

THUNDER GODS IN PREHISTORIC ART: MIMICKING THUNDER FOR RAINMAKING RITUALS AND THE PSYCHOACOUSTICS OF REVERBERATION

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INTRODUCTION

Archaeoacoustics is a fairly new field of multidisciplinary study. In this paper it is used as a non-conventional means to approach the relationships between prehistoric rock art and ancient beliefs in the supernatural. This paper specifically addresses the role of religion and myth in rock art, and uses sound as a tool to reveal the possible functions of rock art in expressing spiritual matters. The basic premise is that complex auditory phenomena were mysterious to ancient peoples unaware of acoustical properties. Sound wave reflection can give the illusion that voices are coming out of solid rock, hence gave rise to many myths around the world that explained echoes as the voices of echo spirits calling back from within the rock. Deep caves can produce so many echoes that they blur together into reverberation sounding like the rumbling of thunder, which was explained in different regions of the world by myths of galloping hooved animals, thunderbirds, rattlesnakes, etc.

The observations that rock art is typically located in places with remarkable echoes and thunderous reverberation (Waller 1993) led the author to hypothesize that much of rock art was motivated by sound reflection misinterpreted as sounds from the spirit world. There is a strong relationship between mythical thunder god descriptions and images portrayed in prehistoric rock art (Waller 2012a). Furthermore, employing these reverberant contexts for mimicking thunder as part of rainmaking rituals to supplicate the thunder gods has economic as well as spiritual applications. Psychoacoustic studies have shown the brain is susceptible to auditory illusions (Waller 2014), in which a given sound is misinterpreted as a different sound from a different source. Echo myths are a prime example of how an auditory stimulus, in this case sound reflection, was so mysterious to ancient people who did not understand sound wave physics that it was perceived as the answer of spirits.

Quantitative sonic measurements of echoes and reverberations (Waller 1993, 2000, 2012b) have shown a correlation between sound reflection strength and the places selected by ancient artists. In addition, the subject matter of the art is often related to the descriptions of echo spirits and / or thunder gods contained in myths and oral legends. Thus sound can help explain both the context and content of much of rock art (Waller 1993b, 2006).

A variety of theories have been put forth attempting to explain the motivation for the perplexing context and / or content of the rock art that is found around the world. Most of these theories have proved unsatisfactory since they fall short of explaining the variety of rock art complexities. In this paper an interdisciplinary attempt is made to harmonize various major theories (Waller 2009), in such a way that a wider range of rock art characteristics is covered than any one theory alone. The various theories of rock art motivation can augment, rather than conflict with, each other, including hunting magic, totemism, structuralism, acoustics, shamanism and the neuropsychological model.

The ways in which these different theories can be harmonized is explored below in a manner similar to the famous parable of the elephant and the blind men, which has often been used to illustrate the nature of perception relative to religious beliefs. Each blind man in the parable thought he had the answer to what an elephant was like -- snake, wall, or rope depending if he touched the trunk, side, or tail -- and indeed each man's perception contained partial truth, but no man had the complete concept. In the case of rock art studies, it is the sense of hearing that now has been found to be pertinent, and this paper explores how opening our ears to sound can help put the pieces of the puzzle together, revealing the importance of the role of spiritual beliefs in rock art.

In the theories below, the reader is referred to summaries by E. Anati (2003) for a listing of primary sources. The various rock art theories that have been proposed are examined from the perspective of the spiritual significance of sound as revealed in echo and thunder myths.

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Art for art's sake

The first impressions of prehistoric cave art were derived from the function of classical art in modern civilization. The leisurely pursuit of art for no purpose other than decoration can be considered the null hypothesis. It explains neither the characteristic contexts of rock art, nor the restricted subject matter, and so can be confidently dismissed and relegated to historic interest only.

Resonance

This proposal (Reznikoff and Dauvois 1988) that deep cave art placement corresponds to places with resonance is an important observation that emphasizes the significance of the acoustic characteristics of locations the artists chose. Although resonance by itself would not apply to open-air rock art, and there was no explanation put forth about why resonance would have been considered significant, this observation is an important clue.



Fig. 1 The Bhimbetka rock shelters in central India are painted with thundering herds of stampeding hoofed animals, consistent with the thunderous reverberation in these shelters, and evoking Indo-European thunder god myths that explain thunder as supernatural hoofbeats. In this case an anthropomorph riding a hoofed zoomorph and holding a staff is very similar in appearance to ancient traditional depictions of Indra the thunder god riding an elephant and wielding a thunderbolt. (Photo by S. Waller)

Sympathetic or hunting magic

The subject matter of deep cave paintings in Europe is >90% hoofed animals, yet these have been shown not to correspond to the animals hunted for food. The species depicted have more in common with the descriptions of thunder gods contained in Eurasian myths that explain the cause of thunder as hoof beats.

Clapping in certain chambers of certain caves can result in percussive echoes blurring together into thunderous reverberation. It raises the possibility that the thunderous reverberation was perceived as being caused by the same supernatural galloping hoofed animals that were believed to cause thunder in the sky, as described in numerous ancient myths.

In the Americas, the thunder gods included thunderbirds, snakes, sheep and Tlaloc; in Australia there are the lightning brothers and thundering kangaroos (thumpers). All these are common rock art motifs; see Figs. 1–4 for examples of rock art for which the context is reverberant locations, and the content is related to thunder gods.

The relationship between reverberation and thunderstorms thus raises the possibility that highly reverberant sonic environments were used in sympathetic magic rituals in which hoofbeat-like percussive sounds were made not just for the practical reason to conjure up hoofed animals for food, but for the spiritual reason to create thunder in mimetic magic as supplication to thunder gods (which also led to practical benefits relating to fertility as a result of rain).

Cave cathedral or sanctuary

The sonic environment of caves is one feature that can give these places a special, even otherworldly, aspect to this day. It is difficult for us today to separate this feeling from the feeling of sacredness one perceives in great reverberating cathedrals and temples, because of the direct association of the architectural

acoustics with the intended known religious purpose of those structures. Thus it would be difficult to determine if ancient people lacking that association would also have had the same spiritual response; i.e., to ascertain if it is a natural response. There is reason to justify that the response of the ancients was greater because the extra reflected sounds were completely mysterious.



Fig. 2 In the Pecos region of Texas, a figure resembling a thunderbird is painted in a rock shelter at which one can hear thunderous reverberation. (Photo by S. Waller)

Fortuitous to intentional

Evidence that stalactites and rock gongs were struck to produce musical notes includes pounding marks and other demarcations. Over time, these marks could have come to be associated with the sound, and the fortuitous patterns formed may have naturally inspired representations of objects.

Totemism

The theory that rock art represents spirit helpers is in agreement with acoustical motivation, since a wide variety of sounds can echo off rock surfaces and could be interpreted as various spirits, as shown by the wide differences in descriptions of echo spirits and thunder gods in myths around the world.



Fig. 3 Sheep petroglyphs are common throughout the American southwest, such as this figure carved in an echoing canyon in Utah. Sheep have been associated with rain, and legends from the Great Basin explain echoes as witches hiding in the bellies of sheep and snakeskins, mocking passersby. (Photo by S. Waller)

Structuralism

The data amassed by A. Leroi-Gourhan (1967) showed relationships between the various species depicted compared with shapes of the portions of the caverns in which they were depicted, resulting in an apparent grand scheme of Palaeolithic cave decoration. Unfortunately the pattern did not hold up for caves discovered afterwards and thus was not predictive. It is interesting, however, that while the shape of a space is one important determinate of its acoustics, another equally important factor is the sound absorption coefficient of the surfaces. This factor seems now to have been the reason that the hypothesis based on cave shape as the sole determinate of cave art placement was disproved.

While stone in general gives good sound reflection, because sound reflection is better from some surface textures than others, there is only a loose relationship between reverberation and cave shape. If indeed the cave art was motivated by sound, this could explain why only a loose relationship was found between cave art and cave shape.

Gender and sexual symbolism

Another outcome of Leroi-Gourhan's studies (ibid.) was the finding of branched signs that had previously been interpreted as weapons, but which he interpreted as male fertility symbols. The realization that similar branched signs are known to have represented thunderbolts (Waller 2012a) can help resolve this dichotomy, since branched signs are found in caverns with thunderous reverberation, and thunderbolts were widely perceived as literal weapons that virile thunder gods hurled to fertilize the earth, thus were also male fertility symbols.

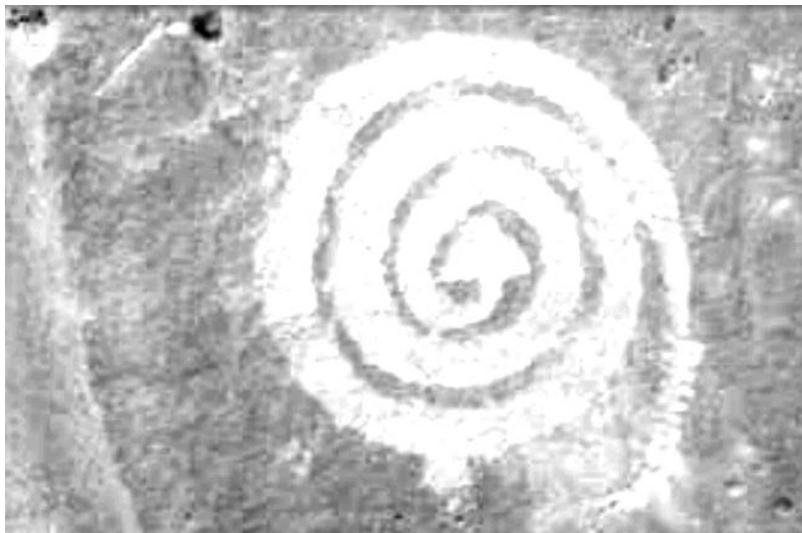


Fig. 4 A spiral petroglyph in the shape of a snake complete with a rattle tail was pecked at an echoing rock art site in New Mexico. This carving recalls southwestern Native American myths explaining thunder as the rattling of the tail of a giant rattle snake. (Photo by S. Waller)

Mythological; hermeneutics; literary textual interpretation

The theory that rock art represents supernatural beings described in myths is entirely consistent with the acoustical theory of rock art motivation. There is a wide variety of explanations for the phenomena of echoes and thunder in myths around the world, yet there are also common themes and similarities, just as there are common themes and similarities in the subject matter of global rock art.

Phenomenology

Acoustics fits in perfectly with the concept that rock art was inspired by mysterious phenomena that were inexplicable to ancient cultures.

Shamanism, neuropsychological model and entoptics / phosphenes

Rhythmic percussion is a common means for trance induction, and sound reflection can augment this sonic experience to facilitate a trance. It is well known that sound can produce images and visions in the mind's eye.

Sacred landscape; territorial markers

Acoustic characteristics, while not visibly obvious, are an important property of the landscape; indeed the term 'soundscape' has been coined to underscore the importance of sound in the environment. Systematic acoustic studies have shown a correlation between sound reflection and rock art placement, which is consistent with the hypothesis of sound reflection as a motivation for the placement of rock art.

Celestial interpretations; calendrical; archaeoastronomy

The connections between thunder in the sky, thunder gods and thunderous reverberation from rocks leads to a possible connection between rock art and supernatural sky beings. Also, many cultures believed celestial bodies travelled underground when they set in the west so they could rise again in the east. Any sounds heard to come from within the rocks could thus easily have been associated with these sky beings traveling underground. There are a variety of myths from Europe, Asia and the Americas that describe thunder gods living in caves, which is consistent with interpreting reverberation as thunder.

SUMMARY

While archaeoacoustics may not hold the complete explanation of rock art motivation, it can serve to harmonize, rather than conflict, with other theories that have been put forth (except for art for art's sake).

Acoustics, through the illusion of sound reflection mimicking spirit voices and thunder gods within the rocks, directly ties together the concept of the supernatural and prehistoric rock art. Furthermore, sound production in highly reverberant spaces appears to have been an important part of rituals to communicate with these supernatural beings that could be heard but not seen.

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