

Concept Paper

# The Near-Death Experience: A Reality Check?

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**Abstract:** This paper critically reviews assertions that near-death and out-of-body experiences (ND/OBE) offer proof of extra-corporeal existence when the brain is supposedly “dead”. While this field has almost moved away from mere anecdotal recording, the current trend is focussed on demonstrating existence without functional brains. These endeavours have fallen far short of anticipated results—that cardiac patients would report on strategically-placed markers around acute resuscitation units. Two problems arise: a failure to produce corroborative empirical evidence for extra-corporeal cognition (a) when the brain is “dead”, (or “clinically dead”, so-called) and (b) how the memory required for recall could paradoxically be set down at that critical time-point. The view advanced here is that ND/OBE occur as subjects’ states are returning to complete resumption of conscious-awareness and which, from several published accounts, is particularly abrupt but which nevertheless accounts perfectly for memory—and recall. Similar transcendental adventures accompanying returns to conscious-awareness occur with other preceding states of reduced consciousness. Most recollections are intensely geo-physical, anthropomorphic, banal and illogical: their dream-like fantasy provides nothing revelatory about life without a brain, or importantly, about other supposed cosmic contexts. Additionally, it is proposed that since prevalence rates are so extremely low (<1% globally), the few subjects undergoing ND/OBE may have predisposed brains, genetically, structurally or resulting from previous psychological stress. In a somewhat similar vein to post-traumatic stress disorder, subjects with predisposed brains exhibit markedly changed post-experiential phenotypes, so that the ND/OBE itself could be viewed as a transient, accompanying epiphenomenon.

**Keywords:** prevalence; hellish NDE; this-worldly content; duality; reporting accuracy; neurophysiology; waking phenomena; post-experiential NDE subject; epiphenomenon

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## 1. Some Initial Considerations

For many, the occurrence of near-death and out-of-body experiences (ND/OBE) is probably viewed with bemused detachment, while for others, including many professionals, it constitutes a subject demanding a life-time’s dedicated research. The other obvious but important divide is between those who disregard the significance of ND/OBE as opposed to those who see them as offering unassailable proof of life without, or outside, the body or brain.

In many publications, it is often asserted that ND/OBE involve ~10%–20% of the population. As NDE are unanimously acclaimed to represent a worldwide phenomenon, then, given an existing population of 7 billion inhabitants, these figures would be indicative of ~1–1.5 billion ND/OBE subjects—surely a global pandemic. We do not have a complete inventory of all ND experiencers, but the Near Death Experimental Research Foundation currently lists over 4000 respondents who have undergone at least one such event.

As a preliminary, I offer some notional figures. A suggested figure of 7 million ND/OBE, for example, would thus yield a 0.1% global prevalence, but it could be higher. So, for example,

a presumptive population even as high as 70 million subjects worldwide would only just reach 1% prevalence rates. This emphasises the overall *insignificance* of this phenomenology, especially when compared with 3.5+ billion individuals worldwide (~50%), for example, professing allegiance to the three historic Abrahamic faiths.

Notwithstanding prevalence estimates, the most important issue is whether ND/OBE offer evidence not only for life outside the known world, but perhaps more critically, of possible existence while the brain is supposedly “dead”, as some would have it.

In passing, we should note that the thrust of this argument is largely based on studies with cardiac arrest subjects. The latter clearly endure variable periods of reduced cerebral blood perfusion, during which circumstances measurable brain activity dwindles rapidly. Nevertheless, the conclusion forced upon us is that in these circumstances some form of “conscious” life (whether denoted as mind, soul or raw consciousness) does occur without any cerebral underpinning during those critical periods of under perfusion. One important outcome is the degree of bias introduced through sole use of cardiac patients.

Given that brief background, the aim of this short review is to consider, through it sequential subsections, the extent to which many of these claims could be deemed reasonable and thus truly reflective of extra-corporeal existence. I continue immediately with generalized, critical comments upon the nature and quality of NDE reportings, follows by more formal approaches from neuro(patho)logical and theological approaches. I end by suggesting new proposal for research of thought which could advance our understandings of this fascinating phenomenology.

## 2. The ND/OBE Experiential Curriculum

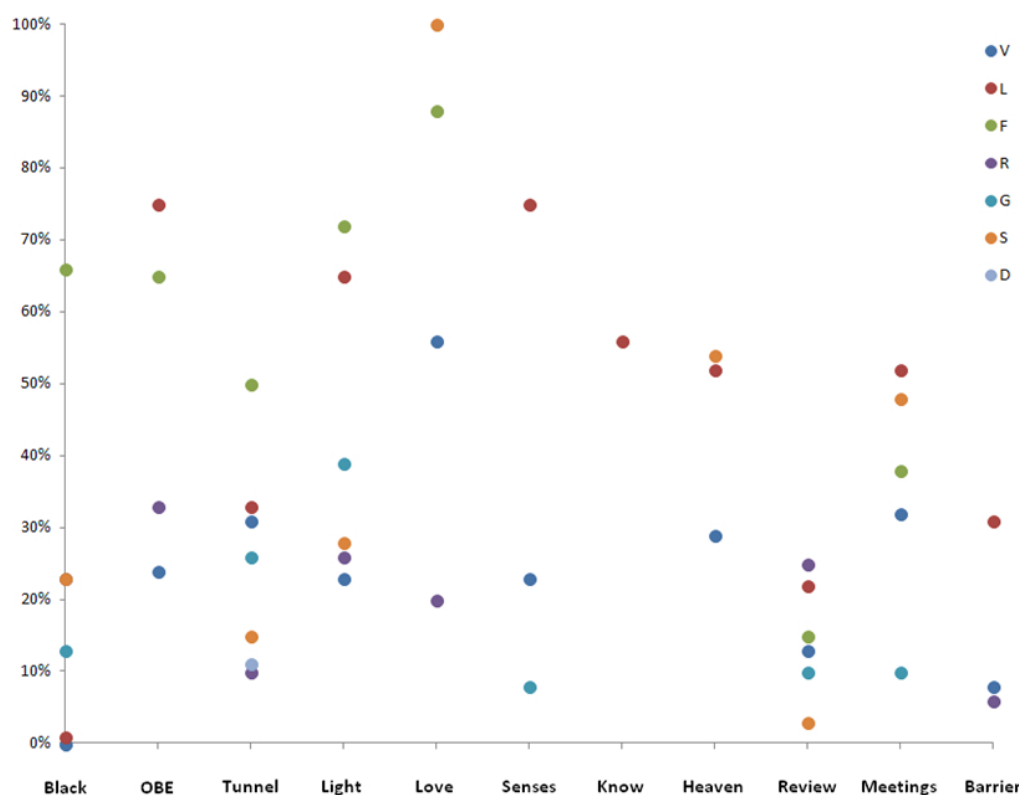
### 2.1. Baseline Features

The basic features are well-known and have been extensively itemised through media interest, with often little informed critical appreciation of the material being disseminated. That, to my way of thinking is important, because there is no universal form of experience—what Kenneth Ring termed the “*core*” experience [1]. His own graph ([1], p. 40) reveals how fewer subjects seemingly were able to sample the complete list of options on offer—otherwise termed a “*depth*” experience. Indeed, the so-called “*depth*” requirement may have nothing to do with the supposed gravity of the event itself, but only with duration. We have no empirical tool with which to measure the “*depth*” of any experience, while it is obvious that prolonged events (like dreams) do not necessarily have to be deep. One might conclude only, analogous to dreaming, that a prolonged experience would have greater remembered significance for the subject than one of transience. Nor is there a uniform sequence, as idealised by Raymond Moody [2]. For example, the tunnel phenomenon and light may not be present. Indeed, the marked heterogeneity of ND/OBE experiences recalled makes precise definition extremely difficult. Finally, Ring’s “*thanatomimetic sequence*” should be quietly jettisoned into historical oblivion.

For those reasons others have classified NDE into specific phenomenal, yet arbitrary compartments—cognitive, affective, parapsychological, and transcendent [3]: these lack any neurophysiological inputs. Such approaches have less to do with itemising individual ND/OBE components, or to any preconceived sequencing for the phenomenology undergone. Nevertheless, despite such chosen subdivisions, there is no clear understanding, nor expectation, of who is experiencing what.

In order to elucidate that claim, I have attempted a graphic representation of data (expressed as percentages) from key published series (Ring [1]; Sabom [4]; Fenwick and Fenwick [5]; Grey [6]; van Lommel [7,8] and Drab [9]). Despite most being termed “*scientific*”, it should be realized how very difficult it was to extract precise numerical detail from these collected anecdotes. The graph (Figure 1) reveals that fewer than 50%–60% of the subjects in each series underwent every category of experience (The letters at top right hand aspect refer to each study). We are forced to conclude that ND/OBE, viewed across the board, are far less consistent than had hitherto been imagined or

capable of being idealized, or even defined. Once, however, more formal categorisation through robust neurophysiological application has been obtained, the picture may well become that much clearer, and hence comprehensible [10].



**Figure 1.** This scattergram plots the percentage (vertical axis) of subjects experiencing the varied features of near-death and out-of-body experiences (ND/OBE) (~800 as recorded in the works of prominent authors in this field): as far as is possible, these data have been extracted and forged into the major experiential groupings (along the horizontal axis). Contrary to expectation, there is no obvious correlation, symmetry or uniformity among any of these categories. Extraordinarily, they point to the marked randomness of the experiences reported for this large cohort of subjects. This is the first occasion on which these results have been drawn together in one composite diagram. What is quite evident is that these cumulative data fail to underpin the smoothed accounts of ND/OBE phenomenology which many of these authors are keen to enunciate and present to the public and media.

Any naive observer confronted with these data for the first time would hardly draw the conclusion that they represented either a “core” or “depth” type experience, nor that there could be any kind of “thanatomimetic” sequence. (Based on data taken from [1,4–9].)

## 2.2. How Trustworthy Are NDE Reports?

Can we believe the testimonies recorded, and rest assured that these events have actually happened? The former Grote Professor of Logic at Oxford University, A.J. Ayer, was clearly shown to have bent the truth [11]. We should recall that as a so-called “Logical Positivist”, he would have demanded the strictest evidential basis for any propositional statement offered. Yet he was forced to grovel in making his final public confession that God did not exist. The American physician, Larry Dossey ([12], pp. 17–18) also published a fabulous account involving a supposedly blind woman (“Sarah”) recalling precise details in the corridor and operating room on a “specific” morning (the day on which the anaesthetist wore unpaired socks): again this embarrassing venture into untruthfulness was exposed. A “nowhere” NDE was reported of a woman who allegedly crossed a river, saw

her father, heard beautiful music, and was surrounded by angels [13]. The point of this is that the media seem to pump up these occurrences, often accompanied by coloured photographs revealing out-of-focus lights in which a subject is supposedly floating. The best-selling book "The Boy Who Came Back from Heaven: A Remarkable Account of Miracles, Angels, and Life beyond This World" [14] was a complete fraud. The child—Alex Malarkey—although involved in a car crash, simply invented the story. He never "died", nor visited "heaven", or even had opened a Bible. Furthermore, the publishers showed considerable reluctance in withdrawing the book. More embarrassingly, the name of this culprit seems to fit the crime.

The message here is that readers unfamiliar with ND/OBE territory need to be extra careful in interpreting what they read, or are being led to believe.

### 2.3. The Idiosyncratic Nature of NDE

Above, I hinted at the variable content of NDE which frustrates definitional clarity. Each account is a personally-recalled event which is culturally, historically, and geographically determined, together with an influence from historic/religious traditions [15]. It is, I think, important to recognize the mosaic fabric of all accounts given. One classic account from mediaeval England recalls a man of substance who was in a prolonged coma, probably resulting from pneumococcal pneumonia (the so-called *vigil coma* of earlier pre-antibiotic days). He was led by a person clothed in white through "Hell" where souls were being burned and frozen, followed by a nearby encounter with "Heaven" with happy people, music and beautifully scented vistas [16]. In marked cultural contrast, within the Hindu tradition of India, a man was called to appear before Yama-Raj, the God of death [17]. Before his required audience, his legs were sawn off. Unfortunately he had been mistakenly called, so necessitating him to reclaim his legs from a cupboard containing all other victims' amputated legs. Then he returned home. There is clearly a vast difference in content between the Indian relationship to Yama, the Kaliain peoples of Papua New Guinea for whom paradise is a world of factories, automobiles, planes, and highways [18], and the typically anodyne Anglo-American accounts of soft breezes and wafting strains of angelic music amidst displays of highly-coloured flowers, blue skies and radiant sunlight.

### 2.4. Hellish Experiences

Hellish NDE are seemingly not commonly reported, and on average ignored (perhaps for good reason!). But why?—are these also not part of the experienced phenomenology? Only the Fenwicks [5] and Margot Grey [6] from England describe them. The American doctor Jeffrey Long [19] merely offers a ~10% prevalence. If my figures (given above) are reasonable, then possibly 700,000 or more subjects worldwide could have experienced "Hell". So where are these people, and why are they denied opportunity to speak? Is it because of their reluctance to revisit extremely vivid, violent and terrifying events?

Several accounts include occasions of intense darkness and gloom, a feeling of falling backwards, of being propelled or sucked downwards (due to effects of the "vestibular system": see Section 3, below), sometimes accompanied with auditory sensations of unintelligible screams, sounds and noises. There are frightening creatures, and red colours accompanied by fear, panic, anguish and desolation, followed by either a conventional NDE or rapid return to conscious-awareness. For example, a subject's account during a general anaesthetic: "I was above my body and [below there was] a black pit with hands trying to grab me and pull me down into it. A lion came out and jumped on me". The lion is, of course, completely hallucinatory. Nevertheless, the perception of his body being manipulated by "hands" suggests awareness of being put onto and removed from the operating table, and manipulated as the operation proceeded.

Similar experiences of being rough-handled were described by the neurosurgeon Dr. Eben Alexander [20] (with presumptive *E.coli* meningitis) and the US art critic Howard Storm [21] Admitted overnight to a Parisian hospital with peritonitis. There was attacked by frighteningly horrible

people who poked and threatened him. Curiously, they spoke in English, not French. He held them off by praying—but praying offers no regular escape. Afterwards he experienced a typical NDE. The Anglo-Saxon lord, Drycthelm, (as recorded in Bede's History, c750AD [16]) while being led through Hell was attacked and struck at by horrible vermin-like creatures, but protected by a Man dressed in white who led him onwards. Nevertheless, certain observations arise from these terrifying recollections.

First, why do some experiences involve terrible things and then proceed to happier occurrences?

Second, could darkness imply the incipient return of conscious-awareness? Indeed, this view is strengthened by my observation that many of these subjects were either *infected* (Drycthelm, Alexander) and/or in *toxic delirium* (Storm, Drycthelm, Ritchie), indicating a superficial level of "unconsciousness": indeed, it is remarkable (but rarely noticed) that they all consistently felt being "plucked at", reflecting possibly being touched and moved by clinical and nursing staff—turned, cleaned and washed, examined or positioned for interim investigations such as X-rays, or prepared for operation. These examples indicate that the mode of precipitation may, in having a differential impact on various parts of the brain, condition the type of response undergone.

Third, what geo-cosmic locations are being sampled during this black interval, before the nicer NDE ensues? More importantly, do these "co-ordinates" have to change in order to accommodate the ensuing heavenly locus? There is much in these events needing far more circumspect analysis and careful thought, not merely the psycho-phenomenological "failure to let go of one's ego at death"—which, some might feel, is a rather unsatisfactory explanation [22,23].

### 2.5. The Semantic Content of Experiences Undergone

I am unaware of any studies in which the content of subjects' reports has been subject to extended critical analysis. Yet, some very bizarre happenings have been published in numerous assembled anthologies without comment by their respective authors. Here are some examples which have an important bearing on what might actually be going on during these experiences.

Following a heart attack ([6], p. 79), a subject meets his father deceased 15 years previously "...dressed just like he used to be...in grey trousers and a cardigan. He hadn't changed a bit. We chatted quite naturally [about the family] and he joked..."The obvious questions are: had his father ever undressed and showered? And while showering, were his old grey trousers and cardigan laundered?

Another woman after cardiac arrest explained: "I found myself in front of a nice prefabricated building—and mother was visible inside". The patient observes that, having brought some dress-making material, her mother took scissors and prepared to cut the fabric despite her known inability as a seamstress. This horrified the daughter, but her mother replied that since arriving [there] she has been *taught* how to sew. Then, refusing her an entrance into the house, the daughter was forced to return home (? to earth), not a little disgruntled, perhaps ([6], p. 54).

A third woman ([5], p. 100), having endured a painful labour followed by Caesarian Section, agonised: "I'm not staying here—[my husband] can't cope with the new baby, he's just got a new job and I've left a pile of shirts to be ironed and he doesn't know how to do them."

These are some of the most curious accounts I could muster from the NDE literature surveyed and employed by the various authors as serious contributions to it. If that is credible, then we cannot therefore dismiss them, nor fail to notice their geo-physical, anthropomorphic content which offers dream-like themes of extreme banality, devoid of intelligible meaning. This analysis, to my mind, offers a further telling argument against any serious import to NDE phenomenology, other than deriving from the brains of the subjects reporting.

### 2.6. The Jesus Characteristics and Geography of Heaven: True Insights—or Not?

Similar criticisms as given above apply, more specifically, to so-called viewings of Jesus during NDE. Do these, at last, give us the crucial fill-in detail lacking in New Testament documents?



“I can see that form now—it had blond-gold hair...and a beard—very light, and a moustache [and] a white garment on—there was a red spot here [points to image of a Sacred Heart on gown]—and a chalice in his hand” ([1], p. 60).

Or: “He was tall—had a white robe on—his face was beautiful—his skin was glowing and absolutely flawless” ([4], p. 49).

And “She [in reference to the subject’s mother] was wearing a long sparkling silver gown—[as] did Christ—he had long hair—long beard” ([4], p. 169).

And: “...I saw Christ. He was incredibly beautiful...his feet were bare. The bosom was open and you could see his chest. He had hair down to his shoulders and a beard. There was light coming out of his head like a star” ([5], p. 229).

Jesus was a Sephardi Jew, thus probably of dark countenance with black hair.

Finally, what is the descriptive geography of the “otherworld”? For Sabom’s subjects ([4], Table XII) we get blue skies; clouds; parkland; mist; water; the Sea of Galilee; a road; a fence; a long corridor; mountain top; golden gates; and geographic peoples undertaking cultural handicrafts. And from the correspondents in Jeffery Long’s *“Evidence of the Afterlife”* [19], we are uncritically served up with blue skies, rolling hills, flowers, colours, music, distant city vistas, and so on. These lists are culturally-determined and hardly exemplary of any useful insights into the supposed otherworldly realm. Again, we seemingly derive nothing new or revelatory, or never before encountered on earth, but only a humdrum miscellany derivative of the media; art galleries, film, Hollywood, and so on. Unfortunately, nothing retold is novel, or truly “transcendent”: only lacking in meaning and imparting a totally valueless message.

### 3. Neuro(patho)logical Considerations

#### 3.1. *The Physical Features of the ND/OBE Body*

The emphasis in the published accounts is that subjects are out of their bodies so that the physical aspects of corporeality which enshrines earthly life should no longer be necessary. But in many of the recorded accounts by several authors, this dependency on flesh seems to have gone unnoticed. We saw an example above with the deceased father wearing the same old clothes brought from his last moments on earth.

Here is an account of an attempted suicide with a firm sense of self. “I remember that I could see myself walking away. I was...20 feet away...I could see me walking away. I was wearing this grey suit that I bought last year and I was walking away from myself hanging there” ([1], p. 46). He was not wearing a grey suit, but wore something entirely different, hinting that what is reported is not necessarily a true account of what actually happened.

In another example, the description is also physical: “I had this piece of clothing on...very loose...and I remember having bare feet...it was very different...very thin, very delicate, very light. My face and hands were the same because I remember trying to touch my face to make sure everything was OK...[and]...I could feel it” ([1], p. 52). What is so interesting here is that the subject mentions her feet, which is most unusual. I have often wondered what subjects thought they had on their feet, and whether the other-worldly (heavenly) abode was boarded, paved or carpeted.

In all these accounts there is a firm sense of possessing a body and of the first person perspective, exemplified by the use of the personal pronoun “I”, or of actions requiring legs or capacity to sit down, or other reference to the self (“me”, “my”, etc.). Such self-directed reference points to the involvement of the cerebrally-located temporo-parietal junction (TPJ) (see below for detailed analysis) as co-ordinating centre for this outcome [24].

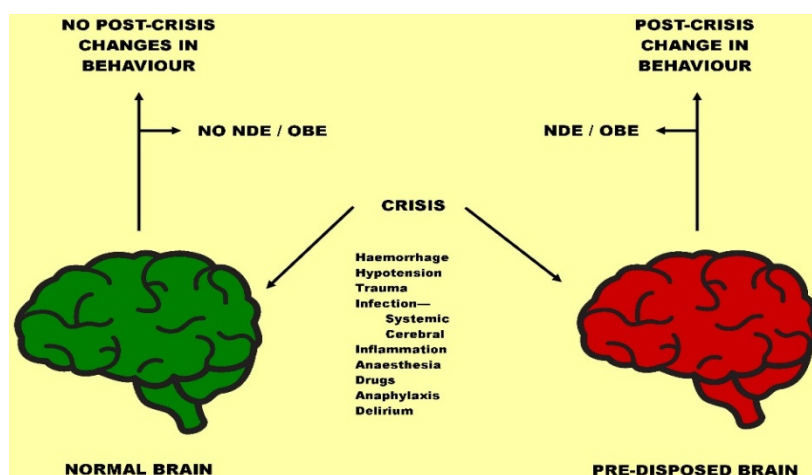
### 3.2. Duality of Conscious Awareness during ND/OBE

On the other hand, there are occasions when a duality of awareness has been recorded. This to me is another very relevant factor as to how we view the phenomenology of ND/OBE, because these depict occasions when *other-worldly* experience is welded to *this-worldly* experience. Since each is unlikely to exist within their separate domains, the implication indicates quite clearly a bodily response to both aspects of the experience. These include hearing voices at the end of the bed, the placing of an oxygen mask over the face, being “poked” at by verminous creatures, feeling the searing burn after application of the defibrillating electrodes, or the painful stab of an injection—all interrupting the peaceful world of the NDE. The subject recorded by the Fenwicks ([5], pp. 154–55) was electrocuted while aboard a naval vessel. The old Holger-Nielson assisted respiration technique was employed during his resuscitation (this involved raising the victim’s arms rhythmically in order to ventilate the lungs). He described the frustration of trying to rise during his NDE while, at the same time, being held down by the external hold on his arms.

Similar dual experiences have been recorded in migraine sufferers, with doubles replicating their physical actions. One lady proclaimed being able to observe herself during her duties: “*It was if I was in another dimension—there was ‘I’ and there was ‘me’*” [25]. Another case by the same author recounted a woman who, during her aura, felt that her phantom body was more real, her actual body being regarded as the more illusory. In another case, the migraineur’s elevated body observed her earthly activities, during which, “*time was suspended*”. This kind of experience, due to changes in blood perfusion to the brain, is truly reminiscent of OBE, reproducing several common phenomenological aspects.

### 3.3. The Vestibular System and the Out-of-Body Component

Much ECE phenomenology—hellish and heavenly—involves considerable hallucinatory motion: flying, ascending, floating, accelerating, spinning, falling, weightlessness, and bumping back into one’s body after the episode of weightlessness.



**Figure 2.** It is widely assumed that undergoing medical or psychological crises is the direct cause of ND/OBE and out of which changes in post-event behaviour arise. But an increasing number of neurological papers suggests that a variety of behavioural aberrations occur because the brain is already predisposed by an earlier insult not routinely clinically observable or apparent. Then, subsequent to these varied later crises, marked changes in post-experiential behaviour then may appear. Genetic factors are also likely to be operative here as well. It is therefore possible that a changed behavioural phenotype is the principal outcome of subjects following one of the typical clinical crises undergone (listed), so that the ND/OBE, itself, might be viewed only as an epiphenomenon.

Throughout normal existence, the vestibular system contributes to the sense of body image (ego-centric) and its relationship to the immediate environment (peri-personal space), with the help of additional incoming information provided by movements of the eyes, head, neck, skin and joints (Figure 2). All this information is received into a higher-level “multi-modal” area within the temporo-parietal junction (TPJ) of the right cerebral hemisphere [26–28]. The actual vestibular component comes from structures within the inner ear via the “vestibular” division of the VIII<sup>th</sup> cranial nerve. These structures include the semi-circular canals which orientate us spatially, while the saccule and utricle sense gravity and alterations in bodily motion. The utricle and saccule contain large numbers of hairs bearing a crystal at their ends—the so-called “otoliths” [29]. These bend in response to the strength and direction of external environmental forces imposed upon the body. Their movements are translated as signals into nerve endings which ultimately unite to form the vestibular branch of VIII. Their normal functioning, for example, allows us to continue walking upright in the dark while holding a cup of coffee without spillage. Their influence is also perceived in the illusory continuation of the motion experienced after coming off a fairground roundabout, or disembarking a ship which has just weathered heavy seas.

An OBE invariably occurs while subjects are recumbent, due to reduced positional sensitivity of the utricle to gravitational force. The common illusion of floating beneath the ceiling during an OBE represents an anomalous perception of bodily (conscious) location, extended almost invariably within para-centric space and never extending, it should be noticed, miles away to the horizon. This is the most extreme form of the projection of consciousness, in comparison with autoscopy and heautoscopy. The former is an inert recognition of one’s double, while the latter is more intriguing, since consciousness seems to oscillate between the subject and the illusory bodily phantom.

#### 3.4. *The Tunnel Phenomenon and the Perceived Light*

These are aspects of ND/OBE phenomenology beloved of the media. Yet, despite being frequently shrouded in “mystical” overtones, the percentage of subjects reporting a tunnel (Figure 1) is not overly impressive. Indeed, only 10% subjects in Drab’s meta-analysis recalled this phenomenon: these had severe accompanying diseases such as a cardio-respiratory collapse and cancer [8]. “Tunnels” were described long ago in association with deep ether anaesthesia [30], while in other studies [31,32], 8% “laboratory fainters” were also confronted by a tunnel. Furthermore in the same study of over-breathing, 16% volunteers underwent an OBE, even though the latter had no associated commerce with so-called heavenly vistas, and so on. Clearly, the tunnel is not a physically-based route leading to eternity, nor the exclusive preserve of ND/OBE.

However, in terms of ND/OBE, what *meaning* does the tunnel convey—if any? A closer reading of subjects’ accounts reveals that a tunnel usually is reported only if vestibular-induced hallucinatory movement is simultaneously experienced with an enlarging circular light. This association is made all the more explicable because of our knowledge of some of the resulting brain damage effected by a reduction in cerebral blood flow (for example, following cardiac resuscitation). One form of damage [33] involves part of the visual system (termed the optic radiation, which is a bundle of nerve fibres spreading upwards from the posterior visual cortex to the temporal-parietal zone). Importantly, there is a relative loss of *peripheral* vision, although *central* vision (so-called macular region) is spared, thus accounting for the central perception of a light as consciousness is progressively regained. Here then is a reasonably plausible account of reported “*movement through a tunnel*” and onwards “*into the light*”.

#### 3.5. *How Accurate Are Reports about OBE?—General Comments*

Subjects sometimes have reported on things or events impossible to have been witnessed from their resuscitative viewpoint, thus encouraging associations of OBE with “telepathic” or other so-called “otherworldly” possibilities. As far as is known, no writer or investigator has compared levels of increasing conscious-awareness (measured, for example, with a BIS machine (as sometimes used



by anaesthetists to gauge levels of surgical anaesthesia)—despite their inconsistencies [34,35]), with the events later narrated by the subject and extrapolated backwards from the objective time-point at which full conscious-awareness re-emerged. In no such study is it possible to declare indubitably the concurrence of the phenomenology when the brain was actually and precisely non-functional.

The NDE fraternity is keenly interested in obtaining data which critically shows that patients undergoing NDE during their treatment are actually—somehow—out of their bodies and exhibiting conscious awareness without a functioning brain. Those whose professional lives are not caught up in these intensely challenging outcomes do need to be made aware of the pressures involved. The publication of the recent Aware study is a case in point [36].

That study was exceptionally hyped-up throughout the media in the expectation that those patients undergoing cardiac arrest across US/European centres, and having an ND/OBE, would later comment on specific material concealed around the Intensive Care Units of involved hospitals. Rather miserably, not many patients recorded any kind of experience. The “data” rested on one single patient who apparently heard an instrument “bleep” during his resuscitation. The authors massively concluded from this lone example that there was experience despite a “dead” brain. But there was no robust neurophysiological investigation to demonstrate a non-functional brain and that this corresponded precisely to his observational abilities during his resuscitation. Nor was it demonstrated whether the patient was in fact conscious when the bleep went off.

This is an example of gross extrapolation from a single case-record where the much-needed empirical parameters were simply not demonstrated. On social media networks [37] there has been withering criticism of the “Aware” study, given that the conclusion was based on such fragile, if dodgy, evidence. Indeed, the stakes are high obviously, and could not be higher, because the proposition now at the forefront of this ND/OBE debate is whether some kind of existence is possible outside the body, if not a “dead” brain. The problem is that these brains are not dead, because the patients survive. A dead brain would belong to a corpse residing in a morgue refrigerator and awaiting the undertaker’s arrival. As Dieguezwriely commented [38]: “There is the embarrassing failure to find even one irrefutable case of ‘veridical perceptions’ during brain inactivity...whereas such cases should be all over the place according to any transcendental or non-reductionist account”: (his emphases).

### 3.6. Are OBE Reports Reliably Accurate?—The Non-Contributory Case of Pam Reynolds

Here, we should recollect that OBE testimony may be inaccurate or patently false, as with (the late) Pam Reynolds, despite her worldwide notoriety concerning the account given of her brain operation. We know her anaesthetic lasted >6 h, and her verbatim account comprises ~725 words ([4], p. 37; [39], p. 184). In recalling her ND/OBE, she declared she was “*sitting on the neurosurgeon’s shoulders with heightened visual acuity*”, but Reynolds erroneously failed to understand: (1) that her head was turned on its left and held there by a 3-pointed mechanical brace; (2) that her hair had not been completely shaved; (3) that she was unable to state *where* the bone saw was used; (4) that despite her grandstand view and hence before her very eyes, she astoundingly failed to recognize that the surgeon was removing a large circular flap of her skull in order to assess the feasibility of operating, as well as to provide access for himself; (5) that she mistakenly alleged that the bone saw and femoral vein cannulation were *consecutive* procedures: they were, in fact, *simultaneous*. That had to be, because organising the extra-corporeal circulation and cooling system to support her body and brain during the next operative phase would take a long time, yet it had to be in place when the surgeon was ready to proceed further and remove the life-threatening bulge on her artery; and (6) Next we have to consider that she heard the saw, *despite wearing ear plugs*. But no-one seems to have realized (not even the medically-qualified Dr. Sabom) that she would have heard the sound of the saw *as a result of* normal bone conduction through the auditory division of the 8<sup>th</sup> cranial nerve, thus by-passing the blocked ears. In this case, *the blocked ears now become completely irrelevant!* The situation obtaining here is precisely analogous to the buzzing tuning-fork test employed by placing it on the front of any patient’s forehead (in ENT clinics) to assess whether there is an air-conduction defect (commonly

blocked with ear-wax) on one or other side. In addition, she would have literally “felt” the saw’s presence and especially its vibrations as it ripped through her skull. Those latter sensations—sound, touch, vibration—would have been conducted through her (posterior) dorsal columns, and onwards towards her thalamus, and thence into consciousness. This is directly analogous to the dentist’s drill which, no doubt, we have all felt—and heard.

The laterally-placed spino-thalamic tracts of the spinal cord would not have played much role. So there is nothing unusual about the fact of she heard the saw and its pitch, even though she could not say, amazingly, where it was being used! Clearly, it seems apparent that she was not out of her body on that fateful morning.

The crucial outcome here, so far unappreciated, concerns where her mind/consciousness actually were during the 6+ hour period of anaesthetic unconsciousness, given that the sparse 725-word report offered contained remembered cerebral events which could only have lasted a few minutes in real time. Surely a mind or consciousness freed from physical (cerebral) constraints, as written about by van Lommel [8] OK, should be able to do better than that! So this critical question remains: where was her brain and what exactly was it doing when it was supposedly outside her body for that very long, blank period exceeding 6 h of real time? The answer is that it was firmly within her skull, as also her consciousness—or mind. What is clearly evident is that Reynolds’s case provides no exemplary proof of anything.

Finally, another point missed by all the ND/OBE experts. During the operation, Reynolds was frozen down to 60 °F degrees (normal body temperature: 98.4) during which time, all circulation ceased including that to the brain. But another critical addition to the technique was the use of barbiturates in order to further metabolically protect her brain from the resulting loss of blood flow [40,41]. But that concentration of barbiturate would have remained constant during the critical operative period since there was no circulation because of the induced cardiac standstill, and thus no effective renal clearance of the drug once it had been administered. The sensitivity of the midbrain to barbiturates is recognised [42] and can cause *peduncular hallucinosis*, resulting in vivid, lively visual hallucinations ([43]; [44], pp. 183–86). The use of barbiturates could therefore either be another, or a contributory, neurological reason for her hallucinated experiences on that day.

I note that this hitherto “miraculous” case has been quietly dropped from the anecdotal curriculum. But surely the ND fraternity should be honest enough to acknowledge the errors accruing in this case and to accept that there is a complete, prosaic, down-to-earth explanation for what went on. The case of Pam Reynolds should not be left on the sidelines because it no longer conforms to accepted paradigms. The lesson obviously still awaiting to be learned is that OBEs are not necessarily true representations of what was actually going on at the time. That principle must surely be generally recognized—at some time or another.

### 3.7. The Neurophysiological Basis of ND/OBE Phenomenology

The neurological basis of OBE as part of NDE is certainly becoming much clearer. At least, that’s one outcome to be reasonably sure of, and we can all be thankful to Professor Olaf Blanke [23,45] and his colleagues for their contributory elucidations. Moreover, it is most important that apart from OBE, we should also take into consideration the occurrence of associated aberrations of ego/paracentric space—that is, autoscopia, heautoscopia, and the sensing of invisible presences, as noted in a previous section. It is becoming somewhat more difficult to continue insisting that ND/OBE are “mystical” or “other-worldly”, occur only with “dead” brains, and thus “point” to something outside the realm of everyday existence. As a result, the whole mysterious edifice surrounding these events and built up over the years by so many of its proponents is beginning to fall apart, since the science is progressively entering this domain and undermining many of those previously-held assumptions [10].

My argument is that ND/OBE are neurophysiologically determined: such an approach provides the sole explanation for the bizarre, illusory juxta-positioning of “Hell” and “Heaven”. In a previous essay ([44], pp. 71–79), I argued that ND/OBE occur as subjects are re-awakening to full

conscious-awareness. There is considerable evidence in the literature supporting that view, the vividness analogous to a hypnopompic or other type of re-awakening from an antecedent state of depressed consciousness-awareness.

Consider:

“[I came] rushing through a tunnel and snapped back into my body”;

“When they put the shocks [electrical defibrillation] on me and I fell back, down to my body, like a dead weight. And the next thing, I was in my body again”;

“Then there was sudden confusion—I was upset and scared—something was wrong. I regained my body and felt tremendous pain all over”.

These typically abrupt terminations with onset of full conscious-awareness were succinctly summarised at the outset in 1980 by Ring ([1], p. 101): “Once the individual has returned, painfully or otherwise to his body, the...experience is over...but...how exactly does one accomplish this return?—that is, re-unite with one’s body?” (my emphases). But what *actually* needs to be re-united? It logically follows that if NDE are re-awakening phenomena (Table 1) as indicated above, nothing needs to re-unite with the body. Ring’s speculative baggage confuses the issue. Moreover, how else could these reports be interpreted?

**Table 1.** I have dismissed the so-called “core” trajectory of ND/OBE as not being a true representation of what subjects have actually recalled, being more an artefact contrived in the minds of the authors reporting these events, as originally depicted by Moody [1]. That discrepancy is obviously revealed by the data displayed (Figure 1) above. A re-classification of ND/OBE as more reflective of what subjects have actually reported is summarised and classified into early-, and late-, phase experiences.

NDE: Early & Late Phase	
● No pain	● Increased pain perception
● Ability to traverse physical objects	● Hearing real voices
● Absence of gravity—floating/weightless	● “Moral” imperative to assume earthly responsibilities
● Sense of motion—acceleration/gyration	● Unable/unwilling to cross physical barriers
● Seeing light & people	● Bumpy return to body—weight/pain
● No “moral” qualms when leaving family	

Based on my critical readings of published testimony ([44], pp. 71–79), my understanding of events is that

- (1) NDE terminate as subjects regain full conscious-awareness—there is no recorded case to the contrary;
- (2) it follows that ND/OBE occur in the immediate run-up period to that objective time-point;
- (3) the use of word-counts (as used in dream research) suggests that these events are ephemeral and generally last only a few seconds or minutes: there can be no escape from that conclusion, and is a key issue;
- (4) this seems to be a sensible conclusion since, on physiological grounds, memories can only be set down when the brain is not in a moribund state—a fourth vital point needing recognition. Surely the most sensible conclusion is that ND/OBE do occur, and are remembered during those final moments as subjects are rapidly returning to full conscious-awareness;
- (5) ND/OBE are therefore brain-originating phenomena, and not trips to “Heaven”, “Hell”, other imagined cosmic spaces, or generated by external agencies.

From that, we should note that since ND/OBE are clearly, and most vividly remembered, the “dead” brain hypothesis somewhat fails. To avoid the obvious embarrassment, we are then required to believe that consciousness, mind or soul escape from the body/brain to sample an “otherworld” or, alternatively, taps into van Lommel’s universal “cosmic consciousness” (whatever that could mean).

My view, additionally, is supported by other laboratory-derived, empirical data obtained from:

- (1) suicide survivors from the Golden Gate Bridge [46];
- (2) those making themselves lose consciousness by over-ventilating and squatting [31,32];
- (3) from military pilots centrifuged to unconsciousness.

The scientists conducting the military experiments strikingly commented—*“It is interesting that a coherent visual illusion can be generated within such a short period of time”*—that is, during the few laboratory-measured seconds as these aircrew were recovering full conscious-awareness [47]. But all categories in recovering from their varied episodes of unconsciousness, like ND/OBE subjects, underwent episodes of transcendent joy, peace, vividness of experience, with some not even wishing to return to “earth”.

### 3.8. Is there a Predisposed Brain Underlying ND/OBE Phenomenology?

I refer back to my opening remarks on prevalences of <1% in respect of global population. The obvious question arises as to why the majority is not subject to ND/OBE during one or other lifetime crises. Even ~90% for those surviving cardiac arrest (even if we took the unrepresentative figures of 10%–20% as applicable across the board) do not have them.

This way of thinking inevitably suggests possibilities of brains that are predisposed in those subject to ND/OBE. An analogous occurrence is post-traumatic stress disorder (PTSD), for whom following the endurance of a severe, life-threatening crisis, there is a marked later change in phenotypic behaviour as well as manifest epigenetic changes to the genome [48]. For many PTSD candidates, there is a clear history of childhood abuse—verbal, physical, even sexual. And with other forms of fearful, threatening assault, including facing a gun or knife, or undergoing rape, the residual horrifying trauma of such encounters can be persistent and hence life-destroying. These early influences have profound, long-lasting influences on subjects’ subsequent mental profiles—however that profile may be realised in later years [49–51]. And if severely stressful occasions interfere with later life behaviours, might not lesser impacts likewise lead to other forms of deviant or unexpected behavioural responsiveness?

Previous demographic observations on ND/OBE subjects have not elicited general factors (ethnicity, gender, age, profession, social class) of apparent relevance. Thus, other deeper factors need to be considered, and appropriate methods employed in the exposure of their contributory role(s). The interdependence of gene and environment is not well explored in terms of ND/OBE. I am unable to find any studies, despite the fairly large populations reported in which, for example, so-called identical twins have together had this type of experience—or more interestingly, *not*. Nevertheless genetic factors are of great conceptual interest, because several polymorphic variations in key brain receptors (genetically-determined alterations in the chemical composition of these molecules) for such important neurotransmitters as serotonin and dopamine, influence responses to environment [52,53] as manifested in the particular personality and temperament of each individual, and even involving such traits as “spirituality” and “transcendence”. We should note that after selective brain surgery (for variously graded cortically-located malignant gliomas), a loss of transcendence was observed after interference specifically with the left and right parietal lobe areas [54]. Importantly, pre-operative assessments on these patients showed the reality of the later changed behavioural outcomes. There is a large literature pertaining to such influences, and similar methodologies need to be applied to large cohorts of ND/OBE experiencers, compared with large, age/gender/ethnically-matched groups of control subjects. How sure are we that ND/OBE do not comprise a subtle grouping whose characteristics have not been explored—neither, so far, identified?

In addition to genetic traits, and genetic-environmental interactions and their resultant outcomes, the fascinating study of Britton and Bootzin [55] indicated that some ND/OBE subjects do have subclinical structural damage to their brains (temporal lobes), and is a viewpoint deserving of wider, in-depth study. Their subjects revealed a greater prevalence of inter-ictalepileptiform wave-forms, albeit on the left-hand side, but which were not correlated with the specific features of each NDE

undergone. Left-sided temporal lobe activity of this type is more likely to be associated with a “presence”; the meeting of “spirits”; heautoscopy; flashbacks; and life-reviews. Moreover, a neurological predisposition may be far subtler THAN OTHER AUTHORS [56,57] HAVE indicated. There are enough post-ND/OBE people around, so it is surprising such intriguing observations have not been continued with much larger cohorts of these subjects.

From another perspective, there are studies indicative of an abnormal perception of bodily habitus, dissatisfaction with their private and public appearances, and low regard for their shape and appearance [58]. It is not clear why this marked perceptual difference in body shape occurs, but could well be due to a neurological dysfunction. My point here is that the propensity to undergo ND/OBE is tied closely to a cognitive misjudgement of body shape, and therefore is reflective of a predisposed brain.

Despite a large body of neurophysiological evidence, far more prospective work needs to be done, especially in the detailed comparative investigation of the brains of potential subjects—*before*, as well as *after*, they undergo an NDE. Some analogous form of cerebral pre-disposition could be the initiating trigger (Figure 2) which exposes these subjects to an altered behavioural phenotype following exposure to acute psychological or physiological crisis (infection: inflammation: dissociating drug usage: haemorrhage: child-birth: for example: moreover, much NDE reportage may have been significantly biased by excessive use of male coronary care patients).

We should also be aware that the temporal lobe lies at the vascular watershed between the forward carotid system, and the rear vertebral-basilar arterial systems to the brain. Thus acute reductions in perfusion pressure would make this region of the brain highly susceptible to the effects of reductions in blood supply and hence oxygen availability. Many studies are being conducted with coronary care patients, whose reason for admission is due to atherosclerotic blockage of the coronary arteries. But arterial atherosclerosis is a generalised disease, coincidentally affecting leg and brain blood vessels. In these patients, a loss of cerebral perfusion pressure could be all the more catastrophic. Moreover, as their brains recover, the brain reperfusion could be uneven, thus allowing some centres to operate without the necessary physiological controlling centres being already in place.

The occurrence of NDE as conscious-awareness is being regained [59] could thus be envisioned as a reactive epiphenomenon, dependent on the causative (crisis) factor coupled to underlying lesional pathologies (genetic, intra-uterine, and post-natal) in subjects' brains, or other longer-term incursions on cerebral function, along the lines discussed above. This would not undermine the interesting propositions [60,61] related to genetic abnormalities in brain switching concerning REM intrusion modes, and allied phenomena. This idea goes far in offering additional contributory explanations into the neural basis of ND/OBE phenomenology. All of these suggestions are indicative of several new lines of neurophysiological study (clinical and neurophysiological) aimed at evincing deeper understandings of the underlying mechanisms of reactive ND/OBE.

### 3.9. REM-Intrusion and the Emergent State of Otherworld Possession

In their papers [60,61] Nelson, Mattingly and Schmitt remind us that consciousness comprises wakefulness, and two sleep modes—deep sleep and REM sleep. During the latter, the brain is neither in a non-functional, nor manifestly inoperative mode. The authors draw attention to the possible disturbances that could exist between these three states, and especially between wakefulness and REM sleep and the dreams which accompany it. However, between these varying states of arousal, there may arise anomalous circumstances in which subjects do not know which state they are in, leading to feelings of detachment from themselves and the world, which generates a spurious sense of belonging to a greater “union”, or “composite association”, and which usually defies expression.

That state, in reality, exemplifies the ineffability of the events undergone during these rare occasions, as distinct from the purely banal descriptions of blue skies and wispy white clouds that characterize much ND/OBE reporting. Furthermore, this state of uncertainty is probably not much different from other “mystical states” expressing such percepts as “Absolute Being”, union with



God as experienced by Christian mystics, or other spiritualized encounters with presumptive divine figures ([62], p. 224).

Their argument is partly drawn from subjects having transiently abnormal forms of consciousness, such as sleep paralysis [63], lucid dreaming [64,65], and narcolepsy. Narcolepsy, the disposition to fall asleep at any time, results from a reduced secretion of a protein known as hypocretin (orexin) which is under genetic control [66–68]. Indeed, these specific abnormalities in arousal result from a pre-disposed brain whose influences can be determined when questioning some who have undergone ND/OBE. There may also be strong connections with the condition known as *peduncular hallucinosis*, discussed above in relation to Reynold's hallucinatory recollections (Section 3.6). These disturbances, in general, would arise from abnormal neuropathology in the upper brainstem, which controls our varied states of arousal. Indeed, the transitions occur as molecular switching between the relevant sets of mutually inhibitory neurons is operative, especially including those secreting nor-adrenaline or acetylcholine, as well as other specialized sets of neurons and their specific neurotransmitters [69,70].

Additional support for this view is provided by the observation that loss of blood pressure (as might naturally occur with a cardiac arrest, heavy bleeding, or severe anaphylaxis) prompts distant effects on the brain stem, with the stimulation of REM sleep [71]. The functional connection for this outcome arises through the tenth cranial nerve (Vagus) which transmits from the heart and great blood vessels to the area in the upper brainstem which is associated with the switch between conscious-awareness and REM sleep (the ventrolateral peri-aqueductal gray matter, or vlPAG) [62,72].

These observations are of extreme importance in offering neurologically-based approaches to some of the varied phenomenology which is idiosyncratically experienced during ND/OBE. More pertinently, they offer a possible explanation for the utter ineffability of those particularly rarer occurrences during which subjects no longer know where they are, but who now seemingly find themselves located in an amorphous existence which is felt to suggest union with a greater outside being, or other non-definable state of existing, and in which selfhood likewise is deemed to have evaporated.

#### 4. Theological Considerations

##### 4.1. Considering the Spiritual Domain of NDE

These considerations bring us to a more formal approach to NDE content in its relevance and reference to the "spiritual" world. From a theological perspective, it must be asked whether these particular reminiscences are truly representative of visits to a heavenly realm and even, perhaps, veridical encounters with divine beings as seen from within the more formalised purview of Christian theology.

Understanding the nature of divine encounter is never easy, but the kind of experiences recorded in "classical" religious literature have been analysed by the US philosopher William P Alston [73]. He, with William James [74], notes their four experiential characteristics: ineffability (of which we have spoken in the preceding section); noetic; transient; passive. I have already alluded to the lack of new knowledge (noesis) arising from NDE, while their passivity and transience are less controversial. Of great importance is how the divine encounter is received. That is because, by whatever means the message is delivered, it must enter the subsequent conscious activities of the recipient. S John of Patmos understood the command "Write". But that contrasts with the intensely abstract lightning flash which apprehended S Paul as part of his Damascene Experience. Clearly, for many people throughout history, the certainty arises that a divine encounter occurred and that this directed subsequent behavioural directions. And, for Peter Berger, history is full of tell-tale glimmerings of the influence of the Godhead in earthly affairs [75].

But "spiritual experiences" can be interrogated scientifically, and so in emphasising the neurological basis of NDE/OBE in respect of "otherworldly" or even "heavenly" implications, I wish to briefly consider the data of Alister Hardy, formerly Professor of Zoology at Oxford (despite some Referee concern). Hardy perceived religious experiences as ancient, evolutionary

traits of great transcendental discovery and outreach, received and evoked through word, music or painting—even science, anticipating additional progress from purely observational reports towards formal scientific underwritings. Thus, as Evolutionary Theory had developed from the observations of Wallace and Darwin, and Molecular Genetics from the monastic pea garden of Gregor Mendel, so likewise a “Biology of God” could ultimately be realised, based on reported religious behaviour and experiences—however ineffable. Hardy was sensible enough, however, to recognise the need for a functioning brain [76].

My first point in using Hardy’s data is to reveal the difference between his well-authenticated data, and the less scientifically documented reports in the books on NDE referred to in Figure 1, above. He was a proper scientist who carefully tabulated his data in regard to visual, auditory, haptic (tactile) and olfactory (taste) modalities undergone ([76], pp. 26–29). And my second point is that his data can now also be related to current computerised data on the percentage occupancy for each sensory modality in the cerebral cortex. When both sets of observations are expressed graphically, in parallel, they correspond extraordinarily closely [77] (Figure 3).

These findings strongly indicate experiences very closely reflecting, if not deriving from, brain function. If these experiences, like ND/OBE were supposed to be out of the brain, especially if that brain were in a supposedly non-functional mode as is so often asserted these days, such results might not, perhaps, be expected. There are no enshrouded areas within the brain containing “sacred” neurones, shielded from the vulgarities of ordinary, daytime neural commerce. Any religious system comprises propositions which need full cognitive engagement with and which, when assented to, result in a sustained faith in their authenticity, and in a hope of things to come. While NDE phenomenology is frequently upheld as reflective of divine experiences, formal Theology conversely recognizes no such association or new insights as derivative of that literature.

#### 4.2. *Changed Perceptions in Subjects Post-Event*

One of the undoubted sequelae of undergoing ND/OBE phenomenology presumably involves long-term cerebral mechanisms responsible for radical transformations in the lives of many subjects following their subsequent return to daily living. It is difficult to conceive of other mechanisms responsible for these remarkable changes, other than altered, and newly-established, neurophysiological processes in brain function and thus reflected in personality. One remarkable alteration is a reduced fear of death and a strengthened belief in the reality of the afterlife—however now (re)-conceived.

There also emerges increased personal motivation, self-respect and confidence, often translated into heightened concerns for others as expressed through compassion and tolerance. Family ties are invariably fostered in greater expressions of love, friendship and goodwill, while an increase in personal faith obtains for those whose lives already were endowed with a pre-existing belief-system. It does not appear that we have seen a massive trend towards the “universal spirituality” which Kenneth Ring envisaged by the millions of US subjects who apparently have undergone ND/OBE ([78], pp. 145–47, 252).

On the contrary, many non-NDE subjects do not undergo such profound changes in personality, nor for that matter, in religious belief or spirituality. These more sober accounts are entirely inconsistent with van Lommel’s claim ([8], p. 151) that after an 8-year follow-up, his non-NDE subjects developed alterations in their outlooks and beliefs. The flaw in this claim results from his failure to incorporate a larger, age/gender-matched control (non-cardiac, non-ND/OBE) group that was otherwise healthy, and to have compared any changes in *their beliefs over the same period* with those who, following a cardiac crisis, did not undergo ND/OB experiences. Clearly, van Lommel’s study [7] needs to be repeated with this revisionary protocol in place, in order to more fully explore any influence of a medical crisis on future behavioural changes in those not undergoing ND/OBE.

#### 4.3. Comments on So-called Paranormal Outcomes of ND/OBE Phenomena

This section deals with the alleged occurrence of psychic phenomena in the wake of ND/OBE. Kenneth Ring makes much of this in *Heading Towards Omega* ([78], p. 166). According to Ring, the “empirical evidence supporting the claim that NDE... trigger psychic activities is very impressive indeed”. Ring actually believes that ND/OBE facilitate subjects’ spiritual awakenings and transformation, and thus “resembles a full-blown mystical experience—and this is the key—the effects of [NDE] also resemble those that stem from a mystical experience” ([78], p. 170). I am unable to clarify the grounds on which Ring makes this overwhelming assertion. Neither is there much to suggest that, in the mainline monotheistic traditions, “mystical” experiences lead to any widespread enhancement and outward manifestation of psychic ability.

Ring’s *Psychic Experience Inventory* elicits changes wrought in subjects’ psychical powers (clairvoyance, telepathy, pre-cognition, déjà vu, OBEs, and so on) and secondly, measures alterations in belief(s) concerning the spiritual, psychic, and occult worlds. He found that 80% of his subjects became more “intuitive”, 96% claimed “to be more in touch with an inner source of knowledge or wisdom”, while ~50% became “more clairvoyant and experienced more pre-cognitive flashes, déjà vu phenomena, and contact with spiritual guides” ([78], pp. 172–73). These conclusions are not given in a regular, tabulated form, but merely stated.

These data need evaluation in the light of other studies of the paranormal in the general population, and in which undergoing ND/OBE was not the central issue. Ross and Joshi [79] studied 502 subjects from a larger cohort of residents in Winnipeg, Canada. Overall, ~66% Canadians reported having one paranormal experience, and 10% more than four. Importantly, subjects traumatically or sexually abused as children revealed a clearly increased susceptibility to paranormal experiences than non-abused subjects ( $p < 0.001$ ) (see my Section 4.3 above). The prevalence of déjà vu phenomena was so common (~55%) that the investigators hardly thought it worth considering them as true psychic events. The occurrence of pre-cognitive dreams (18%) and mental telepathy (16%) was high, although Gallup and Newport [80] observed 25% of their US poll admitted having telepathic events. Non-dream pre-cognition showed a prevalence of 6%. It is not easy to compare item for item in this, and the other studies referred to above. Nevertheless, the point must be emphasised that psychical phenomena are extremely common throughout the (North American) general population, occur more frequently in younger persons, and are associated not only with childhood traumas, but may also be the sequelae of preceding brain damage, such as infections, closed head trauma, or other types of intrinsic cerebral neuropathology.

In another example, Ring continues his enthusiasm for psychic abilities following ND/OBE ([1], pp. 35–36) concerning Case 25 who suffered a hypotensive episode during childbirth, during which she simultaneously foresaw that her child would have a heart problem and be gifted. At first, Ring “did not have time to investigate this [him]self”, so the event lacked any immediate, objective corroboration. Yet later in the same book ([1], p. 75) we are invited “to recall Case 25 which presents more striking data consistent with the assumption that ND experiences can sometimes disclose pre-cognitive information” (my emphases here and below). Finally, Ring (1980) ([1], p. 126), the same case hardens into “a woman who, on nearly dying, received pre-cognition information about her newly delivered baby and felt she had to come back”.

This kind of poorly-controlled writing hardly progresses the ND/OBE cause. If pre-cognition were a real, and important quality acquired from undergoing ND/OBE, one might ask why such individuals were unable to predict “9/11” or the massacre in the Parisian offices of *Charlie Hebdo* in 2015. Even worse, we are expected to believe reports that following an ND/OBE, some subjects’ newly-acquired bodily electric fields make watch batteries malfunction, degrade car ignition systems, or result in kitchen refrigerators blowing up. It is amazing what some people believe.

From neurophysiological perspectives, there is a desire to understand the circuitry underlying acquisition of ordinary beliefs as well as paranormal beliefs and experiences which, to sensible people would seem entirely weird, but from which some useful neuropathological underpinnings

might emerge [81]. The term “paranormal” popularly refers to extra-sensory perceptions (telepathy, telekinesis, pre-cognition) and psychokinesis (actions over distances). Neuro-physiologically, paranormal refers to misperceptions of reality which appear to have profound personal significance, including the reasons why such misguided interpretations of day-to-day phenomena occur. These include co-incidences, visuo-auditory patterns thought to convey information or messages, abductions and alien control (as is seen in schizophrenic patients). Another aspect embraces the idea of “transliminality” which identifies subjects demonstrating high measures of magical ideation, a tendency towards paranormal events and “mystical” occurrences, introspection, fantasy-proneness, a tendency to hallucinate, sleep paralysis, as well as a high level of creativity [82,83], personality characteristics also found in other studies mentioned above [55–57]. These altered aspects of personality were associated with marked differences in the electroencephalographic records obtained, compared with those scoring low on The Transliminality Scale, indicating brains that are predisposed to these kinds of mental phenomenon. Less clear, at present, are whether and what type of body asymmetry, such as handedness, finger length discrepancies, and left-right brain preferences as indicative of developmental abnormalities, contribute to the paranormal phenotype [84]. This is a field which is expanding at an enormous rate, and despite methodological setbacks, will surely identify those people prone to these aberrant psychological profiles and the underlying biological processes responsible for their occurrence.

There is, however, an urgent need to move beyond the power of the single anecdote: in recent times the demise of the UFO (unidentified flying object) and abductions by aliens (whether little green men from outer space) has been overtaken by the application of quantum mesmerisms as possible contributory mechanism. The progressive employment of current “scientific” paradigms into the field of the paranormal parallels similar trends observed in 19–20th Century Spiritualism, which originally spawned the words “telekinesis” and “telepathy”, related directly to the introduction of radio and telephone communications. During that period, the first photographic records of “ghosts”—neatly clothed in contemporary garb and well-positioned alongside their latter progeny [85]—also began to appear (and, it might be added, fairies at the bottom of the garden). Little wonder that nowadays, quantum mechanics is the latest fad to have been dragged into the affray.

#### 4.4. *Grappling with Those Eternal—Yet Persistent—Key Questions!*

Theology deals, in part, with ultimate things and thus has its own eschatological curriculum—concerning the “Last Things”—including what happens to us after a real death, and of meanings such as having a resurrected body [86]. While there is no need to pursue these aspects of theological life beyond death and yet despite the uncertainties, they offer a stark contrast with some of the statements and mythology arising from the corpus of ND/OBE recollection [87].

Despite my insistence that ND/OBE reportage is intensely geomorphic, crowded by anthropomorphic reference, and littered with considerable banality, inconsistency and even overt silliness, others persist in seeing something of value in these recalled experiences.

For example, Dr. Long insists: “There is the ‘spiritual’ content of NDEs, namely answers to age-old questions: *Why are we here? What is important about our earthly existence? Is there an afterlife?*” [19]. In other words, from Long’s viewpoint, NDE reportage offers indisputable answers to these eternal questions. While evasively side-stepping an incisive definition of “spiritual”, he asserts: “Now that I have reviewed thousands of NDE case studies, I can say that the content of NDE had substantial consistency in these answers”. Really?—we might ask, yet not from the kind of banal case-reports and other material that I have briefly cited above (*Sections 2.3, 2.5 and 2.6*), surely?

Yet undeflated, Dr. Long persists: “I would emphasise that this consistency tells us that something real is taking place...” But what is that “something” and how “real” is it?

“...and that this remarkable consistency of spiritual messages suggests”—only suggests?—“something extremely important, not only for subjects, but for all of us”. But if we enquired about the kind of “extreme importance” he has in mind—and which might affect “all of us”, I doubt that we would be a further informed

Unfortunately, the problem questions set up have emphatically *not* been answered. That's the real flaw arising from the continued, dogged presentation of the psycho-phenomenological anecdotes with which Dr. Long occupies his time and which, despite his titular claim, unfortunately fail in offering any conceivably comprehensive "proof of afterlife", or its detailed characteristics.

These "spiritual" questions do remain to taunt us. And, what, then, are we being told by such NDE reports? Anything? As I have indicated, nothing whatsoever about the big questions posed. Indeed, in light of all of these intensely anthropomorphic, geo-centred reports, they recall Moody's comment, who so pertinently and perhaps unwittingly encapsulated the scene: "*Again and again, my NDE subjects have described to me a panoramic, wrap-around, full-colour, three-dimensional vision of these events in their lives ...*" [2].

That, I think, sums up the position very well. Given the many this-worldly contents of NDE reports, one might be somewhat reluctant in crediting to them any serious divine, or revelatory content, value or meaning.

## 5. Summary: Checking Reality

### 5.1. The Background Perspective

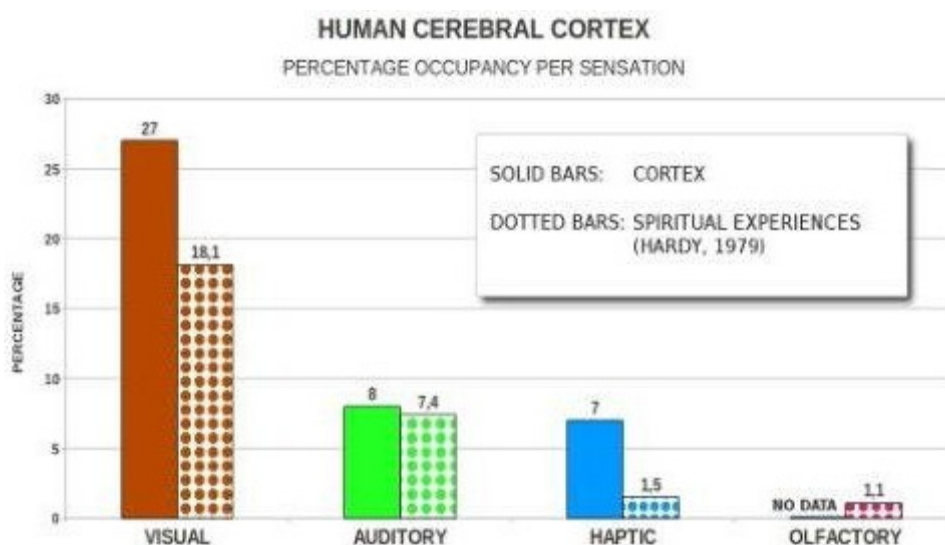
The manner in which the subject of ND/OBE has changed since Moody's books emerged nearly half a century ago has been fascinating. Yet in its evolution, two antithetical stances have been spawned, rather akin to the acute stand-off between pro-life and pro-women's groups over abortion, and pro-suicide and pro-life supporters over assisted suicide and dying. Concerning ND/OBE, there are those who earnestly believe the phenomenology points to a wider consciousness beyond individual minds. This seemingly involves some kind of cosmic or universal consciousness to which we are all inevitably bound, and for which mysterious quantum forces have now been recruited in explanation. Well, that is certainly one point of view. But of course, we should be conversant with the fact that life on earth is itself frequently illusory or frankly hallucinatory [88].

Alternatively, others believe these phenomena can, to a large extent, be explained by reference to the neurological basis and workings of the brain. In other words, ND/OBE are essentially hallucinatory phenomena resulting from perturbations of neural function. Curiously, those who hold this particular way of thinking are called "Sceptics", as though neuroscientists and their allies belonged to a "Luddite cabal" hell-bent on overturning what the other side holds true.

Yet, in writing their many books, a large number of authors have wanted, perhaps even needed, to refer to their work as "scientific". But as I pointed out above, it was very difficult to produce an original graph of the collected results of several prominent ND/OBE authors (Figure 1). Conversely, the work of Alister Hardy (former Professor of Zoology in the University of Oxford) in his compilation of all the detailed sensory attributes of spiritual encounters of 3000 subjects (Figure 3) provided an altogether different opportunity. His data were like referring to a scientifically-based, laboratory notebook. That said, I am very concerned with the outpouring of books connected with either a unified mind or other forms of conscious action or competence, derivative of earlier studies whose results do not warrant such extravagant claims, nor the enormously inflated conceptual speculations resulting from them.

One exemplary book is "*Mindsight*" [89] deriving from the authors' previous study of ND/OBE in the blind [90]. But there are deeply troubling concerns with this paper that do require exposure. Of just under 40 recruited subjects, it should be noted that only 10 (<25%) had never undergone visual experiences, albeit the crucial aspect of the study. The two most prominent subjects, Brad and Vicki changed their stories to less exuberant accounts when interviewed on a second occasion. Other accounts were either distinctly unimpressive due to excessive use of leading questions (Marsha), fuzzy recall of crucial details (Nancy) or, importantly (Frank) critically lacking corroboration by key witnesses to the (visual) events he allegedly recalled. The paper's discussion hardly makes reference to the results obtained, but quickly moved to a speculative other-worldly realm based on other authors' work of no immediate relevance to the study in hand.





**Figure 3.** Recent computer-aided studies of the human cerebral cortex have provided calculations of percentage occupancy for all the major sensory areas [77]. Below, against those percentage occupancies, are plotted the frequency of religious encounters classified by Hardy [76] as visual, auditory, tactile *etc.* There is a very close relationship between the two sets of data, firmly indicating that the contours of religious experiences (whether visual, auditory, *etc.*) closely follow the contours of the brain's involvement in these sensory attributes. Had these experiences originated from “outside” sources, one might have expected a different pattern or even one which did not, in the least, follow their cortical representations. Many of the subjects recorded by Hardy underwent features of ND/OBE. (Note that these data do not include other relevant functional areas of cortex which cannot be quantitated as easily as the major sensory areas).

Similar criticisms could be made against van Lommel whose actual study involved ND/OBE in cardiac arrest survivors [7,8]. From that work, despite the signal lack of any robust confirmatory neurological procedures, it was concluded that the experiences reported, albeit only in retrospect, arose at the precise time when their brains were non-functional, or, as the expression goes, “*clinically dead*” (see Section 3.5, above). And the argument then proceeds, as if a logical corollary and inevitable outcome, that consciousness can escape its neural confines and begin to enjoy a far greater functional union with its cosmic counterpart. A similar move was amazingly derived from the recently published Aware study [36], although the “evidence” for that momentous claim involved but one subject.

One can see, when such results together with the unimaginable conclusions drawn are howled at, that the term “sceptic” is deployed against the so-called unbelieving community.

### 5.2. Some Conceptual Inputs

- (1) It seems important to stress again that ND/OBE are non-uniform, extremely heterogeneous events—viewed historically, culturally, or personally. They are heavily overloaded with anthropomorphic and geophysical reference. Their idiosyncratic personally-biased characteristics almost deny definition. Their dreamlike content can be absurd, illogical, and even frankly silly. The juxtaposed occurrence of “hellish” as well as “heavenly” reports, and their inter-conversions, seriously undermines the possibility of sensibly belonging to, or even representing, another presumed non-physical realm. That difficulty, to my knowledge, has not been fully acknowledged by the ND fraternity.
- (2) Another threat, excluding willful dishonesty, is that some of the reported happenings are factually incorrect. Yet these aberrations are glossed over in the attempt to assert often with considerable force that the ones which are supposedly *not incorrect* indelibly point to existence away from, and independent of, the body. The current trend is based mainly on cardiac patients who may

represent particular, and possibly biased, kinds of ND experiences. Apart from their employment in supporting the "*consciousness-exists-outside-a-dead-brain*" mantra, they cannot be made to generalize upon, or even promote, those proposals advanced.

- (3) And while a few people have apparently learned all knowledge, and amassed the information residing in large (earth-like, it should be noted) libraries, these revelations are never capable of disclosure on return to earth. There has never been one, single revelatory report bringing to our attention something never before witnessed throughout the annals of recorded history on this planet. All we are served with are blue skies, fluffy white clouds, beautiful flowers, and so on (see *Section 4.4*, above). To me that sounds rather locally suspicious, and not the ideal programmatic material with which to usher in the new "Omega" or "Millennium", or whatever else we are headed for.
- (4) Another major problem that requires addressing is how the memory for these events is put down. It should be obvious to everyone that our memories require defined neural process for their capture, thus to facilitate subsequent expression. The increasingly ravaging effects of dementia severely remind us of that. However, "cosmic consciousness" seems very reluctant to relieve us of our failures to remember things on earth, neither those, it seems, having had the privileged luxury of travel to other-world destinations. This critically applies to all those experts who insist that some form of non-neural mentation can exist alone, or as part of the "Big Mind" somewhere out there. If it were insisted that the memories recollected were not due to neural function, then why are these same subjects incapable of bringing back remembered aspects of their experiences while away from earth, notably answers to the important questions about knowledge, life and existence? In that respect, there has been a consistent, miserable failure.
- (5) In addition, there must be some resonances to the fact that for many subjects, their experience ends precisely when conscious-awareness returns, reminding us of the abrupt return when our last period of nocturnal REM sleep finishes—so-called hypnopompic re-awakenings. Since this implies that ND/OBE occur during that period as conscious-awareness is being resumed, there is no problem concerning how memory for the event is set down. That period of resumed conscious-awareness can be quite rapid. That, for example, was demonstrated by scientists carrying out laboratory-timed observations with unconscious military aircrew as they came back to life. Their recollections occurred within 40 laboratory-timed seconds.
- (6) Some post-experiential subjects undergo profound changes in their lives and outlooks. Unfortunately, we still do not know what percentage of experients are so involved. But these life-changing reversals, although of great personal significance, are not unique to ND/OBE, since they frequently occur as a result of a profound life stress, an acutely fearful occurrence, childhood abuse, or the result of taking drugs, such as LSD. We do not have a clear picture why only a few ND/OBE subjects experience these changes, yet it is a phenomenon which could be empirically investigated through use of appropriate questionnaires and neurophysiological investigations. There must be discernible differences between those subjects affected, and those not. I have alluded to genetic, structural, and psychological differences that could be relevant: those ideas need follow up.
- (7) On a wider front, we need some answers as to why 90+% (cardiac) subjects *never* have ND/OBE. Investigative techniques could be employed to attempt to find differences. It must be asked why these are not being employed to find solutions to these remaining uncertainties. Far better to devote time and money updating those unknowns rather than to continue the vain, dogged attempt to see whether subjects out-of-body can report on played videos or marked boards distributed around intensive care settings.
- (8) Neurophysiological data are rapidly transforming the ND/OBE scene. Work on the temporo-parietal junction gives insights about the self, and of its projections into peri-personal space (OBE) and the sensing of other presences. The concept of REM intrusion, elucidated in context of sleep paralysis, lucid dreaming, and narcolepsy offers profound insights into the

apparent loss of selfhood when the switching between the relevant neural loci in upper brainstem is disturbed. In that “no-man’s land”, the resulting experience does become ineffable, such that the subject feels entirely separated from reality and thus in the presence of God, or “Absolute Being”, etc. The third neurophysiological prong concerns possible developmental abnormalities in left-right bodily orientation, and the resulting propensity to extend towards the paranormal, magical ideation, fantasy proneness, and so on.

These are all exciting and continuing developments whose outcomes will transform and extend the scope of ND/OBE phenomena. Together, they are now providing an extensive neurophysiological base with explanatory powers into the rational understandings of these events. Future studies need to concentrate on these issues, as well as the proposition that ND/OBE subjects have specifically predisposed brains from which ND/OBE and particularly, the striking post-experiential alterations in psychological profiles, obtain. What neural changes permit such altered, long-term behavioural phenotypes? My conclusions are that ND/OBE, however immediately dramatic per se, are subsidiary to the more overwhelming behavioural changes which the precipitating crisis evokes in recovered subjects. More inter-collaborative work would help to resolve these remaining problems and also provide some respite from entrenched antithetical positions, which this essay has attempted to laybare.

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