
Rock Art or Rorschach: Is there More to Entoptics than Meets the Eye?

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Abstract

The recourse to entoptic phenomena as an explanation of certain geometric rock-art imagery has generated considerable debate among archaeologists and anthropologists of consciousness, and even among neuropsychologists, to a lesser degree. Surprisingly little has been discussed concerning the philosophical location of this debate in relation to the mind-body problem of consciousness, however, and a new perspective presented here on the experience of form constants challenges current thinking. Considering the neuropsychological-shamanistic theory of Paleolithic rock art in light of visionary experiences among both the blind and the sighted, and under different states of altered consciousness, an argument is presented that form constants are not actually entoptic as they are currently defined, that is, made within the eye and the visual cortex. It is suggested that the entoptic rock-art model is swayed by philosophical biases that force theorists to see what they want to see, somewhat like a Rorschach ink blot test, when, rather, it actually appears that there may be more to entoptics than meets the eye.

Keywords: entoptics, rock art, visual perception, psychedelic, shamanism

Introduction

Revolutionizing the field of rock-art research by offering a novel shamanistic approach to the discipline, the publication of "The Signs of all Times: Entoptic Phenomena in Upper Paleolithic Rock Art" by Lewis-Williams and Dowson (1988) has fueled a lively debate kept active throughout the last two decades (Dowson 2007). The authors advance a neuropsychological model for analyzing the motifs of parietal and mobile art of this period, proposing that the nonfigurative images are in fact artistic representations of universal optical patterns, intrinsic to the human visual system, once perceived by our shamanic ancestors during altered states of consciousness (ASCs). These *entoptics* (meaning "from within vision") seen in the visual field and heightened by the darkness of the cave recess would then literally be traced onto the rock surface and mobile art pieces, thereby representing a neurological imprint of our Paleolithic forebears. Assuming that there is little structural difference between modern brains and those of the Upper Paleolithic period, the neurological basis of these so-called entoptics means that they are a universal phenomenon still observable today.

Lewis-Williams and Dowson (1988: 202) define *entoptic phenomena* (derived from *entoptical phenomena* by Helmholtz, 1925) as "visual sensations derived from within the optic system anywhere from the eyeball to the cortex." The term covers two classes of typically geometric percept: *phosphenes* (Savigny 1838), which are entopthalmic ("within the eye") (Walker 1981) and can

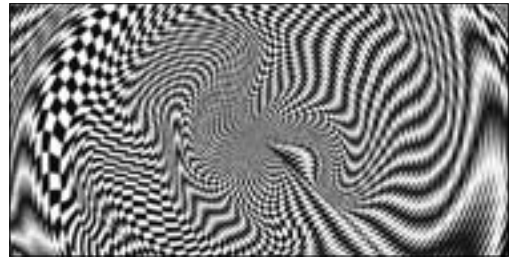


Fig 1 Artistic depiction of a phosphene (by Aldo). Phosphenes are geometrical percepts that can be induced by physical stimulation of the eye, such as by pressing on the eyeball with a finger.

be induced by physical stimulation, such as via pressure on the eyeball (Figure 1); and *form constants* (Klüver 1926, 1966 [1928]), which derive from within the optic system and are speculated to originate from beyond the eye. Both classes are distinguished from visual *hallucinations*, such as iconic visions of culturally controlled items (e.g. animals) also represented in rock art, which they consider to lack any foundation in the visual system. Consequently, the generic term entoptic phenomena is restricted to the largely geometric visual percepts observed.

Lewis-Williams and Dowson's model essentially rests on several assumptions, which include (1) entoptic phenomena occur universally in altered states; (2) our ancestors used one or more techniques for altering consciousness (e.g. psychoactive plants, hyperventilation, rhythmic movements, sensory deprivation, etc.); (3) a sufficient quantity of Upper Paleolithic rock art represents the entoptic phenomena experienced during ASCs; (4) the explicit visual content of the ASC experience may vary with the cultural context but the basic features of the experience (such as

geometric visual percepts) are repeated and are “hardwired” into the human nervous system. Elsewhere the debate has raged over the first three of these assumptions (e.g. Bahn 1988; Bednarik 1988, 1990) and, although these arguments are interesting, this part of the debate will not be tackled here and the model will be assumed to be sufficient on these grounds for our purposes. However, surprisingly little has been raised concerning the latter hardwiring assumption.

This lack of critical analysis of the continued assertion that the geometric visual phenomena of altered states are “hardwired” into the optic system (Lewis-Williams and Pearce 2005) appears to stem from intellectual neglect: those discussing the archaeological and anthropological aspects of the model are not concerned with the mind-body problem per se (e.g. Bahn 1988; Bednarik 1988, 1990), although some have criticized the model generally for being reductionistic (e.g. Wallis 2009), whereas those tackling the neurological assumptions generally assume a de facto materialist-reductionist position on brain-mind interaction in their approach (e.g. Bressloff et al. 2001). Additionally, few commentators appear to be addressing the assumptions about ASCs from an experiential position. Consequently, there has been little challenge to the notion that the geometric forms perceived in ASCs are in fact entoptic, as that word is defined by Lewis-Williams and Dowson. However, some under-explored corners of phenomenological research into geometric imagery in altered states offer accounts that are perpendicular to this assumption. Specific features of some rock art may indeed be representations of geometric percepts from altered states,

but are those percepts merely generated by neurochemically induced misfiring in the optical system?

Entoptics as Hallucinations and Projections: Both, Either, or Neither?

In his myth-busting paper on research into hallucinations, Shanon (2003: 6) writes that, “It is my firm belief that just as one cannot talk of music if one had not experienced music first-hand, one cannot seriously discuss the phenomenology of the so-called altered states of consciousness without actually having had a first-hand feel of the non-ordinary experiences with these states.” Drawn to the literature on ASCs, entoptic phenomena, and rock art, the reactions of the present author upon reading various papers on the topic matched those of Shanon, having had numerous experiences in altered states—via breathing techniques, sensory deprivation, yoga, lucid dreaming, and various other means, particularly through the ingestion of certain psychedelic substances. These substances include the mushrooms of the *Psilocybe* genus (containing the psychoactive molecules psilocybin and psilocin) and the Amazonian jungle decoction ayahuasca. Used widely in the Amazon basin and across much of South America, ayahuasca, which means “the vine of the spirits” in Quechua, is usually a combination of at least two plants, one of which contains harmala alkaloids—such as the ayahuasca vine (*Banisteriopsis caapi*)—and the other of which contains N,N-dimethyltryptamine (DMT), such as the chacruna bush (*Psychotria viridis*) (Shanon 2002). The ancient use of the ayahuasca vine goes back to at least AD 500–1000 Andean Chile, as

confirmed by archaeological hair samples (Ogalde et al. 2008).

My own experience consuming DMT-containing substances and mixtures has provided me with a host of geometric visual phenomena of such exquisite complexity, seeming impossibility, and baffling multidimensionality that it seems difficult to believe that “the patterns of connections between the retina and the striate cortex and of the neuronal circuits within the striate cortex determined their geometric form,” nor that “people [perceiving entoptic phenomena following the ingestion of psychotropic substances] are seeing the structure of their own brain” (Lewis-Williams 2002: 126). The mescaline and perception researcher Smythies (1953: 346) had difficulty enough mapping the visual system to merely three-dimensional percepts: “how may these visions be related in their internal three-dimensional spatio-temporal structure to the electrical patterns in the cortex, which possesses an entirely different spatio-temporal structure determined by the complex convoluted shape of the cortex?” So how is it that a tangle of neurochemical “wiring” (a term used ad infinitum by Lewis-Williams) can be mapped to what the present author has perceived as a nonordinary extra-dimensional geometric vision? Approaching entoptic phenomena, then, from a first-hand phenomenological position there is good reason to agree with Shanon (2003: 6) about his observations from his own ayahuasca experiences when he further states that “to a great extent, most scientists ... who talk of hallucinations do not know what they are talking about and that, in fact, what they say is more a reflection of their conceptual presuppositions

with regard to this subject matter than a fair characterization of the psychological phenomenology at hand.”

It is being proposed in this article that Lewis-Williams and colleagues, by drawing on a reductionist neuropsychological perspective, have merely imposed their rational materialist philosophical assumptions on the data without actually experiencing such states and experiences first-hand. This situation has comparisons with the leading academics of late nineteenth-century rock-art research refusing to visit the caves of Altamira, which contained the most ancient art discovered at that time, merely because of intellectual prejudice (Bahn 1997). As much as the ancients supposedly projected their visions onto the rock surfaces and painted or engraved them (Figure 2), so too have various researchers projected their beliefs about psychoactive substance-induced visual percepts onto the phenomena. Rather like a Rorschach inkblot projective test, rock art has once again been used as an ambiguous pattern on which to superimpose one’s subjective intellectual viewpoints—in this case a priori speculations about the brain-mind. So, are supporters of the neuropsychological assumptions of the entoptic model just seeing what they want to see, and is there actually more to entoptics than meets the eye?

Multidimensional Form Constants

Following his experimentation with the psychedelic mescaline-containing cactus, peyote (*Lophophora williamsii*), Klüver (1926, 1966 [1928]) originally conceived form constants to fall into four different geometric categories: lattices, cobwebs, tunnels, and spirals. Later researchers used cocaine, LSD,



Fig 2 Shamanic rock art in Grapevine Canyon, Nevada, USA. Shamans came to this canyon from considerable distances around for hundreds of years (perhaps longer) as it was considered the home of a creator god/culture hero. The shamans would engage in trance (probably enhanced by use of *Datura* infusions), and record their “dreams,” their visions, on the rocks of the canyon, as in this example here. (Photo: Paul Devereux)

and cannabis, as well as a variety of nondrug means of inducing geometric visual percepts (see Dronfield 1996) and they defined similar categorizations which Lewis-Williams and Dowson (1988) finally combined to make six entoptic forms: grids, lattices, dots, zigzag lines, nested curves, and filigrees. More recently Dronfield (1996) opted for seven. Renderings of these geometric percepts on paper obviously look two-dimensional, although from my own experience with mescaline-containing cacti such patterns are often perceived to fit the structure of objects in consensus reality and look three-dimensional. In relation to their own mescaline-induced percepts Klüver (1926: 505) concurred that “the designs [as on rugs] seem to be localized on walls, on the floor, etc.,” as did Smythies (1956: 81) who noted that the “hallucinations are spatial and

coloured entities and may possess not only a high degree of internal organization, but may also be closely integrated into the ‘veridical’ remainder of the visual field in which they occur.”

On tryptamine-based psychedelics, such as DMT, such geometric patterns may take the same form (frequently hexagons in this author’s own experience) but, unlike mescaline visions, can assume extra-dimensional qualities the likes of which do not ordinarily occur in waking reality. One of the most prominent researchers writing on their own tryptamine experiences, McKenna (1991: 35), supports this assertion: “there is an immense vividness to these interior landscapes, as if information were being presented three-dimensionally and deployed fourth-dimensionally, coded as light and as evolving surfaces.” The geometric visions of psychedelic states, such as those of Klüver’s (1926) peyote experiences, may be depicted in two-dimensional form so that they resemble some rock-art patterns of the Upper Paleolithic period, but both renderings, if indeed they are depictions of psychedelic-induced visual patterns, are merely that which can be drawn in a simplified form on paper or rock. To think that these renderings represent the dimensionality of what may actually be perceived in such states would be to confuse the map with the territory. To support this view, a number of first-person accounts are presented (from others) of experiences with psychedelic substances.

Considering ayahuasca first of all, the prevalence of extraordinary visual phenomena, such as geometric forms, is quite widespread and were experienced by 64 percent of first-time ayahuasca users in one study (Barbosa et al. 2005). Furthermore,

the cognitive psychologist Shanon (2002: 88) considers such visual patterns “reminiscent of those defined by Klüver,” but, in support of their non-entoptic origins reports that “at times, the geometric patterns may seem to defy ordinary real-world Euclidean geometry; some persons that I interviewed made reference to higher orders of spatial dimensionality.” Reports of similar, seemingly impossible, multidimensional patterned visual displays are also extant elsewhere within the ayahuasca print literature.

I saw an image of the Great Spiral and had a sense of moving within it ... The Spiral changed into an incredible area of third/fourth dimensional energy. (S. 1999: 171–2)

The room erupted in incredible neon colors, and dissolving [sic] into the most elaborate incredibly detailed fractal patterns that i [sic] have ever seen. (Cott and Rock 2008: 363)

Everything was moving around me. I saw energy as small circles pulling in the direction of the bigger circles, external to their rays, and, at the same time, toward the smaller circles that coexisted in their interior to infinity. And that's how it went, from there to infinity and from infinity to the center of the star of David, where the last circle disappeared and began again. (Polari de Alverga 2000: 147)

The Extra Dimensions of Cyberdelia

Full written reports of psychedelic experiences in published books and journals are relatively sparse and remain widely distributed, and by far the greatest resource

of such accounts can be accessed easily online from the *Vaults of Erowid* (www.erowid.org) where a large collection of *trip reports* has been amassed. This website is an online library containing 51,542 pages related to psychoactive substances and has 56,015 daily visitors (Erowid 2008). As of November 2008, the Erowid *Experience Vaults* had a total of 17,898 pseudonymous experience reports covering 314 psychoactive substances (Erowid 2008). At this time there were 142 ayahuasca trip reports, of which 30 contained the search term “dimension,” and 5 of these discussed extra-dimensional percepts (3.5 percent of all ayahuasca reports). Of the thousands of trip reports submitted by readers less than 20 percent get published on the site and at least two trained volunteers grade the reports for accuracy, believability, interest and quality before being finally reviewed for publication by an editor (Erowid and Erowid 2006). Reports are thus of a high quality but are susceptible to possible bias in their selection, and so may have limited generalizability. Nevertheless, other researchers have used these accounts for phenomenological research purposes (e.g. Addy 2007) and, further, a small selection of these trip reports reveals a fairly consistent and frequent report of multidimensional—so arguably trans-entoptic—geometric percepts under the influence of ayahuasca and DMT, as just two substance examples. The following quotes are from ayahuasca reports on the Erowid website.

Now, in the darkness of my mind there was an entirely different world- a digital, multi-dimensional world of infinity. (Jungle Girl 2008)



Fig 3 Form constants (after Klüver 1966 [1928])

After a point i [sic] came to realize that the entire prismatic hyperdimensional wall of images that assailed me was itself one conscious entity. (Scotto 2000)

Flying through a multidimensional place of pure vision and thought, I saw endless arches of golden salamanders, flowing through the very fabric of space & time, their colors changing and rotating like countless kaleidoscopes. (Satori 2003)

It should be noted that the shapes described in these ayahuasca visions—spirals, fractals, circles, stars, prisms and arches—resemble Klüver's (1926) *form constant* patterns of lattices, cobwebs, tunnels, and spirals (Figure 3), and Lewis-Williams and Dowson's

(1988) so-called entoptic phenomena of grids, lattices, dots, zigzag lines, nested curves, and filigrees. Such multidimensional geometric percepts are seemingly reported more frequently, however, with the use of the more intense, more visual, and much shorter-acting DMT, which is considered to be ayahuasca's most psychoactive chemical constituent (McKenna 2004) and is usually smoked for its effect. This chemical isn't the only psychedelic substance within ayahuasca, however, because subjectively potent brews occasionally do not contain DMT when analyzed (Callaway 2005).

As part of one research program conducted in the 1990s, more than 60 participants received a combined total of 400 doses of DMT and reported seeing "all sorts of imaginable and unimaginable things" (Strassman 2001: 147) that nearly always began with a Klüver-esque kaleidoscopic display of geometric patterns (Strassman 2008b). Such patterns include beautiful colorful cobwebs and tremendously intricate tiny geometric colors described by many as "four-dimensional" or "beyond-dimensionality" (Strassman 2001). Inspecting Strassman's (1994) 100-item Hallucinogen Rating Scale used to survey the phenomenology of such drug experiences (see Strassman et al. 1994) it can be seen that item-67, following on from a question about the kaleidoscopic nature of the images, specifically addresses the dimensionality issue. Respondents to this item of the scale were given a choice of six categories upon which to rate the "dimensionality of images/visions/hallucinations," with options including one labeled "multidimensional" and another styled "beyond dimensionality." When asked how his DMT participants responded to this

item Strassman (2008a) replied, "It would take some digging around to find out how many volunteers scored 'multidimensional' or 'beyond dimensionality' for Item 67. But, if my memory serves me well, nearly all the high dose session volunteers marked either one or the other response for this item."

Much like Lewis-Williams's (e.g. 2002) suggestion that there are three levels to the ASC, another cartographer of psychedelic space-time has suggested that there are three levels to the DMT experience, the third and deepest of these reportedly involving "three or higher-dimensional space" (Meyer 1994). Further, a quick search on the internet archive of Erowid for DMT experiences (up until November 2008), revealed a pool of 191 trip reports, of which 63 contained the search term "dimension" and 29 of these (15 percent of all DMT reports) specifically discussed extra-dimensional percepts, supporting Strassman's assertion. The following quotes represent a sample of these DMT accounts.

Many-dimensional starflake prisms collide and explode in color and beauty! (Psychedelicious 2008)

The space behind my closed eyes becomes almost immediately multidimensional. I can clearly see a [sic] animated, domed, geometrically patterned visualization, largely made of colored & patterned equilateral triangles ... the geometry's [sic] of the structure taking place around me were not so simple, not so kiddy-math ... I have done some minor readings on sacred geometry and it had always just struck me as something that was neat math that could produce intricate and beautiful patterns, but faced

with these kinds of structures [I seriously doubted this], built literally out of all of these geometries in ways that boggle the mind. (Bong Man 2006)

Apparent crystallization of matter all around me ... felt even, like being within a sentient prism. All spatial perception seems to enfold itself in to a gravity well of such ineffable density that it is like floating on the event horizon of a black hole, a prudent observer to nothing less than a multidimensional miracle. (Diamond Joe 2000)

At this point the glorious geometries transcended what is even vaguely feasible in this three dimensional mundane [reality], constantly concreating into new and varigated [sic] permutations, exfoliating out of themselves what might be called hyperspherologies of the divine, and to look anywhere was to be shot clean through with scintillating amazement ... You have a sense of being swarmed by the whimsical mastermind artforms of an extremely eccentric Boolean contortionist, a diabolical merry go round of linguistic Rubix cubes, 13th dimensional millipedes saying themselves to themselves as they make love, and impossible Gordian knots dancing the jitterbug at a lyrical lightspeed: a gelatinous ballet of endlessly self-juxtaposing pirouettes. (SFos 2000a)

All of the examples above clearly establish that the geometric percepts seen in certain altered states, such as those induced by ayahuasca and DMT, may assume extraordinary dimensional qualities that are virtually ineffable and exceedingly difficult to render in static two-dimensional art, though



Fig 4 Visionary artist Luke Brown's "Vajravisión." According to the artist his intention is to map his hyperspatial experiences with utmost accuracy as a form of multidimensional cartography.

some artists have made admirable attempts (Figure 4). Taking this observation a step further, it is suggested that these percepts therefore challenge the received wisdom that Klüver's psychedelic form constants are actually entoptic, that is, derived from within the optic system somewhere from the eyeball to the cortex (e.g. Lewis-Williams and Dowson 1988). Not only is there the standard cognitive neuroscience

miracle of electromagnetic impulses somehow becoming converted into the three-dimensional percepts of the outside world—a feat still not satisfactorily explained by neuroscientists or philosophers (see e.g. Velmans 2009)—but the mind is apparently also capable of multidimensional geometric perception beyond what is ordinarily perceived in the normal waking state. Positing that visual perception can function beyond

what neuroscientists understand to occur in the striate and extrastriate cortices (e.g. Bresloff et al. 2001), what further evidence is there, then, that such seemingly trans-entoptic perception genuinely occurs?

Turning a Blind Eye to Entoptic Phenomena

Both studying visual perception as a psychologist and participating in psychedelic experiences it has long been of interest to know what blind people make of psychedelic experiences: do the blind see geometric imagery on psychedelics too, and if so how come? Research giving LSD to totally blind participants suggests that some of these participants do indeed perceive visual “hallucinations” (Krill et al. 1963) although those doing so had also experienced some visual phenomena in normal life, and none of the four congenitally blind people given LSD reported visual hallucinations. The findings of this research seem to suggest that a working retina isn’t necessary for LSD-induced visual hallucinations to occur; but a normally functioning occipital lobe (absent in those congenitally blind) may be, although these findings are not conclusive. LSD provides a subjectively different experience to DMT, and while no experiments giving DMT to the congenitally blind have been conducted to the best of my knowledge, such a study has been performed with two 7-year-old monkeys blind for one year, and the animals demonstrated a dramatic increase in visual behavior (e.g. exploration) on both LSD and DMT (Siegel et al. 1976). Nevertheless, research into the effects of psychedelics on the human visual experience in the blind is presently inconclusive.

And above humane flight dost soar aloft
With plume so strong, so equal, and so
soft.
The Bird nam’d from that Paradise you
sing
So never flaggs, but always keeps on Wing.

Where couldst thou words of such a
compass find?
Whence furnish such a vast expence of
mind?
Just Heav’n thee like Tiresias to requite
Rewards with Prophesie thy loss of sight.

(John Milton, *Paradise Lost*, l 667)

A new body of evidence is emerging, however; that tentatively indicates that even congenitally blind people can have visual experiences during other states of altered consciousness, such as during a near-death experience (NDE) (somewhat like Tiresias, the underworld blind seer of ancient Greece in the poem above). A study into the visual experiences occurring during the life-threatening incidents of 31 blind or severely visually impaired people indicates that they may have the same type of near-death experience as the sighted, despite not ordinarily having visual experiences (Ring and Cooper 2008). Interviews with those both congenitally and non-congenitally blind having NDEs reveal reports of veridical out-of-body experiences (OBEs), often seeing the scene of their drama from a disembodied perspective (in 67 percent of cases), as well as having visual life reviews, meetings with other beings (spirits, angels, religious personages, etc.), and traveling down a tunnel. Of the sample, 80 percent had visual aspects to their experience, including 64 percent of the 14 congenitally blind

participants. For example, one congenitally blind interviewee who had had two NDEs recalled that “those two experiences were the only time I could ever relate to seeing and to what light was, because I experienced it” (Ring and Cooper 2008: 26), and she went on to describe an OBE as part of her experience, “the first thing I was aware of is that I was up on the ceiling looking ... I looked down and I saw this body, and at first I wasn’t sure it was my own. But I recognized my hair.” (28).

How is it then that a person who has never experienced sight, let alone a sense of visual space, can have a veridical visual experience during an ASC in the absence of a normally functioning visual system (both retinal and cortical)? Ring and Cooper (2008) don’t pretend this type of vision is the same as true ordinary seeing, but instead consider it as a kind of transcendental awareness which they call *mindsight*. The evidence from blind people for this type of seeing is not conclusive, because inference from the other senses cannot be entirely ruled out, but this wears thin as a counterargument because of the extraordinary detail and verification of the accounts by other witnesses. Subsequently, the mindsight proposition still deserves attention. For example, further evidence for supposed mindsight is apparent from highly detailed and acute observations made by others during NDEs, such as a poorly sighted woman seeing dust on the light fixtures from the perspective of the ceiling, “From where I was looking, I could look down on this enormous fluorescent light ... and it was filthy. And I remember thinking, ‘got to tell the nurses about that.’” (Ring and Cooper 2008: 105). The evidence, therefore, suggests that a functioning optic

system is not required to generate mindsight, offering some support for the concept of trans-optic percepts.

Omni-directional Perception

This kind of veridical visual phenomena seen from a disembodied perspective occurs with normally sighted individuals having NDEs as well, of course. However, there are also accounts of people having other extraordinary visual experiences in such near-death states that further challenge the notion, proposed by Lewis-Williams and Dowson (1988), that entoptics are made within the visual system, such as a woman nearly dying of Asian flu virus having “a fourth-dimensional rather than a three-dimensional experience” (Corazza 2008: 27), along with the omni-directional perception of a woman having an NDE caused by pneumonia during pregnancy:

I glanced down at the stretcher, knew the body wrapped in blankets was mine, and I didn’t really care ... I could see everything. And I do mean everything! I could see the top of the light on the ceiling, and the underside of the stretcher. I could see the tiles on the ceiling and the tiles on the floor; simultaneously. Three hundred sixty degree spherical vision. And not just spherical. Detailed! I could see every single hair and follicle out of which it grew on the head of the nurse standing beside the stretcher. (Ring and Cooper 2008: 107)

A similar account of omni-directional vision is also provided by a poorly-sighted (20/200 uncorrected vision) optometrist during another type of ASC, meditation.

I could suddenly see everything—the whole room and myself in it—and I

couldn't tell where I was seeing from! I wasn't seeing from my eyes or from any single point of view. I seemed to be seeing everything from everywhere. There seemed to be eyes in every cell of my body and in every particle surrounding me. I could simultaneously see from straight on, from above, from below, from behind, and so on. (Lieberman 1995: 47)

Such omni-directional visual experiences also occur with ayahuasca and DMT (respectively), corroborating the trans-optic nature of visual experiences in such ASCs.

Dimensions expanded, my closed eye range of vision became 270 or so degrees ... I started hallucinating intensely ... there was a light behind the flowing geometric patterns over everything ... it was absolute, unadulterated madness ... awe-inspiring, transcendent, and profoundly disturbing. (Reverend Raw 2009)

I then tried to imagine what it would be like to see in every direction at once, i.e. what would a ball look like if you could see every side of it at once? I could sense it but not imagine it in my mind. So this is the challenge I set myself [for the DMT experience]. It not only seemed to work ... but it did so immediately. I rushed upwards into this superspace that was a spun galactic ecology of stars, a swarming hive of dragonfly constellations ... This was very profound. (SFos 2000b)

Paranormal Visual Perception

The experiences related here, incorporating multidimensional vision, eyeless sight in the blind, and omni-directional perception could

arguably challenge materialist-reductionist views of the capacities of the mind in general, and of the neuropsychological assumption that entoptics are made within the visual system, in particular. Constructivists on the other hand might argue that such reports do not actually represent genuine trans-entoptic phenomena but rather reflect culturally mediated linguistic devices used to try to communicate complex experiences. Nevertheless, some light may be shed on the genuineness of these extraordinary experiences with research findings from within the field of parapsychology, which does not a priori reject such experiences on materialist-reductionist or other philosophical grounds as some disciplines do but, rather, tests the paranormal hypothesis empirically under tightly controlled conditions. The phenomenon of clairvoyance, which literally means "clear seeing," is defined as the "paranormal acquisition of information concerning an object or contemporary physical event ... [whereby] the information is assumed to derive directly from an external physical source ... and not from the mind of another person" (Thalbourne 2003: 18).

One such clairvoyance-type category of research is known as *remote viewing* (or *remote perception*), which requires accurately describing the physical (usually visual) characteristics of a distant location by mental means only, without ever having visited the location. At one point during the 1990s, both the CIA and the DIA in the United States joint-funded a \$20million research project into remote viewing under the codename STARGATE, which returned highly significant results overall when reviewed by two independent scholars. Of which, one

said the research provided good evidence of paranormal perception (Utts 1995a, 1995b) whereas the other (particularly skeptical) scholar said that the highly significant results needed replicating (Hyman 1995). Other large-scale remote-viewing research studies, however, have also returned positive findings (e.g. Targ 1994; Dunne and Jahn 2003). The evidence for genuine paranormal visual perception seems relatively good, albeit with a useful signal-to-noise ratio that is impracticably low. Further evidence for genuine paranormal visual perception is also forthcoming from reviews of research from other areas too, such as dream ESP (Ullman et al. 2002; Sherwood and Roe 2003) and image-guessing experiments into clairvoyance and precognition (literally “prior knowing,” or seeing future events) (Honorton and Ferrari 1989; Steinkamp et al. 1998). In such research, attempts are made to select a target image from among a range of decoy images based on the similarity of the selected image to the participant’s mental imagery, either produced in dreams or through conscious intention.

Returning to psychedelics, ayahuasca use is frequently accompanied by out-of-body experiences (e.g. Devereux 2008) and ostensibly telepathic or clairvoyant visions (e.g. Luna and White 2000), as is DMT (Luke and Kittenis, 2005). For instance, Kensinger (1973: 12) reports that “on the day following one ayahuasca party six of nine men informed me of seeing the death of my chai, ‘my mother’s father.’ This occurred two days before I was informed by radio of his death.” Surveys typically reveal that under the influence of psychedelic substances there is a distinct increase in the experience of paranormal events, such as

ostensible clairvoyance and precognition, and out-of-body experiences (Luke 2008; Luke and Kittenis 2005). Attempts to verify experimentally the genuine nature of this surveyed increase in *psi* (an umbrella term for clairvoyance, precognition, telepathy, and psychokinesis) brought about by psychedelics have so far been inconclusive—primarily due to poor methodology and a relatively small number of studies; however, the results are at least suggestive of the genuine induction of *psi* with these substances (Luke 2008). These findings further challenge the assumption that visual percepts witnessed in ASCs are generated by the visual system and the brain generally, because materialist-reductionist conceptions of the brain-mind have a hard time accounting for distant mental information transfer. Consequently, proponents of this philosophical position generally just disregard the evidence for *psi* instead of trying to account for it. As Radin (1997: 263) notes, “the persistent controversy over *psi* can be traced back to the founding assumptions of modern science. These assumptions have led many scientists to believe that the mind is a machine, and as far as we can tell, machines don’t have *psi*.”

Conclusions: Cleansing the Doors of Misperception

Arguably, the visual experience, particularly in altered consciousness, can provide percepts that defy the standard materialist conception of the capacities of the visual system: as a transducer of light that produces a kind of virtual reality perception of the three-dimensional world occurring immediately in front of the eyes. The examples provided in the present article rather suggest that some visual perceptions have trans-optic

origins, so how can these observations be accounted for? There are a number of steps on the way to answering this question that beg consideration. First, the limitations of the evidence need to be considered. First-person phenomenological reports are often treated with suspicion (e.g. Dennett 1991), occasionally justified; however, in consciousness research the experience itself is the object of study and so such experiences are valid by definition (assuming the honesty of the subject). With the current observations in hand it would indeed seem intellectually dishonest to consider so many corroborative reports of extra-dimensional perception, mindsight, and omni-directional vision as deluded and untruthful, so such experiences should probably be taken seriously, despite their perplexing nature. What these experiences actually *are* is a matter of further debate. Nevertheless, the wealth of well-controlled parapsychological research, once fairly appraised, should be considered supportive of a general nonordinary type of perception requiring a nonordinary explanation.

In seeking such an explanation, the materialist-reductionist assumptions about the function of the visual system should not be taken for granted, and so—with regard to the archaeology and anthropology of consciousness—the aspects of Lewis-William and Dowson's (1988) neuropsychological model that relate to the philosophy of mind should be reevaluated critically. Clearly the data presented here do not fit the current theories on entoptics. In reevaluating the model it would seem prudent, then, to take an approach to the study of altered states that was proposed nearly 40 years ago, albeit one which has not as yet received

the attention it deserves: scientific research and theories concerning altered states of consciousness should be researched from the first-person perspective at least as much if not more so than they are from supposedly objective perspectives. Such an approach gives rise to the long overdue methodology of a *state-specific science* (Tart 1972, 2000), whereby the phenomenology of ASCs are researched on their own terms. As Shanon (2003) notes, one cannot hope to talk knowingly about music if one has not heard music. The same applies to the phenomenology of consciousness and its altered states.

Furthermore, accessing particular states of altered consciousness within the domain of a state-specific science might allow for the direct experience and understanding of intellectual concepts that ordinarily lie beyond the grasp of those few who originate such theories. For instance, Jansen (1999) supposed that the use of the psychedelic anesthetic, ketamine, which was developed in 1962 at about the same time as Bell's (1964) theorem of nonlocal space-time was proposed, enabled some to report the experiential equivalence of the concept. Similarly, it has been proposed that the use of psychedelics can help one's understanding of psi phenomena because they allow the mind access to nonlocal space-time (Millay 2001). Furthermore, it has been proposed that DMT can activate quantum states in which the ordinary perceptual-cognitive-symbolic mode of thinking and perceiving is replaced with a direct-intuitive-nonlocal mode, enabling access to extradimensional connections within the multiverse (Frecka 2008).¹ Whatever the 80-year-old categorization of form constants

presented by Klüver (1926, 1996 [1928]) certainly needs updating to incorporate the full spectrum of ASC-induced geometric percepts and their apparent dimensions, particularly those arising from psychoactive substances besides just those provided by researchers working with LSD, cannabis, cocaine, and mescaline between the 1920s and the 1970s.

Finally, the other step that needs to be taken on our journey, inching toward a way out of the neurological maze of geometric ASC percepts, is the incorporation of an alternative conceptual map on which these extraordinary experiences can be located and navigated theoretically, rather than being conspicuously omitted. Several workable candidates look much better designed for the job than the dominant neuropsychological “meat computer” (Minsky 1987) conception of the brain-mind. One such plausible contender is expressed by the analogy of the brain as a television set or other worldwide communication device, in which the mind is analogous to the television show, which does not originate from within the television set but is received by it (Devereux 1996; Lommel 2004). According to this view, much like the electromagnetic field that carries the television’s information signal, minds are not confined to the insides of heads either but extend outward in a field-like manner, even communicating directly with other minds and information sources beyond the limitations of space and time. Certainly the radical conception of the brain as a receiver of consciousness, rather than the inadequate materialist notion of it as a generator of consciousness, is likely a more satisfactory concept within which to incorporate the experiences described in this article.

Similarly to Lommel’s analogy of the brain as a television, but coming from a psychedelic perspective, Huxley (1954) promoted Bergson’s (1990 [1896]) theory of the brain as a filter of memory and sensory experience. Bergson viewed the brain as an organ that acts to reduce the wealth of information available to awareness so as to avoid becoming overwhelmed by a mass of largely useless data, irrelevant to the ordinary survival of the organism. The French philosopher Bergson further suggested that, if these filters were bypassed, humans would be capable of remembering everything that had ever been experienced and of perceiving everything that has happened everywhere in the universe (e.g. as in clairvoyance). After taking mescaline Huxley added psychedelics to the theory and suggested that these mind-manifesting drugs override the “reducing valve” function of the brain, allowing humans access to both psychic and mystical experiences, and to illustrate this point Huxley took the title of his book from a quote by the English mystic and poet William Blake—“If the doors of perception were cleansed everything would appear to man as it is, infinite.”

Huxley’s (1954) rather basic conception never received a more formal operationalization, but modern neurochemical research lends some support to his notion of psychedelics working on the brain’s reducing valve. For instance, Vollenweider and Geyer (2001) have proposed that psychedelics both inhibit the “gating” of extraneous sensory stimuli and simultaneously lead to an overload of internal information in the cortex. It is thought that these combined information-overload effects are at least partly responsible for

the “hallucinogenic” (a particularly laden medical term which obscures more than it reveals) experience with these drugs, as is indicated by an increased physiological startle response to incoming auditory stimuli (Vollenweider 2001). This disruption of the sensory gating function by psychedelics could also underpin the neurochemistry of genuine psi experiences, which, like psychedelic experiences, are associated with the inhibition of ordinary sensory filtering, elevated creativity, boundary thinness, schizotypal symptoms, and self-expansiveness (Luke and Friedman 2009).

Concluding Remarks

What then of Lewis-William and Dowson's neuropsychological theory of shamanic rock art if the mind is considered capable of being more than just the brain? The model would mostly still stand: our ancestors would still be considered to have actively engaged in pursuing ASCs; certain rock art would still be considered to represent geometric percepts from these ASCs; and the geometric percepts themselves would still be considered to be universally perceived phenomena in ASCs. *Only the source of these percepts* would need reevaluating, assumed to derive from our physical visual system by Lewis-William and Dowson. It is hoped that this article has cast sufficient doubt on the standard neuropsychological assumption that the brain generates the percepts of altered states of consciousness, and it is further hoped that Lewis-William's (e.g. 2002) robotic a priori view that form constants are “wired” into our brains is not taken for granted. This may be a rather too optimistic ophthalmologist's hope, however, because the mainstream neuroscientific enterprise

has so far generally proved to have tunnel vision on the brain-mind issue, particularly where visual perception is concerned. On the (extra-dimensional?) surface of it, when we pool the reports together, there certainly appears to be more to entoptics than meets the eye, but are there other researchers willing to look any further into it?

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Note

- I After listening to a lecture on space-time and consciousness recently by a professor of astrophysics I presented to him a similar idea about the 11 dimensions of space-time conceptualized in M-theory (e.g. see Carr 2008), suggesting that perhaps those people taking DMT who report multidimensional percepts, often geometrical, are actually witnessing such a concept first-hand. The professor kindly explained, however, that only mathematicians can really conceptualize such a thing as 11-dimensional space-time, and then only mathematically, not visually of course. I wonder: Maybe a combined research approach by both physicists and psychonauts could help to unravel the complex puzzles of string theory or some such conundrums of physics.

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