

## Introduction

Immediately before my eyes are a vast number of rings, apparently made of extremely fine steel wire, all constantly rotating in the direction of the hands of a clock; these circles are concentrically arranged, the innermost being infinitely small, almost point-like, the outermost being about a meter and a half in diameter. The spaces between the wires seem brighter than the wires themselves. Now the wires shine like dim silver in parts. Now a beautiful light violet tint has developed in them. As I watch the center seems to recede into the depth of the room, leaving the periphery stationary, till the whole assumes the form of a deep funnel of wire rings.

– Anonymous participant, Knauer and Maloney, 1913

These words relate the experience of a participant in a scientific study, who sees visual hallucinations while tumbling down the rabbit hole under the influence of the drug mescaline. Mescaline is an alkaloid chemical compound that is found naturally in peyote (*Lophophora williamsii*): a small spineless cactus that is common to the southwestern United States and Mexico. Among Native Americans such as the Tarahumaras, Kiowas, Comanches and indigenous peoples of Mexico such as the Cora people and Huichol, peyote is valued for its visionary properties and is considered to be a religious sacrament. In these traditions, the top of the cactus is cut off and dried to form ‘mescal buttons’, which are later eaten in a ritual context. The use of peyote is believed to date back at least 6000 years (Terry et al., 2006), and is known to have been used in Pre-Columbia Mexico by the Aztecs<sup>1</sup>. Indeed, the word ‘peyote’ originates from the Nahuatl word ‘peyotl’. In 1918 mescaline was identified

as the active hallucinogenic ingredient of peyote, enabling its chemical synthesis and scientific study. When taken orally mescaline is absorbed and high concentrations reach the brain within 1-2 hours (Julien, 2001, p.337). Within 3.5-4 hours the individual will experience psychoactive effects, such as distortions to visual and auditory perception, dissolution of ego boundaries and ‘dimensions of “oceanic boundlessness”’, which may last up to 10 hours.

In 1928 Henrich Klüver carried out his first psychological trials with mescaline, in order to identify the underlying structure and form of the hallucinations that his participants experienced. With regards to the visual aspects of these experiences, Klüver (1971, p.66) revealed what he described as ‘form constants’: honeycomb, cobweb, funnel, and spiral forms. According to Klüver’s research, these form constants are the basis for visual pattern effects such as the “deep funnel of wire rings” described above. Participants would either experience these forms directly, or versions abstracted from them. For example, while an individual might perceive geometric funnel patterns in the early stages of a mescaline experience, later on such funnel patterns might assume realistic forms such as actual tunnel environments.

Klüver’s (1971) work on form constants has since been followed by others, such as Bressloff et al.’s (2001) study, which suggested that the forms perceived were the result of patterns of connection between the retina and the visual cortex. The research also informed a landmark article in the field of anthropology by Lewis-Williams and Dowson (1988), which investigated the basis for certain symbolic markings that were found in Upper Palaeolithic parietal art (art on cave walls or stone). While the presence of various animal forms in rock art from this era was clear, Lewis-Williams and Dowson proposed that other seemingly abstract signs could in fact be representations of ‘entoptic phenomena’: phosphenes<sup>2</sup> and form

constants seen during altered states of consciousness (ASCs). Thus, they argued that the presence of images resembling the form constants in rock art suggested that those who created them were likely to have been part of shamanistic societies. These hunter-gatherer shamanic societies would have used ASCs in order to contact spirits and supernatural entities, heal the sick, and affect animals and the weather (Lewis-Williams, 2004, p.133). The artists who created these markings were representing aspects of the visions that they considered to be sacred.

Lewis-Williams and Dowson's (1988) argument is compelling since it suggests that some of the earliest known art may have been based on the visual forms experienced during hallucinations. If correct, the representation of ASCs could be among the oldest of human enterprises<sup>3</sup>. If this is the case, then surely the topic is one that calls for our attention, and it is to this call that this book responds. However, the book will not re-tread the anthropological grounds covered by authors such as Lewis-Williams (2004). Instead I will focus on the ways in which recent technologies in electronic music and art provide new capabilities for representing or inducing these states. This will not mean an extended technical discussion regarding the use of neural imaging techniques to directly extract inner experience<sup>4</sup>. Rather, the book will provide an in-depth exploration of the ways in which time-based electronic audio and audio-visual media of psychedelic rock, electronic dance music, experimental film, and modern video game culture have allowed ancient practices involving the production and representation of ASCs to be developed since the 1950s. In addition, just as the shamanic art and music related to ASCs forms an essential part of the shamanic world-view, we shall also see how electronic music and audio-visual media related to ASCs reflects the ethos of various sub-cultures.

## <1>Spiral Tribes

Over the past few millennia mankind has woven an intricate history with intoxicating plants, resulting in various associated artefacts. Exploring this area, Devereux (2008) finds evidence to suggest that the use of intoxicating plants extends back to prehistoric times. For example, Ralph Solecki's (1975) discovery of the Neanderthal 'flower burial' at the Shanidar Cave in Northern Iraq indicated the possible use of herbal stimulants from the *Ephedra* genus 60,000 years ago. Perhaps as old, the ancestors of today's Australian Aborigines may have used the stimulant pituri 40,000-60,000 years ago<sup>5</sup>. Scattered evidence gathered from various archaeological finds also point towards the use of opium and cannabis in Neolithic and Bronze Age Europe<sup>6</sup>, while the Ebers Papyrus in Egypt describes the medicinal use of opium (Merlin, 1984, pp.274-275). In the Indus Valley region (now northern India, Afghanistan and Pakistan), the sacred Aryan text of the Rig Veda describes 'soma': a sacred drink of unknown contents that transports the individual to ecstatic realms<sup>7</sup>. Similarly enigmatic are the Eleusinian Mysteries: an initiation cult in Ancient Greece that continued for nearly two thousand years, in which various ecstatic rites were enacted, and a sacred drink known as 'kykeon' was consumed (Eliade, 1978). Though the contents of kykeon remain unknown, it is believed that the drink may have contained a hallucinogen similar to LSD (lysergic acid diethylamide) that was derived from the ergot (a parasitic fungus) of barley (Wasson, Hoffman and Ruck, 1978).

While the full details of many of these early examples may have been lost in the sands of time, more recent recorded history provides a clearer impression of the ritual use of hallucinogens. Modern use of the term 'shaman' derives directly from

Siberian shamanism and the Tungus word meaning ‘to know’ (Laufer, 1913). In Siberian shamanism *Amanita muscaria* mushrooms are ritually used for their psychoactive properties, by either eating directly or drinking urine (since the active ingredients are passed this way). Anthropologist Weston La Barre (1972, pp.181-182) has argued that the origins of shamanism in the Americas may lie in Siberian shamanism, having been transported there via the Bering land-bridge which connected Eurasia with the Americas around 25,000 years ago. When Spanish conquistadors landed in the Americas, Bernardino de Sahagún (1499-1590b, p.130) found the Aztecs using *teonanácatl* (meaning ‘flesh of the gods’), *Psilocybe cubensis* mushrooms. Fascinating mushroom-shaped stones found throughout Guatemala, Mexico and Honduras suggest that the use of these mushrooms may date back to at least the 1<sup>st</sup> Millennium BC<sup>8</sup>. Today the shamanic use of mushrooms continues in the Huichol and Mazatec peoples of Mexico, who are descendant from the Aztecs. Elsewhere in North America, Native Americans use peyote, while in South America shamans of the Peruvian Amazon use ayahuasca (or ‘yagé’); a hallucinogenic brew that contains a natural source of DMT (N,N-dimethyltryptamine, a powerful hallucinogen).

Returning to Europe, prior to the 16<sup>th</sup> Century ‘wise women’ (folk healers) were commonplace (Thomas, 1971). Typically located in wilderness areas outside of towns, wise women performed magic rituals, sometimes involving the use of ‘hexing herbs’ with intoxicating properties<sup>9</sup>. For example, Harner (1973, pp.125-150) discusses the use of belladonna, mandrake, datura and henbane in the preparation of witches’ ‘flying ointments’. Harner argues that the hallucinogenic properties of these flying ointments may account for the tales of witches flying through the air and cavorting with spirits and demons at Sabbat. With the advent of the Reformation and

modern medicine, witchcraft saw a decline in the 16<sup>th</sup> Century, though various natural hallucinogens such as *Psilocybe semilanceata* mushrooms are still found throughout much of Europe today.

In 1938 Albert Hofmann synthesized LSD, a compound with remarkable hallucinogenic properties. Such drugs came to be known as ‘psychedelic’: meaning ‘mind manifesting’, as coined by British psychiatrist Humphry Osmond in reference to their powerful consciousness altering capabilities. The use of LSD explored for both therapeutic and military purposes during the 1950s, later rose to prominence in the public sphere through its popularity in the 1960s counter-culture, and was subsequently banned in the United States and most other Western countries (Roberts, 2012). The euphoric stimulant MDMA (3,4-methylenedioxymethamphetamine, commonly known as ‘ecstasy’), originally synthesized in 1912 by Anton Köllisch, followed a similar pattern. Alexander Shulgin promoted the drug for use in psychiatry in the late 1970s and early 1980s, before it became popular in the emerging electronic dance music culture and was subsequently outlawed. Modern use of psychedelic drugs is predominantly characterised as hedonistic, though in hippy cultures and some neo-shamanism groups they are used as ‘entheogens’<sup>10</sup> for spiritual purposes.

Throughout history the use of ASCs has ranged from religious ritual to hedonistic indulgence, and has often been a source of conflict. In shamanic societies where ASCs play an integral role in shaping beliefs, the plants that produce these states are seen as sacred medicines. Yet such beliefs are not always shared between societies. When Spanish conquistadors found the Aztec shamans using hallucinogenic mushrooms, they violently suppressed these practices, forcing them underground. The fate of witches using hexing herbs in Europe followed a similar

pattern, as the Christian Church sought to eradicate pagan practices and beliefs. In more recent times, Native Americans were unable to carry out their religious use of peyote without breaking the law, until a legal exemption was passed in 1991. Conversely, in Peru, shamanic tribes have profited from the booming ‘ayahuasca tourism’ sought by Westerners seeking exotic forms of spiritual awakening. Yet parts of the Amazon are also battlegrounds for groups that have vested interests in the international drugs trade. Fuelled by demand in the West for cocaine and heroin, drug trafficking has claimed thousands of lives in Mexico and other countries through which packages are moved. There are also consequences for individual users at the end of this chain, as these drugs carry risks due to toxicity and the potential for addiction. For example, heroin addiction can have devastating personal and social consequences. These consequences may lend some credence to the argument in support of regulation, but this is a double-edged sword as it perpetuates illicit trading and invariably does little to reduce harm (Godlee, 2016). Of course, the substances themselves are not inherently evil and neither are the ASCs they produce; opiates are also extremely valuable in healthcare for their medicinal properties in pain-relief<sup>11</sup>. It seems then, that much depends on the context in which intoxicating substances are used. Furthermore, some ASCs such as meditation or dreaming can also be accessed without the need for plants or drugs. While the latter types tend to be less controversial, certainly there has historically been much disagreement over who can access ASCs and how they may do so<sup>12</sup>.

### <1>Psychedelic Artefacts

It may not come as a surprise that the presence of ASCs in culture over thousands of years has resulted in a great deal of art, literature and music related to these experiences. As discussed, early examples include spiral patterns in rock art, or mushroom-like stone figures, which some anthropologists consider to be related to ASC experiences<sup>13</sup>. In surviving shamanic traditions, the ASC experience frequently permeates the art and music of those cultures. For example, peyote is reflected both symbolically and through the brightly contrasting colours and hallucinatory geometric designs of Huichol art (Eger and Collings, 1978), while Shipibo art also incorporates geometric patterns and designs inspired by the ayahuasca experience (Schultes, Hofmann and Rättsch 1996, pp.131-133).

In modern Western culture, we find further examples of painting and visual art related to ASCs. Beginning in the 1920s, the surrealist art movement explored ideas of dreams and the unconscious as discussed by Freud. Later on, the 1960s saw a major boom in psychedelic artwork, which emerged as part of the counter-culture of the era, and permeated everything from concert posters and fashion to the pop art and op art movements (Grunenberg, 2005). Rubin (2010) discusses the extensive influence of psychedelic culture on the visual arts of the late 20<sup>th</sup> Century, referring to the paintings of Fred Tomaselli, Kenny Scharf, Alex Grey and others. Johnson (2011, pp.35-40) also explores these themes, drawing attention to the presence of designs that are similar to Klüver's form constants in the work of various visual artists.

In Western literature of the 18<sup>th</sup> and 19<sup>th</sup> Centuries, ASC-inspired literary accounts are found in works such as Samuel Taylor Coleridge's 'Kubla Khan' (1797) or Thomas De Quincey's *Confessions of an English Opium Eater* (1821). In the 20<sup>th</sup> Century, Paul Bowles' *A Hundred Camels in the Courtyard* (1962) used a literary mosaic technique to reflect the effects of smoking hashish; Carlos Castaneda's *The*



*Teachings of Don Juan: A Yaqui Way of Knowledge* (1968) described visionary journeys and shamanic metamorphosis precipitated by various hallucinogens; Tom Wolfe's *The Electric Kool-Aid Acid Test* (1968) recounts his experiences touring America with the Merry Pranksters; and William Burroughs provides us with his extensive enquiries into heroin, yagé and other techniques of altering consciousness through his various works (e.g. *Junky*, 1953; *The Naked Lunch*, 1959; *The Yage Letters* [with Allen Ginsberg], 1963, 1975).

Music appears to have a special connection with ASCs. In their respective work, Rouget (1985) and Becker (2004) have discussed the use of music in trance cultures such as those of Southeast Asia. In these trance cultures, and in many shamanic traditions, music is often used to conduct the ritual and plays an important role in inducing ASC states. Field recordings such as those available on the Folkways record label provide a recorded document of these (e.g. María Sabina's *Mushroom Ceremony of the Mazatec Indians of Mexico*, 1957; Harry Smith's *The Kiowa Peyote Meeting*, 1973). In modern Western music, surf rock n' roll preceded the arrival of psychedelic music in the 1960s, as popularised by acts such as The Beatles, The Jimi Hendrix Experience, Jefferson Airplane and the Grateful Dead. As Hayward (2004, pp.15-18) has discussed, this era also saw science fiction themes and psychedelic music becoming entwined, in the Afrofuturist space jazz of Sun Ra and John Coltrane; or in the space rock of Pink Floyd, Gong and Hawkwind. Veal (2007, pp.209-210) also highlights that these themes saw parallels in dub-reggae music, which he suggests could be viewed as 'psychedelic Caribbean' music. The sound system culture of dub also prefigured the electronic dance music culture that would emerge in the late 1980s. From its origins in Chicago, acid house music subsequently spread to the UK, developing alongside the MDMA-fuelled 'rave' culture (discussed

in Collin, 1998; Reynolds, 2008; St. John, 2009). Electronic dance music culture subsequently became a global phenomenon that included both mainstream commercial forms and underground counter-culture strains; the latter often remaining explicitly orientated towards psychedelic drug culture.

In the emerging audio-visual culture of the 20<sup>th</sup> Century, ASC themes also appeared in experimental films such as Storm De Hirsch's *Peyote Queen* (1965) or in Jordan Belson's visual music films (e.g. *LSD*, 1962), which Wees (1992) compared to Klüver's (1971) form constants. In Hollywood, hallucinatory sequences were also featured in many films: *Easy Rider* (Hopper, 1969), *Altered States* (Russell, 1980) and *Fear and Loathing in Las Vegas* (Gilliam, 1998) are just three examples. Meanwhile, as Turner (2008) has discussed, many individuals involved in the early computer culture were formerly involved in the 1960s counter-culture movements, and were instrumental in fostering utopian attitudes within some sections of the cyberculture<sup>14</sup>. As one of the manifestations of this, the 1980s and 1990s saw psychedelic computer graphics visualisations; from the visualisation programmes of Jeff Minter's *Colourspace* (1986) to the *X-Mix* (Studio !K7, 1993-1998) VJ mix series. As PlayStation culture and rave music flourished in tandem, at the turn of the millennium psychedelic themes were seen in such interactive video games as *LSD: Dream Emulator* (Asmik Ace Entertainment, 1998) and *Rez* (United Game Artists, 2001). In recent years titles such as *Far Cry 3* (Ubisoft Montreal, 2012) and *Grand Theft Auto V* (Rockstar North, 2013) have also incorporated drug experiences into interactive gameplay, with increasing levels of detail and sophistication.

Just as the use of ASCs throughout history has occurred in relation to various cultures and systems of belief, so too do these various artefacts reflect differing attitudes towards ASCs. For example: shamanic art and music can be seen as a means

to invoke and communicate with the spirit world that ASCs allow one to experience. Romantic literary works such as 'Kubla Khan' (Coleridge, 1797), and later the surrealist movement, can also be seen as responses to a perceived loss of connection with inner experience. Subsequently, the psychedelic art, literature and music of the 1960s can be seen as part of the counter-culture movement towards expanded forms of consciousness and social revolution. In this context, drugs such as LSD were seen by some as a means through which to achieve revolutionary forms of consciousness, and the associated cultural artefacts embrace this ethos by representing such experiences, or by actually seeking to induce them. Some of these ideas also extended into the electronic dance music culture of the 1980s and 1990s, though here the ethos was frequently a more hedonistic celebration of euphoric drug-induced states. Of course, not all cultural artefacts within these domains celebrate ASCs, and in some cases music and art may avoid these aesthetic approaches, and be seen as sufficiently powerful in its own right. Other examples may also express cautionary tales or present anti-drug positions. This is especially the case in recent mainstream media, where drugs are often viewed in negative terms and used for their shock value; hence some of the most recent films and video games that represent ASCs do so within the context of the horror genre.

### <1>**Inner Sounds**

Perhaps the most famous literary work related to ASCs is Aldous Huxley's *The Doors of Perception* (1954-1956) in which he discusses his experiences after taking 400mg of mescaline. Huxley uses the technology of the written word (if we may consider it as such) to provide descriptive accounts of hallucinations. However,

the examples we have discussed also indicate the use of both audio and visual media for representing ASCs. Considering visual technologies first, these have advanced since the days of early cave paintings so that impressions of ASCs can now be rendered with the full benefit of modern oil paints and canvas. Yet the capabilities provided by technology for rendering these subjective visual experiences go much further with digital technologies, which also allow the rendering of complex mathematical patterns, fractals and 3D graphics. These allow vast potentials for creating almost any environment or visual experience imaginable. Such capabilities support the design of visual images such as Klüver's (1971) form constants, which can be described using mathematical functions (as discussed by Bressloff et al., 2001). When combined with immersive technologies that surround the viewer's visual field and trick the eye with false perspectives, digital artists have been able to create psychedelic hallucinatory experiences. Similarly, 'projection mapping' techniques work by projecting light on to objects such as sculptures, creating illusions of movement and transfiguration through the manipulation of video. In the context of psychedelic trance parties and elaborate electronic dance music stage shows, such technologies bring fixed objects alive, making visual experiences of funnels, rotating wire rings, or other wild synaesthetic fantasias concrete. From simple early markings on cave walls to animated luminescent digital projections, technology has radically advanced our capability for creating illusory visuals based on the subjective experience of ASCs.

ASCs may act not only on the visual system, but also upon the auditory senses, enhancing or distorting sensory perception, or causing auditory hallucinations. Audio technologies may represent these experiences by imitating changes to auditory perception. This function, if not 'new', is at least significantly enhanced by

developments in technology over the last century that have provided new possibilities for creating and manipulating sound. The beginnings of this emerge with analogue technology for the recording and manipulation of sound in recording studios. More recently in the field of electroacoustic music, high-quality loudspeakers and spatial audio algorithms enable the construction of convincing sonic spaces and events. This technology can not only be used to recreate the sound of real spaces or locations, but also design illusory or imaginary sound worlds such as those that might be experienced during states of hallucination. Furthermore, while sound may represent ASCs, it can also be used to induce them by promoting heightened states of emotion. The ritual use of music for this purpose is an ancient practice, yet in modern times, similar principles are enhanced through the use of sound systems; the throbbing hypnotic pulses of electronic music replacing the acoustic drums of the past.

When both the audio and visual elements described are combined in interactive systems, ‘ASC Simulations’ are possible. This concept has been demonstrated to an extent through the video games mentioned, yet remains an area that is relatively new. ‘ASC Simulations’ may be designed in various ways, and when combined with immersive visual displays and spatial audio, the possibility for them to closely resemble actual experiences of hallucination emerges. Within the next hundred years, they could even become indistinguishable from traditional forms of ASCs. These simulations could have useful applications not only in the world of video games, but also as therapeutic tools. More generally, in a world where human interaction is increasingly mediated through digital information networks, the potential to simulate the subjective experience of human consciousness could have important implications not only for art, music and entertainment, but also for day-to-day communication.

Yet the construction of any such ‘ASC Simulations’ first requires a theoretical basis in order to properly consider how the material design of audio-visual media can achieve this effect. This is the call to which this book responds. Through an analysis of ASCs in electronic music and audio-visual media, *Inner Sound* develops a theoretical model that allows us to consider the design of these simulations. In order to achieve this, the book takes a tour through various material artefacts such as sound recordings, films and video games, so that we may see how they represent or induce ASCs. Along the way we shall travel from Amazonian chicha festivals to a Mazatec mushroom ritual in Oaxaca, Mexico; from the wonderlands of psychedelic rock to the synaesthetic assaults of neon raves; and from an immersive outdoor electroacoustic performance on an Athenian hilltop to a mushroom trip on a tropical island in virtual reality. Through consideration of these various art forms, we shall see how electronic processes have enabled new capabilities, and how the material design of works reflects the ethos of a variety of subcultural groups. These discoveries ultimately feed into a conceptual view of ‘ASC Simulations’ that allows us not only to look back, but to look forward to see what is possible at the frontiers of digital cultures for representing and transforming consciousness.

## <1>**The Chapters**

The following chapters are organised in order to establish a common basis in ASCs and their relationships with art and music in shamanic traditions. Following this, a discussion of various electronic music and audio-visual media is provided, allowing the ways in which these may represent or induce ASCs to be considered. This discussion will feed in to the development of a conceptual model that will allow

us to consider how sound can be designed in order to provide ‘ASC Simulations’. Throughout the book, the relationships between musical aesthetics and ethos are explored, ultimately allowing the reader to consider not only how these simulations may be designed, but also how and why they might be used in digital society.

Chapter 1 commences with an introduction to consciousness. This enables us to explore the variety of ASCs that may occur, and the changes they cause to subjective experience, which can be considered in terms of dimensional models. The possible ethical implications of ASCs are also reviewed, with regards to their physical and psychological effects, and how these may be considered in different cultural circumstances. We also begin to see how sound may be used to either represent or induce ASCs.

Chapter 2 discusses how shamanic traditions may invoke visionary experiences of the spirit world through art and music. This is explored through an analysis of material artefacts such as ethnographic field recordings, which are among the earliest examples of electronic media that incorporate the concept of ASCs. Through the course of the discussion the chapter establishes the relationships that have traditionally existed between music and ASCs in shamanic and trance cultures, which will allow comparisons with electronic music and audio-visual media to be made later in the book.

Chapter 3 explores how audio technologies and electronic studio processes relate to ASCs in popular music. The capabilities of sound recordings and studio electronics are considered through the analysis of examples in rock n’ roll, surf rock, psychedelic rock and space rock/space jazz. Through the course of the chapter I argue that electronic technologies allow the energetic properties of rock n’ roll music to be adapted in order to elicit various concepts, including that of ASCs.

Chapter 4 extends this discussion into the area of sound system culture and electronic dance music. I argue that the sound system places the communicative properties of electronic studio productions within a social context, eliciting powerful affective experiences that are framed by conceptual meaning. The extent to which music may complement or reflect the use of intoxicating substances is considered, while also acknowledging that some artists have actively spoken out against the use of drugs in electronic dance music culture.

Chapter 5 explores the possibilities of electroacoustic music for representing the sensory experience of ASCs with varying degrees of accuracy. The chapter commences with a general explanation of electroacoustic music, and how it may allow illusory representations of real and unreal sounds and spaces. Various works of electroacoustic music that engage with themes such as dreams, shamanism and hallucination are then considered, leading to a conceptual model that defines possible approaches for sound design.

Chapter 6 expands my discussion of time-based media into the area of audio-visual media. I discuss the presence of ASCs in avant-garde films, feature films, visual music, psychedelic light shows, and VJ culture. Continuing to use the conceptual model of the previous chapter, this chapter expands our discussion by exploring the role of sound to represent or induce ASCs in an audio-visual context.

Chapter 7 advances this discussion further by considering ASCs in interactive video games and virtual reality applications. Through examples ranging from action adventures to meditation games, we shall see how ASCs can be simulated in virtual environments using sound, graphics and interactivity. This ultimately allows the concept of ‘ASC Simulations’ to be defined: interactive audio-visual systems that represent ASCs with regards to the sensory components of the experience.



Chapter 8 consolidates my analysis of ASCs in electronic music and audio-visual media. By drawing connections between shamanic art and music, and modern ‘ASC Simulations’, we find that there are some similar underlying principles. However, we also see how electronic technologies enable new capabilities for simulating ASCs in ways that are more accurate than ever before. Looking forwards, the ethics and implications of these ‘ASC Simulations’ are considered, allowing us to reflect on how they might be used for various social or therapeutic purposes. Through the concept of ‘ASC Simulations’ and its exploration then, we will have seen the limits of technology for representing and manipulating consciousness at the frontiers of electronic music and art.

Throughout the book examples are drawn from the material artefacts of sound recordings, films and video games. The original analysis of these works forms the substance of the book, from which underlying relationships with ASCs are revealed. In each case the examples chosen have been selected in order to evidence a particular important function or paradigm in the use of sound. Some of these works are well known, while others are relatively more obscure; yet most are readily accessible with the benefit of online digital media services, and I would encourage the reader to make use of these, in order to complement reading with listening, viewing and playing<sup>15</sup>. Frequently the innovations described with regards to one work are idiomatic, evidencing features that are also found in various other works. As a result, it will often be the case that alternative works could have been chosen to form the basis of the discussion, however in the interests of brevity the aim has not been to catalogue every work exhaustively, but rather to arm the reader with perspectives that may inform his or her own listening and investigations.

## <1>Departure Lounge

The main aim of *Inner Sound* is to provide an in-depth analysis of how time-based electronic music and audio-visual media may represent or induce ASCs, in order to develop the theoretical concept of ‘ASC Simulations’. The ways in which technologies shape the material form of artefacts is considered, and connections are drawn between these and the older traditions of shamanic art and music. Among the areas explored in the book, the representation of hallucinatory states in interactive video games and VJ culture is one that has so far received little attention from research. By giving this area the attention it deserves, it is intended to uncover the underlying structures, and in particular the concept of ‘ASC Simulations’, which will be of interest for audiences and practitioners alike.

With regards to the concept of ‘ASC Simulations’, there are several reasons why research in this area is worthwhile. ‘ASC Simulations’ have already seen a practical application within the area of commercial video games, while we are also beginning to see their use as therapeutic tools. Perhaps most significantly however, the generalisation of research in this field may ultimately yield a set of systematic approaches for representing a variety of conscious human states. In providing virtual representations of human consciousness in all its forms, we may be better equipped to share and understand them. This could be useful for communications technologies, by enabling more human representations of our digital selves, in similar terms argued for by Rosalind Picard (1997) with regards to computers that can respond to or exhibit human emotions. Yet moreover, it also presents the possibility of gaining a better understanding of human consciousness.

As Turner (2008) has discussed, in the late 20<sup>th</sup> Century the twin forces of technological advancement and the threat of cold war nuclear apocalypse led many to seek radical new digital utopias. For many the cybernetics of Norbert Wiener (1961) provided a new view of humans and technologies as information systems that could work together more effectively, providing pathways to a better world. Such theories promoted a progressive global outlook, in which the world is seen in terms of interconnected structures with many mutual concerns. Among the figures involved in this shift in thought, through his ‘Gaia hypothesis’<sup>16</sup> James Lovelock (1979) argued that the most significant benefit of space travel came not from visiting other planets, but from being able to see the earth from space. At this time the images of the earth viewed from space cropped up in many areas of popular culture as a powerful symbol of global communications, ecology and society. Among these, the symbol is also found in the nexus of science fiction and psychedelic music, where space travel became a metaphor for travelling outside of one’s usual conscious state. Just as seeing the earth from an outside perspective provided new ways of looking at society, these psychedelic cultures saw a similar potential in allowing consciousness to escape from the usual boundaries. Analogously then, the most compelling reason to investigate methods for simulating ASCs is ultimately to enable the exploration of consciousness from a position of alterity.

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<sup>1</sup> Franciscan friar Bernardino de Sahagún (1499-1590a, p.173; 1499-1590b, p.129) described the Aztec use of peyote in the 16<sup>th</sup> Century. For a further discussion of this and other early accounts of peyote use among the Aztecs, see Schaefer and Furst (1997, p.141).

<sup>2</sup> ‘Phosphenes’ are visual experiences of light that are caused by physical stimulation, such as may occur when applying pressure to the eye-ball, or due to a change in blood pressure. These can be differentiated from form constants, which are generated within the brain.

<sup>3</sup> The theory has sparked an extensive debate spanning several decades. For further discussion see: Lewis-Williams (2007), Dowson (2007), and Luke (2010).

<sup>4</sup> For example, Nishimoto et al. (2011) have used blood oxygen level-dependent (BOLD) signals measured via functional magnetic resonance imaging (fMRI: a neuroimaging technique), in order to measure brain activity evoked by movies. By registering patterns of activity evoked by the movies, the researchers were able to

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devise a decoding system that predicts the visual stimuli a person is seeing based on their brain activity.

<sup>5</sup> This is the estimate provided in Schultes, Hofmann and Ratsch (1996, p.182). For further information on pituri, see also Ratsch, Steadman and Bogossian (2010).

<sup>6</sup> For example, Sherratt (1991) discusses the evidence for ritual opium and cannabis use in Neolithic Europe. In particular, he suggests that pottery artefacts such as bowl-like containers that carry traces of burning may have been used for the purposes of ritual intoxication.

<sup>7</sup> The contents of soma have been the subject of much debate. For example: Wasson (1968) proposed that soma was the *Amanita muscaria* mushroom; Flattery and Schwartz (1989) proposed it was *Paganum harmala* (Syrian rue); McKenna (1992, p.120) argued for *Psilocybe cubensis* mushrooms; while Sherratt (1991, pp.29-30) indicates an infusion of various plant products.

<sup>8</sup> For further information on these ‘mushroom stones’ and their suggested connection with mushroom rituals, see Wasson and Wasson (1957, pp.274-286), Borhegyi (1961) and Lowy (1971).

<sup>9</sup> For an overview of the hexing herbs used in witchcraft, see Schultes, Hofmann and Ratsch (1996, pp.86-91).

<sup>10</sup> The term ‘entheogen’ refers to the spiritual or religious use of psychoactive plants.

<sup>11</sup> In their history of opium, Goldberg and Latimer (2014) discuss changing attitudes towards the use of opium as a medicine and recreational substance. Significant factors they identify include trade and political interests, and the increased potency and addictive properties of morphine and heroin.

<sup>12</sup> For further discussion, see also Ott’s (1976, pp.83-102) comments on hallucinogens; and Sherratt’s (1995) views on how alcohol and other intoxicating

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substances have fallen in and out of favour in different regions and cultural traditions throughout history.

<sup>13</sup> Other possible examples include: the Megalithic markings seen at the Er Lannic and Gavriini's sites, which Patton (1990) has argued are similarly based on entoptic phenomena; the mushroom-like figures found on bronze razors in Scandinavia (Kaplan, 1975); and the mushroom-figures found in the rock art of the Tassili n'Ajjar plateau in Africa, as documented in Lajoux (1963) and discussed with regards to their ASC interpretation in McKenna (1992, pp.70-73).

<sup>14</sup> In this context, 'cyberculture' describes the culture of networked computers and associated technologies such as human-computer interfaces.

<sup>15</sup> Though the original artefacts are often preferable, many of the musical examples discussed can be found using digital music services such as iTunes, Spotify or Bandcamp. For some of the harder-to-find field recordings of shamanic music discussed in Chapter 2, the Smithsonian Folkways website (<http://www.folkways.si.edu/>) and the British Library Sound Archive (<http://sounds.bl.uk/>) are also invaluable resources; while many of the electroacoustic compositions discussed in Chapter 5 can be heard using Electro:thèque (<http://electrotheque.com/>). Video examples can be viewed using Netflix, Amazon Video, YouTube or Vimeo; while video games can be accessed using Steam or the PlayStation Network.

<sup>16</sup> The 'Gaia hypothesis' as discussed by Lovelock (1979) suggests that the earth functions as a global self-regulating system in order to sustain life.