brain state of any form of behavior. It also contradicts the assumptions of legal accountability, where we assume a person of sound mind is responsible for the consequences of their consciously intentional actions.

The classical way around this impasse is then to claim that the subjective impression of voluntary autonomy is a kind of delusion necessary for an organism to maintain an active life in adaptive survival, but this itself is a contradiction, because it assumes subjective consciousness does have an adaptive advantage of some kind.

Many physicists, from Arthur Eddington’s citation of the uncertainty of position of a synaptic vesicle in relation to the thickness of the membrane on, have drawn attention to the fact that the quantum universe is not deterministic in the manner of classical Laplacian causality and that quantum uncertainty provides a causal loophole, which might make it possible for free will to coexist in the quantum universe. This in turn has led to opposing pleas from classical reductionists that the law of mass action would condemn any fluctuations at the quantum level to become swamped and that no quantum effects can possibly interfere in the cellular level processes of neurodynamics. This position is obtuse and incorrect.

Biology is full of phenomena at the quantum level, which, far from being swamped by mass action, are essential to biological function. Enzymes invoke quantum tunneling to enable transitions through their activation barrier. Protein folding is likewise an effective manifestation of quantum computation intractable by classical computing. When a photosynthetic active centre absorbs a photon, the wave function of the excitation is able to perform a quantum computation, which enables the excitation to travel down the most efficient route to reach the chemical reaction site (McAlpine, Hildne et al). Quantum entanglement is believed to be behind the way some birds navigate in the magnetic field. Light excites two electrons on one molecule and shunts one of them onto a second molecule. Their spins are linked through quantum entanglement. Before they relax into a decoherent state, the Earth’s magnetic field can alter the relative alignment of the electrons’ spins, which in turn alters the chemical properties of the molecules involved (Amit, Courtland). Quantum coherence is an established technique in tissue imaging, demonstrating an example of quantum entanglement in biological tissues at the molecular level (Samuel, Warren).

Although many processes in the brain need to be resilient to quantum noise, in the event of a critically poised dynamic in which there is no stable determining outcome, known brain processes, from chaotic sensitivity, through and the amplifying effects of chandelier cells, to stochastic resonance are able to amplify fluctuations at the quantum-molecular level to the neuronal and ultimately to a global change in the dynamics (King). Hence a change of a single ion channel can lead to threshold activation of a hippocampal neuron and in turn to a change in global brain activity.

Karl Pribram the founder of the idea of the holographic brain has drawn attention to the suggestive similarity between phase coherence processing of brain waves in the gamma frequency range believed to be responsible for cognitive processes and the wave amplitude basis of quantum uncertainty in reduction of the wave packet and quantum measurements based on the uncertainty relation $\Delta E \Delta t = h$, where the relation is determined by the number of phase fronts to be counted (see fig 8). This raises an
interesting spectre, that the evolution of nervous systems has arrived at a neurodynamic process forming a model of the quantum processes at the foundation of physics, suggesting that quantum entanglement in brain states may be a basis for active biological anticipation of immediate threats to survival through the forms of subjective consciousness the brain generates.

To get an idea of what this advantage might be, we need to examine more closely the kinds of survival situation that are pivotal to organisms in the open environment and the sorts of computational dilemmas involved in decision-making processes on which survival depends.

Several researchers have highlighted various aspects of consciousness in an attempt to understand how it evolved (Wilson). For example higher integrative processing associated with global workspace has been extended to a few other animals such as apes and dolphins. Another strand suggests that making integrative decisions socially would have aided better environmental decision-making concerning hard to discern situations involving the combined senses (Bahrami et al). However both these ideas pertain to integrative capacities of brain processing and don’t provide any direct explanation of why consciousness also evokes the Cartesian theatre of subjective experience. We need to try to unravel the much harder problem of why subjective experience occurs at all, even in a parallel integrative brain.

Open environment problems of survival are intractable not just because they involve super-exponentiating contingent factors which would leave a digital antelope stranded at the crossroads until pounced upon by a predator, but because they are prone to irresolvable structural instabilities, which defy a stable probabilistic outcome.

Fig 7: Decision-making in the open environment involves computationally intractable problems, which cannot necessarily be solved by probabilities alone. Which path should we take to the water hole today? There could be a tiger on the shady path or a lion on the stony path. Both of these animals are also trying to out-maneouvre us by changing their decision-making.

Suppose a gazelle is trying to get to the waterhole along various paths. On a probability basis it is bound to choose the path, which, from its past experience, it perceives to be the least likely to have a predator, i.e. the ‘safest’. But the predator is likewise going to make a probabilistic calculation to choose the path that the prey is most likely to be on i.e. the same one. Ultimately this is an unstable problem that has no consistent computational solution.

There is a deeper issue in these types of situation. Probabilistic calculations, both in the
real world and in quantum mechanics, require the context to be repeated to build up a statistical distribution. In an interference experiment we get the bands of light and dark color representing the wave amplitudes as probability distributions of photons on the photographic plate only when a significant number have passed through the apparatus in the same configuration (see fig 8). The same is true for estimating a probabilistically most viable route to the waterhole. But real life problems are plagued by the fact that both living organisms and evolution itself are processes in which the context is endlessly being changed by the decision-making processes. Repetition occurs only in the most abstract sense, which is one reason why the massively parallel brains we have are so good at such problems.

Finally, in many real life situations, there is not one optimal outcome but a whole series of possible choices any or all of which could lead either to death or survival and reproduction. A central enigma of quantum reality is the Schrödinger cat paradox, in which a cat set to be killed by a radioactive scintillation in quantum reality is both alive and dead with differing probabilities, but in our subjective experience, when we open the box the cat is either alive or dead with certainty. This is the renowned problem of the causality-violating reduction of the wave packet.

Come back for a minute to the animal tracing a path to the waterhole. Animals and even people are quite lousy computers with a digit span of only six or seven and a calculation capacity little better than a pocket calculator. We all know what we do and what conscious animals do in this situation. They look at the paths forward. If they have had a bad experience on one they will probably avoid it, but otherwise they will try to assess how risky each looks and make a decision on intuitive hunch to follow one or the other, depending on how thirsty and desperate, or distractedly oblivious they have become by the sunlight and green shoots in the glade.

In a sense, all their previous life experience is being neatly summed up in their parallel processing awareness and their semantic and episodic memory, but the real role of consciousness is to keep watch on the unfolding living environment, to be paranoid to hair-trigger sensitivity for any hint of a movement or the signs or sound of a pouncing predator. The absolutely critical point here is that their consciousness is providing something completely different from a computational algorithm, it is a form of real time anticipation of threats and survival that is sensitively dependent on environmental perturbation and attuned to be anticipatory in real time just sufficiently to jump out of the way and bolt for it and survive. So the key role of subjective consciousness is an integrated ‘holographic’ form of space-time anticipation.

How could this come about? One way is by quantum entanglement. In quantum mechanics, not only are all probability paths traced in the wave function, but past and future are interconnected in a time-symmetric hand-shaking relationship, so that the final states of an entangled pair on absorption are determining boundary conditions for the interaction just as the initial states that created them are. Thus when an entangled pair are created, each knows instantaneously the state of the other and if one is found to be in a given state, the other is immediately in the complementary state no matter how far away it is in space-time. This is the ‘spooky action at a distance’, which Einstein feared because it violates local Einsteinian causality. The transactional interpretation of quantum mechanics expresses this relationship nicely in terms of offer waves from the past emitter and confirmation waves from the eventual absorbers, whose wave
interference becomes the single or entangled particles passing between.

The brain explores ongoing situations which have no deductive solution, by evoking an edge-of-chaos global entangled state which, when it does collapse, results in the ‘aha’ of insight learning, but otherwise remains sensitively tuned for anticipating any signs of danger. This is pretty much how we do experience waking consciousness.

Fig 8: (1) Schrödinger cat experiment has a cat in a box with a radioactive scintillation counter, which works by quantum tunneling out of the nucleus triggering a hammer to smash a cyanide flask pronouncing a cat alive and dead with differing probabilities according to the tunneling wave function of the nucleus potential well. However we find the cat is either alive or dead with certainty. (2) The uncertainty relation $\Delta E \Delta t \geq h/2\pi$ is derived directly from the counting of wave coherence beats, since energy is related to frequency by $E = h \nu$ and $\Delta t \approx 1/\Delta \nu$. (3) Quantum interference experiment shows wave-particle complementarity and reduction of the wave packet occurs statistically according to the amplitude of the wave function (right) although the wave-particle reduction of individual quanta (left) is unpredictable. (4) Wheeler delayed choice shows time reversed boundary condition. A cosmic scale version of the interference experiment using galactic gravitational lensing can be adjusted at the detector after the photons have traversed space to either sample a particle going one way round, or a wave interference going both ways. (5) The transactional interpretation visualizes an exchanged particle wave function as the interference of a retarded usual time direction offer wave and a time-reversed advanced confirmation wave. (6) Time symmetric interactions also occur in quantum field theories where special relativity allows both advanced and retarded solutions because of the energy relation $E = \pm \sqrt{p^2 + m^2}$. (a,b) Virtual photons and electron-positron pairs deflecting an electron in quantum electrodynamics. Since the photon is its own anti-particle, a negative energy photon traveling backwards in time is precisely a positive energy one traveling forwards. (c) weak force exchange (d) An electron scattering backwards in time is the same as positron creation-annihilation.

The key thing about quantum entanglement is that it cannot be used to make classical causal predictions, which would formally anticipate a future event, so the hand-shaking is only good so long as we maintain an entangled state. This suggests that the brain may use its brain waves and phase coherence to evoke entangled states that carry quantum encrypted information about immediate future states of experience as well as
immediately past states, in a kind of quantum ‘present’ which we witness as subjective experience encoded through the parallel feature envelope of the cerebral cortex. The idea then is that this provides an intuitive form of anticipation which cannot however be crystallized into a fully causal classical prediction algorithm because it would collapse the entanglement to do so.

But there is more to this cat paradox situation. In the quantum universe we have multiverses. Quantum mechanics appears to preserve all the conceivable outcomes in parallel so that, not only is Schrödinger’s cat both alive and dead, but Napoleon has both won and lost the battle of Waterloo. Many of these strategic outcomes, indeed all the accidents of history, depend on uncertainties that go in principle right down to the quantum level.

There is continuing debate among physicists about how and where in the causal chain, reduction of the wave packet actually occurs. While decoherence theories suggest this may occur simply through interaction of single or entangled states with other particles. e.g. in the experimental apparatus, in a fundamental sense the wave function of the entire universe appears to one single multi-particle entangled state and so the whole notion of a single line of history unfolding seems to be something only our conscious awareness is able to determine. Several of the founding quantum physicists adhered to this view. John von Neumann suggested that quantum observation is the action of a conscious mind. That argument relies on the view that there is something special about consciousness, especially human consciousness. Von Neumann argued that everything in the universe that is subject to the laws of quantum physics creates one vast quantum superposition. But the conscious mind is somehow different. It is thus able to select out one of the quantum possibilities on offer, making it real - to that mind, at least. Max Planck, the founder of quantum theory, said in 1931, "I regard consciousness as fundamental. I regard matter as derivative from consciousness." Werner Heisenberg also maintained that wave function collapse—the destruction of quantum superposition—occurs when the result of a measurement is registered in the mind of an observer. In Henry Stapp's words we are "participating observers" whose minds cause the collapse of superpositions. “Before human consciousness appeared, there existed a multiverse of potential universes. The emergence of a conscious mind in one of these potential universes, ours, gives it a special status: reality” (Brooks). This is effectively a complement to the anthropic principle of physical cosmology in which conscious observers are selective boundary conditions on the laws of nature in the universe (Barrow and Tipler).

Thus another idea of the role of subjective consciousness is that it is a way the universe can solve the super-abundance of multiverses to bring about a natural universe in which some things do happen and other things don’t. One of the most central experiences of our transient mortal lives is that there is a line of actual history in which each of us, however small and insignificant our lives, are participating in bringing the world into actual being, albeit sometimes somewhat diabolically in times of selfishness and exploitation, but with some reflection on our own transience, perhaps reaching towards a more enlightened existence, in which the passage of the generations is able to reach towards a blessed state where the universe comes to consciously understand itself ever more deeply and completely.

This brings us to a nub question: “Can consciousness anticipate physical reality, let
Can Consciousness Anticipate Physical Reality?

Many aspects of brain function display dynamic features, which show the brain is focused on attempting to anticipate ongoing events. When a cat is dropped into unfamiliar territory the pyramidal cells in its hippocampus become desynchronized and hunt chaotically, in what is called the orienting reaction, until the animal discovers where it is or gains familiarity with its environment, when phase synchronization ensues. In a similar manner the EEG will show a desynchronized pattern when a subject is listening for a sound which is irregularly spaced, but will fall into a synchronized pattern if the stimuli are regularly placed in such a manner that the subject can confidently anticipate when the next sound is going to occur.

This kind of processing is consistent with a computational process involving transitions from chaos to order. The chaotic regime acts both to provide sensitive dependence on any changes in boundary conditions such as sensory or cognitive inputs at the same time as preventing the dynamical system getting caught in a suboptimal state, by providing sufficient energy to cause the process to fully explore the space of dynamical solutions. Artificial neural net annealing and quantum annealing both follow similar paradigms using random fluctuations and uncertainty to achieve a similar global optimization. Such a dynamic also allows for ordered deductive computation, but enables the system to evolve chaotically when the ordered process fails to arrive at a computational solution.

Closed quantum systems display various forms of suppression of classical chaos, essentially because spreading wave packets, unlike point particles are extended in space and can overlap one another to form periodic solutions even when their trajectories are divergently unstable, ultimately leading to regular periodic outcomes. However open quantum systems are not subject to this kind of suppression to the same degree. An indication of how quantum chaos might lead to complex forms of quantum entanglement can be gleaned from an ingenious experiment forming a quantum analogue of a chaotic kicked top, using an ultra-cold cesium atom kicked by both a laser pulse and held in a magnetic field. In configurations where the classical dynamic is ordered, entropy of the system is reduced and there is no quantum entanglement between the orbital and nuclear spin of the atom, however in the chaotic region, orbital and nuclear spins have become entangled (Chaudry et al, Steck). Thus to the extent that phase coherence in brain processing is modeled on quantum wave functions, transitions into chaos correspond to the formation of more complex interactive forms of entanglement and transitions out of chaos into order correspond to the collapse of more complex entangled systems into a simpler coherent system. But does any of this mean that such entanglement could be used in any form of direct space-time anticipation?

Contrary to this idea, a critical historical experiment suggested that, far from anticipating reality in real time, conscious awareness of a decision may actually lag behind unconscious brain processing which is already leading to the decision, although being placed by subjective experience at the time the conscious decision was made. In 1983, neuroscientist Benjamin Libet asked volunteers wearing scalp electrodes to flex a finger or wrist. When they did, the movements were preceded by a dip in the signals being recorded, called the "readiness potential". Libet interpreted this RP as the brain
preparing for movement. Crucially, the RP came a few tenths of a second before the volunteers said they had decided to move. Libet concluded that unconscious neural processes determine our actions before we are ever aware of making a decision. Since then, others have quoted the experiment as evidence that free will is an illusion – a conclusion that was always controversial, particularly as there is no proof the RP represents a decision to move.

With contemporary brain scanning technology, Soon et al in 2008 were able to predict with 60% accuracy whether subjects would press a button with their left or right hand up to 10 seconds before the subject became aware of having made that choice. This doesn't of itself negate conscious willing because these prefrontal and parietal patterns of activation merely indicate a process is in play, which may become consciously invoked at the time of the decision, and clearly many subjects (40% of trials) were in fact making a contrary decision. Neuroscientist John-Dylan Haynes, who led the study, agrees: "I wouldn't interpret these early signals as an 'unconscious decision'," he says. "I would think of it more like an unconscious bias of a later decision" (Williams).

The assumption that Libet's RP is in fact a subconscious decision has been undermined by subsequent studies. Instead of letting volunteers decide when to move, Miller and Trevena asked them to wait for an audio tone before deciding whether to tap a key. If Libet's interpretation were correct, the RP should be greater after the tone when a person chose to tap the key. While there was an RP before volunteers made their decision to move, the signal was the same whether or not they elected to tap. Miller concludes that the RP may merely be a sign that the brain is paying attention and does not indicate that a decision has been made. They also failed to find evidence of subconscious decision-making in a second experiment. This time they asked volunteers to press a key after the tone, but to decide on the spot whether to use their left or right hand. As movement in the right limb is related to the brain signals in the left hemisphere and vice versa, they reasoned that if an unconscious process is driving this decision, where it occurs in the brain should depend on which hand is chosen. But they found no such correlation.

Schurger and colleagues have elucidated an explanation. Previous studies have shown that when we have to make a decision based on sensory input, assemblies of neurons start accumulating evidence in favour of the various possible outcomes. A decision is triggered when the evidence favouring one particular outcome becomes strong enough to tip its associated assembly of neurons across a threshold. The team hypothesized that a similar process happens in the brain during the Libet experiment. They reasoned that movement is triggered when this neural noise generated by random or chaotic activity accumulates and crosses a threshold. The team repeated Libet's experiment, but this time if, while waiting to act spontaneously, the volunteers heard a click they had to act immediately. The researchers predicted that the fastest response to the click would be seen in those in whom the accumulation of neural noise had neared the threshold – something that would show up in their EEG as a readiness potential. In those with slower responses to the click, the readiness potential was indeed absent in the EEG recordings. "We argue that what looks like a pre-conscious decision process may not in fact reflect a decision at all. It only looks that way because of the nature of spontaneous brain activity."

Both these newer studies thus cast serious doubt on Libet's claim that a conscious
decision is made after the brain has already put the decision in motion, leaving open the possibility that conscious decisions are actually made in real time.

Some aspects of our conscious experience of the world make it possible for the brain to sometimes construct a present that has never actually occurred. In the "flash-lag" illusion, a screen displays a rotating disc with an arrow on it, pointing outwards. Next to the disc is a spot of light that is programmed to flash at the exact moment the spinning arrow passes it. Instead, to our experience, the flash lags behind, apparently occurring after the arrow has passed (Westerhoff). One explanation is that our brain extrapolates into the future, making up for visual processing time by predicting where the arrow will be, however rather than extrapolating into the future, our brain is actually interpolating events in the past, assembling a story of what happened retrospectively, as was shown by a subtle variant of the illusion (Eagleman and Sejnowski). If the brain were predicting the spinning arrow's trajectory, people would see the lag even if the arrow stopped at the exact moment it was pointing at the spot. But in this case the lag does not occur. What's more, if the arrow starts stationary and moves in either direction immediately after the flash, the movement is perceived before the flash. How can the brain predict the direction of movement if it doesn't start until after the flash? The perception of what is happening at the moment of the flash is determined by what happens to the disc after it. This seems paradoxical, but other tests have confirmed that what is perceived to have occurred at a certain time can be influenced by what happens later.

This again does not show that the brain is unable to anticipate reality because it applies only to very short time interval spatial reconstructions by the brain, which would naturally be more accurate by retrospective interpolation.

To fathom situations where real time anticipation may have occurred without any prevailing causal implication leading up to it, we need to turn to rare instances of prescience with no reasonable prior cause. These kinds of events tend to be rare and often apocryphal and lack independent corroboration, like stories of telepathic connection or the sense of foreboding that a relative has died, which later receives confirmation. Paradoxically some of the most outstanding examples can come from alleged precognitive dreaming rather than the waking state, which tends to be more circumscribed by commonsense everyday affairs.

As a student, I picked up and read “An Experiment with Time” by J W Dunne, which outlined some double blind experiments in which the author claimed that dream diaries led to as many accounts linking to future events in the people’s lives as they did to past experiences. Finding this less than convincing given my scientific outlook, a few weeks later I had a horrific double nightmare that I was being agonizingly stung. In the dream it was a spider which I couldn’t remove because it would leave poison fangs inside me and in the second dream it had returned to sting me again when I was distracted as one often does in dreams. At eight in the morning my wife awoke to breastfeed our infant daughter and I recounted the nightmares in detail to her complaining about their painful intensity before falling asleep again. About an hour later I was stung wide awake by a wasp which had flown in the window my wife had opened after getting up and crawled into the bed. Suddenly the dream I had not only experienced but had emphatically recorded to my wife had become an unbearable reality. Now I know that a skeptic would interpret this as a mere coincidence, whatever that means in the quantum universe, merely an application of Bayes theorem of conditional probabilities, but the power and
pain of it drove home to me irreversibly that dreaming, and by implication waking experiences too, have implications violating Laplacian causality in just the way that reduction of the wave packet does for quantum mechanics. The fact that it closely followed on reading the book gave this prescience an added dimension, capped by the fact that the scientist providing an introduction to the work was none other than Arthur Eddington who had suggested quantum uncertainty of the synaptic vesicle as a basis for free will.

This raises a series of questions about coincidence generally and Carl Jung’s notion of synchronicity, the idea that seemingly unrelated events and experiences may be caught up in a deeper correspondence as reminiscent of quantum entanglement as phase coherence brain processing appears to be. Again, just as quantum entanglement, although making space-time correlations violating local Einsteinian causality, does not allow us to make classical predictions about future states, so this kind of event cannot be classically proved to be prescient nor can one expect or hope to demonstrate it on a replicable basis, nevertheless many people’s accounts attest to a currency of such prescience.

Fig 9: Above: Extracts from the lyrics posting of 20th July 2001. Below: Passing to the other side and falling in flames, The Mayor of New York saying “This is more than we can bear”.

A month before the twin towers fell in New York I wrote a song and fortuitously posted the lyrics online. They contained several prescient lines, including “We’ll fly so high well pass right to the other side and never fall in flames again” then I watched live in prescient horror as one of the two planes struck the tower and passed right through, coming out in a burst of flames on the other side (http://youtu.be/SPNTBa748Pg). My mother often used to say when I called her, “I was just thinking of you” and the phone rang! Again a skeptic would say: “Your mother is always thinking of her son”. But this fails to address the critical question all shamanic practitioners have to answer. When curing a sick person, it is not to explain why the person has contracted tuberculosis or leprosy i.e. that the respective bacteria are infectious, but why did this person catch it at this particular time. This is the kind of universal entanglement that may have resulted in the evolution of brain entanglement and subjective consciousness to deal with it.

Scientific studies with precognition have had mixed results. Darryl Bem and coworkers (2011) reported precognitive effects in linked subjects, creating a stir in the academic community, but four later studies, three of which were reported together (French Ritchie,
Wiseman, French 2012) failed to replicate these results, emphasizing the ephemeral nature of scientific research in this area.

Telepathy, like prescience, is a phenomenon that has an elusive presence in human anecdotal accounts, which are difficult to replicate reliably at above chance levels, leading some to conclude it is another example of Bayes theorem on conditional probabilities where there is mental bias towards affirmation of a sporadic phenomenon, due to counting only the wins. "I was just thinking of you when you called" as my mother used to say.

Many cultures report accounts where individuals are intuitively aware of a relative for example having passed away. The space and time-spanning nature of the Aboriginal dreamtime and the shamanic world view generally, represent perspectives in which such mental connections can be perceived as intrinsic.

On my first sabbatical, while in London, I had a transient relationship with an ex-student of mine. After a few weeks we parted ways, heading in different directions around the planet - she heading East through Europe, while I flew West to the US. Several months later, back in the antipodes, I was at an evening performance and suddenly had the most uncanny sensation that she was somehow present right there in the room. This caused me to turn around 180 degrees and there she was directly behind me. Key here is the complete separation of two parties who have become intuitively acquainted and make no further contact until the event occurs leaving the mind clear of confounding stimuli, but it could also be regarded as a case of precognition rather than telepathy.

Alexandra David-Neel, reported the technique of mutual meditation with implied telepathic contact, which she first witnessed in the communication between a disciple and his Lama guru (Foster & Foster 1998): "The Gomchen and Alexandra would sit together in silence in a darkened room, focused on the same object, the aspects of a deity for example. After a time the Gomchen would ask what she had seen and if it were the same as his projection. The goal was an entirely unified mental state. Later, camping in the wilds, Alexandra would record instances of the use of telepathy at great distances, of receiving messages the Tibetans termed "written on the wind."

The concept of telepathy has been repeatedly explored in various forms of experiment. Classic Psi experiments by J B Rhine, Pearce-Pratt were performed using symbolic flash cards (Radin 2009), and those of Upton Sinclair and Stanley Krippner et al. (1993) the latter using an entire Greatful Dead concert's attendees, involved the transmitter making drawings or the crowd watching an image which the receivers attempted to replicate.

Duane (1965) reported an experiment in which spatially-separated identical twins had coupled changes in their EEGs in which one twin closing their eyes elicited an alpha rhythm in the other, consistent with some form of direct mental or physical connection. A similar follow-up experiment (Giroldini et al. 2015) showed slight changes in the filtered alpha rhythm of the 'receiving' twin which was deemed statistically significant on careful Monte Carlo analysis.

Grau C et al. (2014) have reported success at transferring information from a subject in France to another in India, but here the EEG signal of the 'transmitter' was transcribed
into a digital code sent over the internet and transformed into non-invasive stimulation
the receiver succeeded in using to distinguish one of two signals 'ciao' or 'hola', so this
experiment says nothing about purely spontaneous interactions.

The idea we are discussing is that, to model quantum entanglement in the physical
universe and the critical effects it could have on survival, in a red-queen race with other
sentient organisms, including predators, parasites and prey, the brain evolved to use
entangled internal states in its own processing when deductive processes were at a
tipping point, resulting in a quantum 'convergence' where the brain began to use the
very entangled states it was modeling in such a way as to manifest the entangled
space-time properties it had become sensitive to.

The notion of the brain using entanglement processing provides a useful paradigm for
resolving many of the contradictory situations that arise when temporal causality is
applied to anticipatory events. We can envisage the conscious brain as an
entanglement anticipator in the following way. Memory is to model the past and
subjective consciousness is to anticipate the future. Memory systems are used to form a
model of the quantum collapsed history already experienced, which is first sequentially
stored in the hippocampus but is then semantically re-encoded into the cortical feature
envelope so that it can be interrogated from any semantic perspective. The conscious
cerebral cortex contains a dynamical system of entangled states which together extend
over a space-time region extending a limited distance into both the past and future - the
quantum-delocalized present. Memory and the current situation set the context and the
cortical dynamic seeks to anticipate the next move. The cortical envelope thus
maintains a state of context-modulated sensitively-dependent dynamic excitation which
generates our conscious sense of the present moment by encoding the immediate past
and future together in a wave function representation. This would correspond to the
entangled life-time of the coherent excitations taking place in the brain state and would
mean that the brain is incorporating quantum-encrypted information about the
immediate past and future of the organism into the current state of subjective
experience. The quantum present provides the loophole in classical causality that
permits intentional will to alter brain states as an effect of the entanglement. An external
observer will simply see a brain process sensitively dependent on quantum uncertainty.

Let us look at how this might shed new light on some of the time violating experiences
we have noted. Precognitively dreaming about being stung can be described in the
following way. While dreaming my brain becomes sensitively dependent on a population
of entangled states reverberating in my cortex. These entangled states extend in space-
time from the earliest experience of being stung to the future point in time I am stung
wide-awake. This is not so hard to understand because the brain was fixated on this
experience during the dreaming night and I was stung wide awake from a further period
of REM-rich morning sleep. In effect the quantum present of my brain state extended
from the dream to the event, in terms of some ongoing wave coherence mode.
Nevertheless some prescient experiences seem to occur over quite long time intervals,
suggesting the brain can encode entangled states in a more permanent form, which can
still be referenced later. Intriguingly, highly active brain states have been shown in fMRI
studies to elicit changes in cerebral activation lasting over 24 hours (Heaven,
Harmelee & al). Long-term potentiation and memory processes are in principle
permanent and may involve epigenetic changes (Levenson & Sweatt).
Prescient experience leads to a series of paradoxes and contradictions for classical causality, based on the arrow of time. Turning to the lyrics example before 9-11, the first skeptical response would be that it was just a coincidence that I wrote a prescient line. The application of Bayes theorem of conditional probabilities to this requires a reasonable probability that someone on Earth will write a line anticipating the plane flying through the tower because we are claiming that if I wrote a lyric there is a reasonable probability by chance that it will seem to anticipate 9-11. It is far from clear that there are any, let alone many, such cases, so we have technically only one event. To try to trace any connection causally leads to contradiction. One causal explanation is that I wrote the line because some information from the future made me sense the impending event. This is a contradiction because it involves classically time-reversed causality. A second causal explanation is that, because I wrote the line, an event showing similarities to it was more likely to happen. It is true that in sensitively dependent systems small differences can lead to much larger fluctuations, but the idea of small events in history driving unrelated major future events, even on a probability basis is causally unstable.

But there is more to this. I originally wrote the line thinking about the destruction of biodiversity, of burning forests and then inverting myth of Icarus, turning the foolhardy challenger melted by the sun into the valiant act against all odds of conflagration that leads to new life, in a manner uncannily similar to the terrorists thinking they would see al-Llah in paradise through their act. Hence it has taken a highly unlikely lateral metaphor to bring about this correspondence. Also the song had other hidden elements. It accused the USA under George Bush of being “the one true rogue nation - the great American shaitan”. Shaitan is a reference to the Muslim Satan, as in the eyes of the 9-11 terrorists. In the last line it closed with “Can we bear it all again? It thus presciently echoed the Mayor of New York’s words on TV “This is more than we can bear”. So how does Bayes theorem handle these nuances? That the song and event are just two obvious manifestations of an incendiary world in an apocalyptic age? This is very far from being a plausible counter-argument.

There is another type of solution possible. Suppose we incorporate all these elements into a quantum superposition of states involving space-time entanglement. The entanglement then contains all of these elements without contradiction, because within the entanglement, time is symmetric, and forward and reverse causalities are consistently encoded by the transactional space-time hand-shaking. There are many experiential threads semantically correlated between past and future, with no contradiction. The disquieting issue is not that prescience might have occurred, but that, if consciousness is here to protect us from the incipient future, maybe with a little more foresight, this tragedy could have been avoided - except that too many major players were acting too ignorantly and the ephemeral connection never got made until the event happened.

One can discern not just one, but three manifestations of the arrow of time bearing on the nature of consciousness and memory. The first is the one we have been considering in the brain - that the future is uncollapsed quantum states still in wave superposition and the past has been collapsed by conscious experience. This leads to some counter-intuitive conclusions, because it implies that the consciousness itself is resulting in the historicity that is causing my brain to have memory. The second arrow is the thermodynamic arrow of time - that entropy, or disorder is increasing overall, despite the
negentropic nature of increasing biological complexity as an open thermodynamic system. However the second law of thermodynamics is a statistical consequence of the time direction in which real events are happening. All the massive positive mass-energy real particles in the universe are retarded particles that flow in the usual direction forwards in time. The time-reversed electron is an anti-electron flowing forwards in time, as shown in the Feynman quantum field theory diagrams in fig 8. One explanation of this real quantum arrow of time is that the origin of the universe is a phase reflecting transactional mirror, bringing the question back to quantum entanglement again.

Fig 10: A traditional spectrum of human cultural, spiritual and religious experiences of existence, all of which, including heaven and hell, exist on the plane of subjective conscious experience, although some lay claim to defining the creation of the physical universe. These include the Judeo-Christian notion of the sabbatical creation by the Elohim male and female in their likeness, despite creating the sun and moon after the plants, the Eden origin, and the final apocalypse invoking heaven and hell, the highly sexual Muslim paradise, Vishnu dreaming the word as Brahman in a lotus coming out of his navel, Kali standing over lifeless Shiva (Varanasi shrine), the cosmic Tao of yin and yang, each generating the other to engender the diversity of nature, the Tantric origin in deep coital fusion between Shiva as consciousness and Shakti as substance spawning the phenomena existence - Maya or illusion, its meditative expression in the Kundalini-charged experience of Yab-Yum enlightenment, the Buddhist wheel of life, including the worlds of the worlds of devas, titans, humans, animals and hungry ghosts, with flaming hell illustrated below, the Aboriginal dreamtime (Colleen Wallace), the Bushman trance dancing experience, visions of Lascaux and the Venus of Laussel, the Nierika cosmic peyote portal of the Huichols, the ayahuasca spirits of the plants (Pablo Amaringo) and the Chenrizig mandala.

Cultural Visions of the Cosmic Subjective

Cultures throughout history have been representing the world of their subjective experience in myth, fable, folklore and religious accounts. Creation myths are commonly
fabulous tales of heroes and supernatural entities, even when they reflect historical realities and gender conflict in the subtleties of their accounts, as the Eden story does of the Fall from nature in a sexual dysphoria between women and men.

Even our major current religions, while claiming to describe how God created the universe are primarily dealing with the stream of subjective experience rather than physical reality. Supernatural realms, from heaven and hell, to the apocalyptic end of days and the imagined rapture all gain their intensity and meaning as fantasized conscious experiences rather than realizable physical realities.

When we think of the eternal hell fires of damnation, we do not seriously believe that it is our molecular flesh, with its DNA and proteins that will froth and bubble in Satan’s fiery pits, but rather a conscious torment in the realm of dreams and visions. Likewise when we deal with the afterlife and the angels of heaven in the clouds, we do not seriously think we are going to be gasping in the upper atmosphere or freezing in outer space, but are invoking a subjectively conscious realm of partially disembodied beings of light whose rules of engagement are akin to NDEs and visionary hallucinations of mystics and shamans.

The notion of a god in the sky purveying a realm of the afterlife is extremely ancient in diverse human culture. The Bushmen refer to the great God in the Eastern sky who has a village containing the spirits of the dead where he sits under a great tree. Again this idea of the sky is the mind-sky – a purely conscious realm, as in a dream.

Traditional cultures, from the Bushmen to the Huichols, approach spiritual realms using the very techniques used to induce non-ordinary mental states, such as trance dancing and consumption of the psychedelic peyote.

One of the most outstanding Huichol peyote shamans of modern times was don Jose Matsuwa who at 1990 was the venerable age of 109. Besides walking in the sacred journey to Wirikuta, 'don Jose spent many years living alone in the Huichol sierra learning directly from the ancient ones who reside there in the caves and mountains. In order to become a shaman in the Huichol tradition one must learn to dream consciously and lucidly, for after a healing has been performed, that night the shaman tries to dream about the patient and find out the reason for the illness. Each day the Huichols tell their dreams to "Grandfather fire". Dreams help to bring together the past, present and the future' (Halifax 249).

Brant Secunda became his apprentice after walking from Ixtlan into the mountains. 'On the third day of my journey, I became completely lost after walking down a deer trail. I became terrified and lay down to die, from sun exposure and dehydration. I then began to have vivid visions of colourful circles filled with deer and birds, but was suddenly awakened by Indians standing over me sprinkling water over me. They told me the shaman of their village had had a dream about me two days earlier and they had been sent out to rescue me' (Rainbow Network Aug 90 4).

Peyote is said to open the niérika, a visionary gateway between ordinary reality and the higher spirit realm. "When the mara'akame passes through the niérika, he moves just as the smoke moves; hidden currents carry him up and in all directions at once ... as if upon waves, flowing into and through other waves ... the urucate. As the mara'akame
descends and passes through the niérika on the return, his memory of the urucate and their world fades; only a glimmer remains of the fantastic journey that he has made (Halifax 242).

The curandero who opened the secret of the sacred mushroom to Gordon Wasson was Maria Sabina. She likewise had prescient visions. Shortly before his arrival in 1953, she had had a vision while on the little saints, that non-Mazatec strangers would come to seek nti-si-tho - the little one who springs forth. Her life was beset by many tragedies including a macabre vision she had shortly afterward on the little things, which foretold the murder of her son, possibly in vengeance for opening the knowledge of the mushroom. Her house and little shop were also burned (Estrada 71, 79).

Indian yogis likewise claim elevated visionary powers. Paramhansa Yogananda described a vision of Kali while meditating at Dakshineswar (Yogananda 79):

“First a delightful cold wave descended over my back banishing all discomfort. Then to my amazement the temple became greatly magnified. Its large door slowly opened revealing a stone figure of the Goddess Kali. Gradually it changed into a living form smiling nodding in greeting thrilling me with joy indescribable. … An ecstatic enlargement of consciousness followed. I could see clearly for several miles over the Ganges River to my left and beyond the temple into the entire precincts. The wall of the buildings glimmered transparently – through them I observed people walking to and fro over distant acres.”

These kinds of visionary experience are common to both psychedelic experiences and lucid dreaming, as Prem Dass notes during a peyote session:

“... I was free and flying with such a feeling of exhilaration that I wanted to cry, for now I was experiencing the true meaning of Don Jose's song ... various kinds of light and form passed ... Each song lifted me higher to a warm, blissful and radiant light. As I came closer to the great brilliant sphere, time was slowing to a stop. Intuitively, I knew I was dead and had absolutely no knowledge of who and where I came from. Yet I knew and felt totally at home, as if I had returned from a journey in a far away land. - Prem Das (Halifax 239).

The relationship between traditional religions and mystical vision is fraught with violence and repression. Although religions are frequently founded by visionaries, mystical vision tends to be repressed as heretical. The early gnostics were suppressed by the orthodox and mystical vision was repressed by the Inquisition. Although Meister Eckhart died before he was tried, Marguerite Porete, author of “The Mirror to the Simple Soul”, a work of Christian mysticism dealing with agape (divine love) and cited as one the primary texts of the medieval Heresy of the Free Spirit, was the first person to be burned to death in the Auto de Fe in Paris. Notably the Free Spirit movement had several key features consistent with open exploration of the cosmology of mind: (a) Denial of the necessity of Christ, the church and its sacraments for salvation – such that reliance on the Holy Spirit was believed to be sufficient for salvation. (b) They believed that they could communicate directly with God and denied the necessity of Christ, the church and its sacraments. (c) They invoked the language of erotic union with Christ sometimes celebrated in rites of sexual union in the metaphor of Jesus and Magdalene. (d) Antinomian attitudes rejecting moral, religious, or social laws and norms.

Many of the key prophets and founders of major religions, were visionaries who were often rejected by the people of their day.
Muhammad for example claimed to have made a night journey to Jerusalem on the axis mundi and received his inspiration from visions of the angel Gabriel in his cave, but according to founding Islamic historians he at least once confused Gabriel with Satan, so his visions cannot be regarded as sacrosanct.

Muhammad meets Gabriel on his night journey (Mi'raj-nameh Turkey 15th cent).

This occurred over whether female deities could be intermediaries of al-Llah, in the so-called satanic verses alleged to have been subsequently removed from the Quran. The historians Ibn Sa'd and al Tabari describe the origin of the 'Satanic Verses' that became notorious with the death fatwa cast on Salman Rushdie for his novel of the same name. The Quraysh of Mecca worshipped the astral goddesses al-Lat, al-Uzza and Manat. One day, Tabari says, while he was meditating in the Ka'aba, the answer seemed to come in a revelation that gave a place to the three 'goddesses' without compromising his monotheistic vision assimilated from Hebrew religion (Armstrong 113).

"Have you then considered the Lat and the Uzza, And Manat, the third, the last? these are the exalted birds whose intercession is approved"

It is said that Muhammad removed these verses because he was later told by the angel Gabriel they were "Satan inspired". The rejection of the Manat led to the historic conflict with the Qura'sh, which resulted in the flight to Medina and the later genocide of 700 Jewish men and the slavery of the women and children (Armstrong 206), for parleying with the Quraysh even though they hadn't opened their gates to the enemy, after Muhammad appointed a dying warrior as judge over their fates, although it was a wasted genocide, because the Quraysh had left without completing the siege, and no subsequent battle occurred. This created a diabolical precedent for IS to behead Yazidi men and take the women into sexual slavery 1400 year later.

"Have you then considered the Lat and the Uzza, And Manat, the third, the last? What! for you the males and for Him the females! This indeed is an unjust division! They are naught but names which you have named, you and your fathers; Allah has not sent for them any authority. They follow naught but conjecture and their low desire." (53.19).

Gautama Buddha’s enlightenment was more about the redeeming the psychology of the ego than performing miraculous, or prescient, feats. Although he was alleged to possess superhuman powers and abilities, due to an understanding of the skeptical mind and how the display of miracles can be abused by unscrupulous people, he reportedly responded to a request for miracles by saying, "I dislike, reject and despise them," and refused to comply. However there is one famous anecdotal miracle attributed to him in a contest with heretics, who wished to perform their own miracles. Buddha proceeded to perform the Yamaka-pāthihārīya (Twin Miracle), which consisted of the appearance of pairs of phenomena of opposite character e.g. flames from the upper part of his body and a stream of water from the lower.

The case of Jesus, whom Christianity has elevated from a religious founder to a divine
figure, the Son of God, is likewise fraught with contradictions. Although we know little of Yeshua’s mental prescience, or visionary experiences, it is his nature miracles in accounts by later writers decades after his demise, that play a critical part in his assumed transcendence. Since miracles are also assumed to be a manifestation of mental powers, we need to consider carefully their origin in the heroic fertility religion surrounding Israel at the time, complementing Yeshua’s messianic mission to Israel. In the light of this, we will have to regard these accounts as mythical anecdotes.

The January date of Yeshua’s epiphany coincides with the advent of Dionysus in many regions. His first miracle – the water into wine – at the behest of his mother, is a classic miracle of Dionysus, the god of the grape harvest, winemaking and wine, of ritual madness and ecstasy in Greek mythology, feverishly sought after by the maenads. In neighbouring Nabatea, in the time of Jesus, the original Edomite god, Dhushara, Lord of Seir, had taken a Dionysian form, including wearing a tragic mask, which conferred immortality. Other miracles, including controlling storms, walking on water and sending the evil spirits of insanity into a herd of swine, causing them to drown, coincide with the Dionysian tradition of miraculous dread, but lie completely outside Jewish religious world-views, leading to Jesus being accused of being Ba’al Zebul – Lord of the Flies.

Yeshua’s status as a messiah is also contradicted by his own words. While the synoptic gospels have Peter saying “Thou art the Christ”, when Jesus asks “Whom do men say that I am?”, the gnostic Gospel of Thomas of comparable age and validity, has Jesus saying: "I am not your master. Because you have drunk, you have become intoxicated from the bubbling spring which I have measured out" (13).

The Gospel of Thomas, which gives the clearest intimations of Yeshua’s subjective world-view, makes absolutely clear that he believes the kingdom to be realized in our conscious experiences of the natural universe, not an apocalyptic rapture of triage:

If those who lead you say to you, 'See, the kingdom is in the sky,' then the birds of the sky will precede you. If they say to you, 'It is in the sea,' then the fish will precede you. Rather, the kingdom is inside of you, and it is outside of you (3).

His disciples said to him, "When will the kingdom come?" Jesus said, "It will not come by waiting for it. It will not be a matter of saying 'here it is' or 'there it is'. Rather, the kingdom of the father is spread out upon the earth, and men do not see it (113)."

The Hebrew mashiach is a figure that brings about a long-term epoch of future goodness. David, Solomon and even Cyrus were extolled in these terms. Unlike David and Solomon, who were anointed by a high priest, Jesus is anointed to his doom by a woman. This highlights Yeshua’s role transcending the beliefs of his time, as being both a chaos messiah in Israel, leading to claims of blasphemy and a fertility hero in the rural backdrop, who then enters into a triple crucifixion passion play – insurrection to the Romans for turning the tables on the Roman currency, blasphemy to the High Priests for reviving Lazarus and a sacrifice of the fertility king when he rides into Jerusalem:

Took branches of palm trees, and went forth to meet him, and cried, Hosanna: Blessed is the King of Israel that cometh in the name of the Lord (John 12:13).

Rejoice greatly, O daughter of Zion; shout, O daughter of Jerusalem: behold, your King comes unto you: ... lowly, and riding upon a donkey, and upon a colt the foal of a donkey (Zech 9:9).
Mary Magdalene is described as “out of whom went seven devils”. These seven are known throughout history as the guardians of the seven layers of hell, who later pursue Dumuzi-Tammuz to his doom, after Inanna-Ishtar’s return from her descent into the underworld, where she was stripped naked of her seven veils one by one.

Yeshua’s anointing by a woman attests to the fertility tradition of neighbouring Nabatea at its heyday in his lifetime, as are his intimations that this anointing is for his sacrificial doom, inevitably to be betrayed by Judas as a result of its profligate nature.

In the synoptics, a woman, variously a sinner, anoints his head with a box of spikenard, while in John it is his feet. In all four cases, he declares it is for his burial. The women of Galilee, who ministered unto him “of their substance”, attend his crucifixion, and they, prime among them Magdalene, are first to witness his resurrection on the third day, completing the sacrificial cycle, just as Salome danced Inanna’s descent, mightily pleasing Herod’s generals, at Machaerus on the border with Nabatea, and after being offered even half Herod’s kingdom, as in the Book of Esther, then claimed the head of John the Baptist on a plate, after John had cursed her mother Herodias for adultery. They were at Machaerus on the border with Nabatea because of a conflict which arose when Herod divorced his previous wife the princess of Nabatea, sending her scurrying home in fear of her life.

Outside the Dionysian nature miracles, the others are more equivocal. The loaves and fishes episode was simply a forerunner for communion morsels spread between many to keep the faith, which even the disciples didn’t see as a miracle at the time:

For they considered not the miracle of the loaves: for their heart was hardened (Mark 6:51).

Faith healing is a common phenomenon that thrives on the placebo effect and anecdotal claims from a mythical distance:

A prophet is not without honour, but in his own country, and among his own kin, and in his own house. And he could there do no mighty work, save that he laid his hands upon a few sick folk, and healed them (Mark 6:4).

At Nazareth, Luke quotes the comment “physician heal thyself” (4:23), hinting that Jesus could not cure his own disability, as noted by the Lexicon Talmudicum and Talmud babli Sanhedrin calling Yeshu-ha-Notzri, hanged on a Passover eve, “Balaam the Lame”, claiming he came from the wicked kingdom of Edom (Graves 1946 6, Graves & Podro 1953 23, 288).

Both polytheistic and monotheistic religions are founded on a god, or deities, as third-party agents. These agents are either in superhuman form, appearing as male and female humanlike figures complete with human personalities, or they are more abstract deities, as Yahweh and al-Llah are, but still possessing many features of emotional personality. Moral deities are envisaged as functioning to reinforce punishment and provide forgiveness to their compliant believers through the same attributes of personality human beings express. We hear of God’s anger, jealousy, compassion and mercy - all emotional attributes we naturally associate with a mammalian emotional limbic system, but critically the emotional experiences of a conscious person fearing another conscious agent. God is above all conscious of His actions even as he is
construed to be omniscient and omnipotent even as we are subjectively conscious of Him – “to know even also as I am known”. No one would dream of worshipping a deity who was not even conscious of their existence.

To accurately judge religions as theories of mental states, and particularly as instruction manuals for human choices and actions under threat of dire social or spiritual punishment, we need to be honest enough to have caveats when their doctrines and dogmas fly in frank violation of nature and of physics itself. There is no evidence for an external agent with an all too human moral personality in any phenomena of natural or physical cosmology. Nature has no moral law which curses the predators or even the diseases. The notion of God creating the universe is a false metaphor humans are projecting on to nature from their own experience of being a dominant species shaping the world around them, often to their own folly and the detriment of nature, creating the world in crude analogy with human tool-making and manufacture. We will never develop a good idea of the cosmological basis of subjective experience if we simply project a human-like personality for which there is no evidence onto the entire universe as an external agent and give that agent naive power to breathe life into clay or surgically remove a rib to create a sexual partner.

To deny all the evidence of evolution, in the genetic age, which attests to an almost divine power of generative capacity of life to become ever more complex, sentient and elegant and even explains how it can come about, and instead insist that a clock-maker deity with a bad temper made a static fallible world in a naïve order in six days four thousand years ago is to doom any potential of this theory of consciousness to be anything more than a dangerous and socially destructive delusion. Neither can we afford to say nature is bestial, sinful, or beneath spirituality, or that the Lion should lie down with the Lamb, for the living diversity of plants and animals and of herbivores and carnivores is central to the diversity of life, just as sexuality is not debased over spirituality, but is the cosmological principle from which all complex conscious life emerges in the immortal passage of the generations.

Eastern religious philosophy is founded on the notion that the physical world is a gross illusion of consciousness, or maya, in which Shiva has lost sight of in his own cosmic conscious transcendence, in his dance with Shakti-Kali. Likewise Vishnu the sustainer is seen as dreaming the universe, in Brahman emerging from a lotus in his navel in deep contemplation, implying the entire physical universe is just a thought in the mind of God.

Nevertheless two deep and powerful Eastern currents found their existential cosmology on a complementarity reminiscent of the wave-particle complementarity of quantum physics and of sexual complementarity. The Tantric cosmic origin begins in deep sexual coitus between Shiva and Shakti as mind and matter complete and replete. It is only when this intimate loving embrace of the complementary principles begins to come apart that we descend by degrees into the deluded realm of individual egos witnessing the gross accumulations of the physical world, ultimately ending in the Kali Yuga today. This notion is powerful in several ways. It attests to the fundamental complementarity between the objective phenomena of the physical universe and the subjective conscious experience we all witness throughout life as sentient beings. It is also a cosmology founded on biology and sexuality as primal generating principles. Likewise the Tao is a cosmology of nature and conscious life founded on the complementarity of yang and yin.
as creative and receptive principles, again founding existence on sexual complementation and the fertilization of the receptive by the creative.

In the Eastern mysticism of the Upanishads, the great journey to spiritual realization is a journey of subjective consciousness backwards into the atman, or cosmic ‘self’ at the core of each person’s subjective mind. The atman is thus the mental state beyond all the conditioned mental states of the ego, very much in the paradigm of the NDE. Buddhism took this description one step further and denied the existence of the self as an objectification, claiming there is no self, there is no god, but the round of birth and death of the suffering ego, which can achieve enlightenment by escaping this cycle into the peaceful void of the Buddha no-mind.

Hence Buddhism stands out as a cosmology not requiring an external agent to create the universe, as in the charming but naïve seven day creation, where the Earth is flat, surrounded above and below by dome-like firmaments in which the stars are fixed, while the plants are created before the sun and moon, clearly a fundamental violation of the generative sequence of the physical universe we have come to know in the scientific era. Buddhism also has vehicles of description based on the fractal geometries of Mandalas, coming a little closer to our descriptions of the laws of nature based on symmetries and broken symmetries. However in a striking parallel we find the Buddhist wheel of life containing fantastic realms similar to Christian heavens and hells, the worlds of devas, titans, humans, animals, hungry ghosts, and flaming hell with people simmering in fiery pots.

Notably Australian aboriginals speak of the dreamtime as if their real world has itself emerged from dreaming reality and the Huichols speak of the Nierika or cosmic portal peyote reveals, connecting them to the world of spirits and the foundations of existence, as if cosmology itself emerges from the visionary state. Animistic and shamanistic cultures likewise imbue all of nature with subjectively conscious dimensions, invoking spirits of wind, water, fire and the rain, animals and plants as active conscious entities, turning the whole of nature into one big subjective conscious experience.

In many belief systems there is conceived to be a direct psychic connection between conscious experiences and attitudes in which thoughts can affect the physical world around us in terms of karma, spirit influence, and natural calamity, again implying the whole universe is in a kind of conscious causal reverberation, which we must be very careful of for our own survival.

In the case of the Bushmen and many shamanic cultures, this is simply an intuitive sense of not bringing about negative circumstances through negative thinking, but in the Buddhist karmic cosmology it becomes a huge moral causality, not only linking to affairs of the world around us in this life, but a reincarnation cycle spanning multiple lives. This is in frank violation of nature, claiming that a human killer might be reborn as a cockroach as a setback on the path towards enlightenment. This is a double violation of nature, both because a cockroach has as valid an ecological niche as a human and because predation and killing is intrinsic to the animal world, as species from the lion to the praying mantis demonstrate. To assert a moral causality over nature based on human egos is a tragic fallacy, just as the notion of a personal soul entering a chain of incarnations, rather than dissolving back into the totality, is as self-serving psychically as parthenogenesis is biologically in relation to sexuality.
We thus find that pretty much all of human cosmological descriptions up to the scientific revolution were not primarily about the physical universe, but of our subjective conscious experience of it - theories of consciousness even when they profess interest in astronomy, the creation of the world or the fertility of the seasons. We can thus to a certain extent forgive spiritual traditions for their deluded violation of natural principles we have come to discover about the physical and natural world only recently through the skeptical inquiry of the scientific method.

The lesson, as in Tao and Tantra, lies in the complementation of the natural and experiential - that each is sacred and an essential complement to the other. We thus need to take onboard all the lessons nature can provide to examine what actually or at least plausibly might be going on in the unfolding universe and what it suggests about the meaning of conscious life, the universe and everything.

Towards a Meaningful Unfolding Universe

This leads to several ultimate questions:

1. Is there any intrinsic meaning to life, or is it we ourselves, as living beings, who express the meaning by unfolding it in our creative lives as conscious participants?

2. Is the world heading for an apocalyptic falling out and a triage of nature caused by a failure to protect our generations’ own futures, or is the entire universe evolving towards a state of ever-deepening realization and enlightenment?

3. Is the fulfillment of life in the universe found in some future ultimate state of enlightenment, or is it expressed eternally across space-time in the consciousness of all sentient beings who will come to witness or have witnessed the ongoing existential condition, who together bring about the historical evolution
The first is an important lesson about life, particularly for people coming closer to the end of life, or facing a terminal condition. If we are conscious participants in the universe, meaning is not something we should necessarily seek to extract from life but meaning is what we give to it, both in our compassionate actions towards it and in the meaning we give to it in sharing with our family and friends and in the creativity we bring to it in our love, music and works from literature through science to the simple random acts of kindness, all of which make the world a better and more bearable place. By sharing our existence together across the generations, we find a sense of presence and meaning, which goes deeper then the individual ego doomed to the mortal coil. This is something more vital and creative than simply denying the suffering of the ego that Buddhism conveys, because life is a creative force which gives rise to sentient beings and to all of living diversity on which our biological existence and that of those who will experience life after we are gone depends.

We need to remember this is not just a dilemma for our own incarnation. Life emerged on our planet from a hot young Earth and may again be annihilated when the sun grows into a red giant, but this does not mean all the sentient life between is made meaningless. Indeed life is victorious in that, on another planet in this or another galaxy, life can spring forth anew.

As to the second question, the notion of apocalypse may well come from a sense of prescience in our collective consciousness that over the last few millennia we have fallen out of gatherer-hunter innocence in paradise, in a falling out between woman and man, into an accelerating state of culture shock, as nation has warred upon nation, leading ultimately to the present state of cultural crisis amid nuclear overkill, clash of the cultures, a mass extinction of biodiversity and the threat of climate tipping point deleterious to the future of humanity. Ultimately apocalypse means ‘unveiling’, the covers being thrown off reality, so we can come to see it face-to-face, no longer through a glass darkly, just as the scientific revolution is doing for the objective world. The crux of the matter is that this is not a diabolical end of days ordained by God, but a consequence of our own cultural becoming and population explosion, which we need urgently to find a compassionate remedy for, in protecting the living planet from the ravages of human impact, so that future generations can survive and prosper. It doesn’t take supernatural intervention to see and understand this, it is simple commonsense.

Hence we turn to the other side of the coin. Is there some way in which the universe is coming to fruition through an accumulating sense of our own immanent conscious integration? The Noosphere, according to the thought of Vladimir Vernadsky, Édouard Le Roy and Teilhard de Chardin, denotes the "sphere of human thought" in a succession of phases of development of the Earth, after the geosphere and the biosphere. Just as the emergence of life fundamentally transformed the geosphere, the emergence of human cognition fundamentally transforms the biosphere. Originally thought to ensue from the nuclear revolution, it is now conceived more commonly in terms of the integration of human consciousness through the internet and formation of a global village. Teilhard argued the noosphere is growing towards an even greater integration and unification, culminating in the Omega Point, which he saw as the goal of history in an apex of thought/consciousness.
Some pictures of the noosphere conceive the future almost in the manner of an ordained destiny, effectively committing the same mistake of religious apocalyptists looking to the parousia. If such a convergence phenomenon is happening, it is subtle and cannot violate any natural law or process. For example the laws of nature surrounding evolution, mutation and natural and sexual selection reach toward climax diversity at the edge of chaos and are as inconsistent with a directed divine destiny as they are with the sabbatical creation. The same goes for the probability interpretation of quantum mechanics. Any tendency toward an unfolding of cosmic consciousness is something that can happen only in the quantum entanglement in the form of coincidence and synchronicity, without perturbing any statistical measure of natural function. This means it is a notion that it may be impossible to prove, so that we have to content ourselves with being conscious participants in this unfolding process without making any claims as to its verifiable existence, or certainty. The nature of free-will, after all is to collectively participate in the unfolding history of the universe by this very participatory process of living existence. That said, it is clear that decisions we make which seek to protect the long-term diversity of life and to cherish and replenish it for the future generations lay the groundwork for such an unfolding, as do the creative expressions we make of our engagement together in music, art literature and science and social and natural justice, realizing the compassionate existence together and celebrating it.

Neither is it a limitation on ourselves that this potential future is something we can merely glimpse but not fully understand, for already as conscious beings we stand male and female in the archetype of cosmic consciousness to witness the totality in our visions and contemplations, and despite the tragedy of life in the mortal coil, and the implicit violence of nature and entropy, we have the wonder of a free lunch in this magical world to love and beget offspring through the sexual mystery which spawned us and to appreciate the sheer magic of coexistence. Neuroscientist Chris Koch (2012) echoes this view “Throughout my quest to understand consciousness, I never lost my sense of living in a magical universe. I do believe some deep and elemental organising principle created the universe and set it in motion for a purpose I cannot comprehend. … But I do believe the laws of physics overwhelmingly favoured the emergence of consciousness, and that those laws will lead us to a more or less complete knowledge of it.”

Finally, in relation to the third question, we need to realize it is the journey, not the destination that is the key. Conscious life is an ongoing process, immortal in the passage of the generations, despite our individual mortality as sexual beings. In the completion of the universe as a conscious entity, it may not be in its final apex that the reality is consummated, but eternally throughout space-time, as a single thing already conceived already known from alpha to omega. This is not an ordained destiny speaking, but our collective participatory consciousness, throughout time and space together, bringing it about in the uncertainty of the entanglement. In this sense it is our entire life experience and what we leave behind for others to follow that is of account, not any final meaning we think may come about in our imagined peak fulfillment, or in our last moments of realization on our death bed. We need to appreciate every moment and every act, good and bad, for its unique preciousness, for life is all too short and transient and yet our consciousness stands inscrutable in the eternal moment and there are so many of these moments in a lifetime, they literally are enough to fill the entire history of the universe.
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