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THE ROLE OF TRANCE IN THE CREATION OF ROCK ART IMAGES

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Abstract. The 'Three Stages of Trance' has become a leitmotif in discussions on the origin of rock art imagery. Here I challenge the validity of this paradigm including the algorithm that has developed whereby geometric motifs equate to entoptic imagery that equates to first stage of trance and therefore indicates shamanism. New approaches to the study of consciousness and brain activity are changing out-dated models and allowing new ways of conceptualising the beginnings of art.

Introduction

Rock art is a window into the world of the past; a window that offers a kaleidoscope of endless possibilities, tantalisingly familiar images and ambiguous signs.

A bull races across the cave wall, as arresting a picture now as it must have been in Ice Age Europe. Bold concentric circles on the rock walls of a natural amphitheatre in Australia's Chamber's Gorge demand attention and respect. We think we know the nature of the animal but do we know this any more than we know the secrets hidden within the circles? We think we know how people draw circles but animals that come to life deep in dark caves challenge our simplistic explanations.

We marvel at the faces and hands, an old man or a child in the paintings of European masters such as Leonardo and Michelangelo but we can see their sketch books, evidence of hours of watching and recording images to use later. Monet, painting the dramatic breaking up of the ice in the Seine, the *Debauche*, feverishly sketched the real scene as long as he could stand the cold and then completed the painting in the studio. Modern artists can take photographs and with digital technology may recreate their subject, Photoshopping it at their will.

The artists of Lascaux and Chauvet did not bring sketchbooks or photographs into the cave. How did they bring in the bull, the horses, the rhinoceroses and the bison and why put dots and lines in what may appear to be random placements. Why carve circles and spirals, dots and arcs on the walls of gorges from Australia to China?

The Three Stages of Trance

In 1988 David Lewis-Williams and Thomas Dowson published a paper entitled 'Signs for all times'. In it they cited the works of researchers such as Kluver, Siegel and Horowitz; work based on laboratory experiments, conducted mainly from the 1920s to the 1960s, in which laboratory subjects were given a range of hallucinogenic agents. Combining reports from various (sometimes disparate) experiments, Lewis-Williams and Dowson proposed that subjects went through three stages as they entered into an altered state of consciousness and had different visual experiences in each stage. The nature of visual imagery during altered states of consciousness progressed from Stage 1 in which entoptic phenomena alone were experienced, through Stage 2 in which subjects tried to make sense of these phenomena by elaborating the images into iconic forms, to Stage 3 in which there is movement and change in the forms and the introduction of lattices and tunnels (Lewis-Williams and Dowson 1988: 203).

They had no doubt that the rock art of the San of South Africa and the Coso of California was shamanistic, and argued that their model exposed the neuropsychological order underlying the art (1988: 213). They also applied their model to Palaeolithic cave painting, allowing them to suggest that a significant component of Upper Palaeolithic pictograms also derived from altered states of consciousness.

Lewis-Williams developed this theory further in a later publication in which he stated 'We can therefore safely assume that some people in the Upper Palaeolithic experienced the three stages of altered consciousness that leads to deep hallucinating states and that

these states were thought of and ritualised in a way that was compatible with their hunting and gathering way of life' (Lewis-Williams and Clottes 1996: 81). He was somewhat dismissive of, as he put it, 'the so-called "signs"', asserting that 'They are more probably fixed Stage One geometric visions' (1996: 93).

So was this the answer? Problem solved, we can move onto something new? Many researchers have said just that. So, unfortunately, it has become, for some individuals working in the field of rock art, a given that non-iconic or geometric imagery equals Stage 1 visions.

For example, in their beautifully illustrated book on the rock art of the Colorado Plateau, Malotki and Weaver (2002), when suggesting interpretations, make comments such as the following about examples of non-iconic images:

... more likely the image is reflective of geometric mental imagery perceived by a shaman artist in the initial stage of an altered state of consciousness [p. 158]

... based on advances in our understanding of the neuropsychological make up of the human mind, ... this panel would be interpreted as pictures of phosphenes or entoptic phenomena. These are universal form constants that involuntarily appear in the human visceral neural system, without retinal input, in the incipient stages of altered states of consciousness such as trances or hallucinations and as a result of severe migraine headache, pain or sensory deprivation [p. 131]

... the modern neuropsychological hypothesis for the origin of rock art recognises such nonfigurative motifs as biochemically generated features of the universal human nervous system ... originating in the mind's eye during the initial phase of an altered state of consciousness, they are said to be common to all humans [p. 66].

But does the published work of researchers such as Kluver (1926, 1966), Siegel (1977) and Horowitz (1964) really provide a rationale for the argument that geometric imagery indicates the maker was in the first stage of trance?

Kluver was in fact much less dogmatic and precise about his findings than is implied by Lewis-Williams. He carried out experimental studies on monkeys, giving mescal to animals with a range of surgical brain lesions, and also took mescal himself; however, the main body of his information came from an analysis of the writings of other investigators. He noted (1966: 18) that

... at the very beginning, our search for typical effects seem to meet serious difficulties. On the one hand, the investigators emphasize that the phenomena defy all description. On the other hand, the phenomena reported present such striking differences in appearance that it seems more adequate to stress the diversity of these phenomena than the 'common elements'.

Kluver's (1966: 20) conclusion after reviewing the work of many researchers including Rouhier, Havelock Ellis and Mitchell was that 'any scheme, which

in a detailed manner, assigns different kinds of visions to successive stages of the mescal state must be viewed as extremely arbitrary. The only thing that is typical with regard to sequence is that very elementary visions are followed by visions of a more complex character'.

He observed that, despite inter- and intra-individual differences, the records were remarkably uniform as to the forms and configurations which he called '*form-constants*' (1966: 22). These appeared chiefly during the first stage of mescaline intoxication, and his analysis of them yielded the following forms; (a) grating, lattice, fretwork, filigree, honeycomb and chessboard; (b) cobweb; (c) tunnel, funnel, alley, cone or vessel; (d) spiral. He never stated that these appear in pure form, rather, that many phenomena are modifications and transformations of these basic forms (1966: 66).

Horowitz (1964: 513), a navy psychiatrist, had observed that some of his schizophrenic patients would suddenly stop during their painting sessions and stare

... with an expression of abstract, perplexed intensity that seemed to be associated with hallucinatory phenomena and then they made simple figures which were different from the previous pictorial forms.

He asked his patients to draw and describe what they saw and then asked 80 colleagues to draw and describe the visual impressions they had (a) when falling asleep or waking; (b) while looking at bright spaces such as the sky, clouds or walls; (c) on being struck on the head or eyes or on seeing a very bright light; (d) after pressing on the eyeballs; (e) when delirious, sick, very tired or isolated. He noted a redundancy of forms throughout the questionnaires completed by normal individuals, the drawings and descriptions by schizophrenics and his own experience with psychotic art. He represented the redundant figural elements in their simplest and most common forms (Horowitz 1964: 516), creating six groups of elements; small circular figures, large circular figures and radiations, parallel figures, grids and filigrees, wavy lines and amorphous specks (1964: 518).

We do not have the raw data, the imagery that people in the different groups actually produced nor can we compare the elements from the different groups. All we have is the elements abstracted by Horowitz from the group as a whole. He made the point that the figures he illustrated 'represent the redundant figural elements in their simplest and most common forms; at times they appeared as overlapping, combined or multiplied (Horowitz 1964: 518).

Siegel had conducted experiments in which he compared the imagery induced by hallucinogens and placebo. He observed (1977: 114) that imagery not induced by drugs was characterised by amorphous black and white forms, sometimes including lines and curves, that moved randomly around the field. With hallucinogens the number of images re-

ported rose sharply, but subjects then had difficulty in describing the imagery because they appeared so rapidly. So he trained subjects to use a standard descriptive code for eight forms, eight colours and eight patterns of movement by showing them hundreds of different slides, for example of tunnels.

The forms were: random, line, curve, web, lattice, tunnel, spiral and kaleidoscope. Siegel compared the effects of hallucinogens, amphetamine, phenobarbital and placebo in both trained and untrained subjects. He found that trained subjects could classify images into the categories much more quickly than the untrained subjects; twenty reports compared to five per minute. The images reported with placebo, amphetamine and Phenobarbital were black and white random forms moving aimlessly. Dramatic changes occurred with the introduction of the hallucinogens, tetrahydrocannabinol, psilocybin, LSD and mescaline. The most obvious aspect of their findings in drug-induced hallucinations was the presence of form, colour and movement in the visual imagery; the constants being primarily lattice and tunnel forms with red colours and exploding rotational movement.

Entoptic or not

Entoptic phenomena certainly happen; we all experience them occasionally and we do so without the aid of hallucinogenic drugs. Most of the time we 'choose' not to see them. The brain filters out unwanted or unhelpful stimuli. Non-veridical visual phenomena such as phosphenes, afterimages, dreams and hallucinations also exist and we know now they follow different pathways. The neurosurgeon, Wilder Penfield (Penfield and Rasmussen 1950: 158) in his experiments on non-anaesthetised subjects undergoing brain surgery, showed that simple phosphenes of dots, lines and stars were experienced following direct stimulation of the visual cortex. The stimulation might arise through a bang on the back of the head, direct electrical stimulation as shown by Penfield and, more recently, through transcranial magnetic stimulation of the visual cortex.

Neuroscience has added greater complexity to our understanding of visual pathways. There are at least ten brain nuclei known to receive input directly from the retina. They connect to specialised visual cortical areas that are also receiving input from the retina via the lateral geniculate nuclei. As Stoerig (2001: 178) expressed it,

... were the visual system organised in a quasi Cartesian fashion so that all retinal input eventually converged onto a single structure whose destruction abolished all vision, we should happily accept that structure as the 'mind's eye'. Instead we find a network of heavily interconnected, functionally specialised structures at both cortical and sub cortical levels.

Stars do occur in the suite of so-called 'entoptic images' but just because someone paints a lot of stars

it does not mean they are reproducing entoptics. Gulumbu Yunupingu, a Yolgnu woman from Yirrkala in northeastern Arnhem Land creates huge bark paintings and hollow logs covered in tiny stars. The stars, she says, are my vision, my dream; the Pleiades, who row their canoe across the night sky, are one of her totems. It would be too easy, if you had no informant and believed that images such as stars are entoptic, to assign Gulumbu's work to such a category; to see it as the result of visions seen in trance.

Gulumbu does have a vision. Her vision is how to inform, how to tell people to walk as upright as the vertical lines in the near stars in her painting. Small dots are the myriad of stars that, to Gulumbu, represent the peoples of the world (Yunupingu 2003). If you live, as Gulumbu does, by the beach at Yirrkala so that the stars of the night sky are as familiar as the street lights of Paris or Melbourne are to the local street kid, you do not need to create stars in your head. They are out there and their infinite array becomes small dots stretching to infinity. What Gulumbu painted came from the vision in her head. It was what she made of the stars she saw in the night sky.

Simple circles are everywhere in the world; in the full moon, in pebble-created rings on a lake surface, etched in the sand by windblown grass, in a child's first attempts to enclose a space and in rock art from every continent. I have previously discussed the ubiquity and ambiguity of circles as symbols in rock art (Bullen 1993, 1998). The study that I reported in 1993 showed that of seventeen students asked to draw what they saw after being given a very brief hypnotic induction, eight produced circles of some kind (Bullen 1993: 53). Three were described as whirling circles of colour while two were radiating semi-circles of colour. Circles could be seen in the other images but not as simple symbols.

The procedure lasted no more than three minutes for each individual. Each image could have been deconstructed into component circles, spirals and wavy lines, but that would have falsified the data. The circle is clearly a form that comes naturally to human beings, and to reduce some of the most dramatic and starkly simple images found in rock art to entoptic copies is to devalue the meanings invested in them by their makers.

Rock art as communication

The concept of art as a vehicle for communication was expressed simply by the artist Peter Booth (2003) when he wrote as a brief note in his 2003 Melbourne exhibition 'whether a picture is abstract or figurative is not the issue — it's what the painting says about the human condition'. Humans as social animals have to find some way of expressing a précis of their mental state and of impinging on others so that they may co-ordinated their behaviour (Arbib 2001: 206).

The mindfulness of rock art was emphasised by Marshack (1989: 36) in his commentary on the 1988

paper by Lewis-Williams and Dowson when he wrote 'to assign even the geometric images in this body of world art to altered states of consciousness is to deny the human capacity for consciously creating and signifying forms'. This view was reiterated by Nicholas Saunders. Focussing on the theme of the relationship of shamanism to rock art, Saunders (2002: 2) acknowledged the importance of Lewis-Williams work on San art but observed that

... emphasis on entoptics has been challenged as promoting neurological determinism in ways that degrade our ability to identify individual and cultural imagination and imperatives. In other words it stands accused of privileging a narrow class of neuropsychological phenomena, arguing that images, shapes and designs in the art are the autonomic [*sic*] consequences of altered states of consciousness rather than the result of conscious, purposeful and meaningful selection by a society.

Helvenston and Bahn (2003, 2005) have written extensively about the improbability of western European Pleistocene art being related to trance, a strong element in their argument being the absence of hallucinogens such as mescal and LSD in the local environment. Even if the makers of the images in Chauvet or Lascaux could have used hallucinatory drugs such as LSD it is highly unlikely they would have produced the lifelike images that we see today. The Huichol Indians produced dramatically vivid pictures when they reproduced their peyote visions but that is very different from art that articulates the essence of being a bull or a hunting lioness. Can we look back twenty to thirty thousand years and have any concept of how the people of Chauvet did just that? We can start our quest in the late nineteenth century.

Over 100 years ago, William James (1890: 44) wrote that 'sensations, once experienced modify the nervous organism, so that copies of them arise again in the mind after the original outward stimulus is gone'. The researchers who make much of Kluver's comments on mescal visions are perhaps unaware of his research into *Eidetiker*. If I ask members of an audience to visualise a bull some will find this a ridiculous request, some will be able to remember a visit to a farm an agricultural show or even a bullfight and imagine a bull. A few will have a perfect picture of a bull. Kluver (1975: 7), in his 1924 studies in California, was following up reports from the Marburg School into *Eidetiker*, 'people who are gifted with optical "*Anschauungsbilder*" '. Before reporting on his own detailed studies with adults and children, he cited the work of Busse who (in translation) said that the *Anschauungsbilder* were people 'able to reproduce after a longer or shorter time the impression of a memory, that is, to see once again an optical example truly and literally in the mind'. Kluver noted that, while the highest incidence of *Eidetiker* was in young teenagers (1975: 79) a small number of the adults he studied were able to demonstrate almost total recall

of a detailed picture three months after seeing it once for a brief time (1975: 149). He himself was not *Eidetiker* nor did he possess vivid and complete optical memory images of objects, and neither skill was enhanced by the taking of mescal (Kluver 1926: 503).

It is likely that individuals identified as *Eidetiker* would also be identified by other tests as individuals with high trance ability. We know that trance ability follows a normal distribution curve. In Western societies today about five percent of the population have very high trance ability, about five percent are at the other end of the scale and the rest follow the curve. Many people with high trance ability are unaware of it. Our modern 'evidence-based' society has not sought out the seers and 'men of high degree' but rather encouraged those who follow the dictates of Western science. The incidence of deep trance subjects in the population may have been relatively constant for thousands of years, but in a society where so much of what happened was inexplicable — illness, the death of a child, storms, droughts and floods — it is likely that they were encouraged to use their ability. A society in which people are pitted against capricious acts of nature values those who can move between the realms and seemingly meet the gods on their own ground. However, this genetic ability needed to be 'switched on'.

Neuroplasticity and trance ability

Until recently it was thought that the connections within the brain that will make our genetic inheritance effective are laid down in utero and early infancy; that by the time we are born our neurological pathways are on the way to being fixed and creating new pathways later in life was considered to be impossible — hence the poor recovery from strokes (Ramachandran 2003: 16)

However that very same Western science has come up with new evidence that 'the hardware of the brain is far from fixed at birth. Instead it is dynamic and malleable' (Schwartz and Begley 2002: 120). Neuroplasticity, the formation of new neurons and connections is happening continuously. Crick and Watson broke the knowledge barrier with their description of the structure of DNA, and it has now become possible to observe both the structure and function of genes and how they express themselves. Genes respond ultimately to changes in their environment, doing so by making messenger RNA, which codes for a particular protein. Activity-dependent gene expression, which can affect subsequent behaviour, happens when an activity stimulates a gene to produce a protein coding for neurogenesis resulting in the production of new neurons and new pathways (Rossi 2002: 10). Some genes are turned on quickly generating protein within minutes rather than the hours required for others to be effective. The activity of regulatory proteins which can enhance the action of gene transcription of messenger RNA, is in turn

controlled by receptors located within the cells or on the cell surfaces. These receptors recognise molecules such as steroid hormones, peptide growth factor and neurotransmitters (Schwartz and Kandel 1991: 188).

Let us assume that in a community living in and around the caves of southwestern France we have a normal distribution of trance ability. Let us be generous and assume that ten percent have the gene that codes for the proteins that promote the neurons that access the amygdala and other parts of the brain we know are associated with the execution of trance. Whatever their age these people will have spent hours watching animals, studying their physical shape and even their shadows, and they will have observed their behaviour in all situations, eating, fighting, threatening, dying, they will have been taught by their elders and their very survival depends on their absorption of those lessons.

It is highly unlikely that neophytes to the experience would have gone into the caves or other special sites alone. Work with bees has shown that if young bees are isolated from their older mentors they do not switch on their clock genes to synchronise their internal clocks with daylight. Touch and socialisation are extremely important not only to bees. Memorable experience has also been shown to enhance gene expression and this is more apparent in highly susceptible subjects (Rossi 2002: 208). What more memorable experience could there be than going into a deep cave lit by flickering lights which cast shadows on walls that have ready-made eyes and haunches in the holes and irregularities in the rock surfaces, and even horses heads like those we see on merry-go-rounds. Those with high trance ability would have had no difficulty in seeing the animals emerging from the walls, and they would have held the animals captive in their minds while they painted them.

This animal visitation is very different from that experienced in a 'hasheesh delirium' by a friend of William James, who described rows of heads changing to spoons, a kaleidoscope of objects, wheels, tin soldiers, countless absurdities and said that 'any animal or thing that I thought of could be made the being which held my mind. I thought of a fox and instantly I was transformed into that animal. I could distinctly feel myself a fox, could see my long ears and bushy tail and by a sort of introversion felt that my complete anatomy was that of a fox' (James 1890: 121).

Today our visual landscape is not restricted to our own back yards. Modern technology allows the possibility of breaking through the spatial boundaries that in the past have limited an individual's visual world and therefore the images they could reproduce.

The set of images produced by an individual could be further limited, and sometimes determined by, cultural constraints and expectations. The Tucano decorated their houses with the geometric and

representational image they saw when they took *yage* (Reichel-Dolmatoff 1972: 104). Reichel-Dolmatoff pointed out that, since infancy, the Tucano had seen these images on pottery, house walls and cloth, and their meanings had been explained to them (1972: 110). Therefore, when they too took *yage* they had a cultural memory to project onto their vision screen. In other words they knew what to expect and what was expected of them.

Conclusion

The concept that some rock art images might be connected with powers beyond the known real world is not new. Breuil (1974: 170) recognised that *Le Sorcier* was not a picture of a real person or animal; a composite image, its biological unreality implied a special nature and power. It is recognised that most, if not all, societies have certain individuals within their population who, by a variety of means, are invested with an enhanced capacity to go beyond the constraints of normal reality. It is probable that through changes to the thalamic control of the frontal cortex they experience a dissolution of normal ego boundaries with altered perception of time and space (Vollenweider et al. 1999: 106). The loss of such boundaries may permit a mystical experience such that the individual appears to themselves and to others to move into another reality.

Lewis-Williams' concept of three stages of trance, under the rubric of altered states of consciousness, artificially locked those with such special gifts into a paradigm wherein the so-called stages of trance were associated with and identified by, certain types of imagery. The shaman, as the individual with the capacity *par excellence* to enter into an altered state of consciousness was the one who could imagine the un-imagineable and recreate it on the cave wall.

A discussion of altered states implies that there is some basic state of consciousness in which an organism normally functions. Consciousness itself is difficult to discuss. It is so elusive that there is no agreement that it actually exists as a biological phenomenon somehow residing in the brain (Revonso 1999: 87).

According to Tart (1986: 3), the ordinary state is not something natural but a highly complex construction specialised for coping with an individual's environment.

Everyone has some experience of altering their level of internal and external awareness. Awareness of a painful stimulus may be altered by distraction through music or an engaging conversation, while immersion in a book or play may induce a sense of having stepped outside the real world or through the looking glass of imagination.

We do not have to imagine that the painters who left such images as the hunting lions or the reindeer crossing a river, the larger-than-life bull or the finely engraved horse's head were in the kind of altered

state of consciousness or ASC that has been observed and recorded in historical shamans by ethnographers and anthropologists. These artists were very special persons who had the ability to hold an image, and the artistic skill to bring the image in their head alive on the wall. They would have been special in any age or place.

Using the Lewis-Williams paradigm, features in the dynamic art of western Arnhem Land, such as dashes around and emanating from, figures, suggested to Chippindale and co-researchers (2000: 77) that the art is associated with altered states of consciousness. The basic premise that the three stages of trance are real and that each is marked and identified by certain imagery leads to the conclusion that the presence of such imagery identifies the maker as having been in a trance at the specified level. The circularity of such an argument renders it unreliable even if the basic premise were true. The ability of 'clever men and women' to use trance to travel through time and space is well recognised and it is highly likely that people with that ability were very important to their society ten thousand years ago. Despite the time depth from the present to the probable ten thousand year plus age of the dynamic art and the known changes to the physical coast line of Australia, Chippindale et al. (2000: 93) suggested that a direct historical continuity between the dynamic vision and modern clever knowledge is likely. Even if Chippindale's arguments based on the Lewis-Williams paradigm are unreliable, his conclusion that the dynamic rock art is concerned with trance imagery may be true. But, there is a further fifteen to twenty thousand years in time and over ten thousand kilometres in space between that art and the first cave painting of Western Europe.

Locke considered that 'the mind can frame unto itself no one new simple idea', and that 'no mental copy, however, can arise in the mind, of any kind of sensation which has never been directly excited from without' (James 1890: 121). He would probably change that view in light of the evidence for neuroplasticity and accept the real possibility of imagining something that has not been imagined before.

Mithen suggested — in contradistinction to Locke — that while a cognitively fluid mind, thirty thousand years ago, could come up with images outside the experience of the natural world, it did not have the words to either communicate it to others or think about it. The mind did not have an adequate language for the ideas it was experiencing. Artefacts and cave art became a way of anchoring those ideas that had no 'natural home within the mind' (Mithen 1999: 291).

It would seem likely that it was special people who had the ideas and also the courage and ability to put them out for others to see. They were perhaps the earliest clever people capturing their dream images on the walls around them.

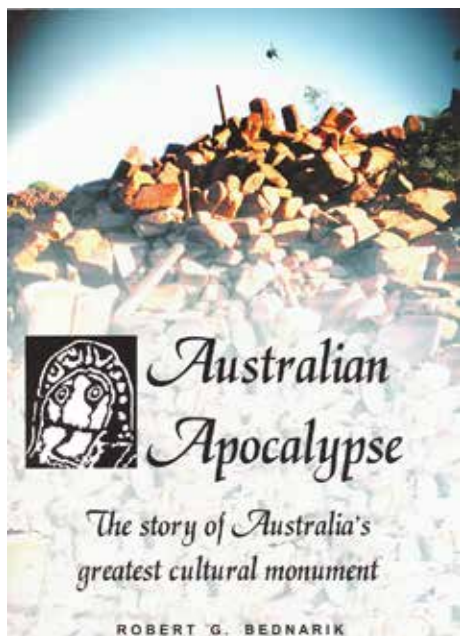
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