Thunderous reverberation and rock art thunderstorm imagery

Abstract

Thunder myths around the world contain thunder god descriptions matching rock art motifs found in reverberating locations. Thunderbirds are found on echoing cliffs of the Americas, and reverberating shelters of the Southwest contain wide-eyed Tlaloc figures, the Mesoamerica’s rain/thunder god. Australia has the Lightning Brothers. In Europe, hoof beats from mythical horses and goats of Odin and Thor reverberated through the skies, and the Bull God’s voice (bull-roarer sound) is the roar of thunder; greater than 90% of European cave art depicts ungulates, typically thundering stampedes in portions of caves reverberating the loudest. An acoustical connection with rock art storm imagery is explored.

BOOM!!! RUMBLE, Rumble, rumble… Thunderstorms were one of the most powerful and frightening natural phenomena encountered by early humans, yet paradoxically also brought life-giving rain. The universal experience of thunderclaps and lightning that was shared by cultures around the world gave rise to many similar legends that explain these phenomena as caused by supernatural spirits in the sky, an example of animism.

I have previously focused my rock art acoustics research on another form of sound-related animism, the personification of echoes (Waller 1993a, 1993b, 2002), but recently I have branched out to other types of sound phenomena, including sound wave interference patterns (Waller 2009a) and whisper gallery effects (Waller 2010). This paper is a result of investigations of reverberation, which is a particular type of acoustics in which sound reflections are so closely spaced together that they perceptually merge into the gradually decreasing persistence of sound that is characteristic of thunder and large spaces enclosed by hard surfaces such as canyons and caves. The following sound files can be accessed at <https://sites.google.com/site/rockartacoustics/home/ifrao-sound-files> and can be opened with common audio programs such as Windows Media Player or Apple Quicktime:

- Niaux, France. Example of thunderous reverberation in the cavernous Salon Noir, which contains ungulate images similar to the hoofed animals held responsible for thunder in Eurasian mythology. Filename: Waller_Thunder_NiauxSalonNoir_SoundRecordingR090032.wav
- Lower Pecos River region, Texas. Thunderous reverberation in painted Shelter VV75 of Presa Canyon. See Figure 1 (left) for spectral analysis. Filename: Waller_ThunderousReverbVV75SoundRecordingR090107.wav
- Control in an open field, showing lack of reverberation. See Figure 1 (right) for spectral analysis. Filename: Waller_Thunder_ControlNoReverb_SoundRecordingR090113.wav
example of thunderous reverberation in the Salon Noir of the French cave Niaux). Without knowledge of the wave nature of sound, reverberation would have been considered a very mysterious phenomenon, as was the distinct individual echo.

Thunder has been the explicit subject matter of some rock art, e.g., thunderbird images in North America:

"Thunderstorms were believed to be caused by an enormous bird that made thunder by flapping its wings and lightning by opening and closing its eyes. The rock drawings of the thunderbird vary from quite naturalistic in the Southwest to highly stylized in the Northwest." (Grant 1967: 59)

Thunder, echoes, reverberation, bullroarers, galloping hoofed animals, drumming, hammering, “the voice of god”, and flapping wings all sound homologous to each other (as revealed in mythology discussed below), such that they were interpreted interchangeably. Many ancient cultures (see discussions below, e.g., Conner 1994; Hosler 1995; Parkman 1993; Salvatore 1991) took advantage of these similarities via homeopathic magic where mimicking the sound of thunder was employed in the belief that it would bring life-giving rain. I postulate that the mystery of hearing thunderous reverberating sounds in caves and canyons in reply to noises evoked not only the mental concept of thunder, but also brought to mind those culture-specific images and symbols of the same noise sources believed to cause the identical-sounding celestial thunder. Such mythical thunderous sound sources included supernatural thunder beings described as having animal and/or human shapes, and these very same shapes correspond to frequently occurring rock art design elements.

The connection between rain-making rituals in general and rock art has been well substantiated in both the Old and New Worlds (e.g., Lewis-Williams & Pearce 2004; Whitley 1998). Connections have also previously been made between thunder and rock art:

"The common element of these rain-making methods was the rock thunder produced by one rock striking another [...] pitted boulders might possibly be viewed as stone drums, on whose percussion one flew to the supernatural world, in search of Sacred Thunder and rain." (Parkman 1993)

In this paper I concentrate on thunderous reverberation as a signature aspect of thunderstorms and focus on its sonorous connection with both rock art iconography and the long-ignored acoustical attributes of rock art sites (Waller 2000). The approach taken herein is a dual technique of formal and informed investigation to explore possible thunderstorm-related meanings and motivations for prehistoric art. The formal approach includes studying internal consistencies of the visual and acoustical properties of the subject matter and location of rock art as tangible physical manifestations in and of themselves. The informed approach makes use of intangible yet ethnographically documented Thunder God mythology and belief systems that I also show directly relate to the visual and acoustical properties of rock art. The combined results of these two approaches offer a globally consistent pattern of human response to the similarities between reverberating thunder, thunderous animal noises, and the reverberations of caves, canyons and cliff faces that were selected for rock art. Examples of thunderstorm imagery at reverberating rock art

d) Quebec, Canada. Rocher à l’Oiseau (“Bird Rock”). The thunderbird rock art subject matter here is explicitly related to thunder and is consistent with the loud thunderous percussive reports that echo and reverberate off the decorated rock surface of this towering cliff face. See Figure 2 for spectral analysis.
Filename: Waller_Thunder_Oiseau_SoundRecordingR090002.wav
sites reinforced by thunderstorm mythology are given below for the Americas, Africa, Asia and Australia. Perspectives from these findings are then applied to give unexpected insights into European deep cave art.

1. Thunderstorms in the Americas

1.1. Pecos River

Many of the world-class rock art shelters in the Lower Pecos region, including the famous White Shaman Shelter, have been previously reported to possess unusual acoustics such as echoes seeming to be answered from across the river (observations by E. Prewitt paraphrased in Garner 2009), and I noted that obvious reverberation was evident in a video of the Fate Bell rock shelter typical of that region (Waller 2009b). My own acoustic studies in field testing confirmed echoes and thunderous reverberation in several rock art shelters in the Lower Pecos River region of Texas: White Shaman (41VV124), Mystic Shelter (41VV612), Cedar Springs (41VV696), Red Linear site (41VV201), Fate Bell (41VV74), Black Cave (41VV76), Angel cave, and shelter number 41VV75 in Presa Canyon. An example of spectral analysis of reverberation sounding like thunder recorded in shelter 41VV75, compared to a control condition is provided in Figure 1. The approximately 47 percussive clapping sounds made sequentially in rhythm show up as red/yellow vertical lines, and the red/yellow/olive color in between these lines reveals sound level build-up of reverberation in the shelter, which is absent in the control.

Fig. 1. Spectral analysis of reverberation sounding like thunder recorded in shelter 41VV75 (left) compared to a control condition (right). X-axis is time, Y-axis is frequency, and sound level in dB is indicated by color as shown by the scale on the left (see notes below regarding available sound files).

The importance of the rain / deer / peyote triad relative to the rock art of the Pecos River region has been detailed by Boyd (2003). When the Huichols make a sacred trip to gather Hikuri (the Peyote-god personified by Peyote) the pilgrims pray for rain and fertility. Amid the praying and chanting of the shaman, the dangerous crossing into the Otherworld commences with the Gateway of the Clashing Clouds. Thunder and lightning are explained by the Huichols as the Clashing of Clouds, and it is believed by the people that Nu'ariwamei, the god of lightning and thunder, remained
at this important stopping place on the way to peyote country (Schaefer & Furst 1997). Peyote that is found during the hunt is set under a gourd resonator and rubbed with a rasping stick, since “it enjoys the sound” (Schultes et al. 1992: 150-151).

The Peyote Bird (a symbol of the current Native American Church) is thought to be connected with lightning, thunder and visions; it is also known as the Water Bird or Thunderbird (Hill 2005).

1.2. Canadian Shield

Many North American native cultures hold the belief that when supernatural birds, especially the raven or eagle, flap their wings they create thunder and the lightning (Grant 1967). Thus, the Thunderbird is a widespread thunder symbol found in American rock art, an interpretation informed by indigenous ethnography. One example of a rock art location decorated with a thunderbird is Rocher à l’Oiseau (French for “Bird Rock”) in Ottawa River in Pontiac County, Quebec (Arsenault 1996). This site has long been well known for its echoing properties, and in August 2009 I documented and recorded strong reverberating echoes there. Figure 2 shows an example spectral analysis of echoes and reverberation sounding like thunder recorded at Rocher à l’Oiseau. X-axis is time, Y-axis is frequency, and sound level in dBA is indicated by color as shown by the scale on the left.

Fig. 2. Spectral analysis of echoes and reverberation sounding like thunder recorded at Rocher à l’Oiseau. X-axis is time, Y-axis is frequency, and sound level in dBA is indicated by color as shown by the scale on the left.

In this case the single percussion sound I made shows as a bright yellow/orange vertical peak, and the orange/red smearing to the right reveals the reverberant tail, followed by a broad second orange peak that indicates the distinct echo, which also has a reverberant tail. The thunderbird rock art subject matter here is explicitly related to thunder and is consistent with the loud thunderous percussive reports that echo and reverberate off the decorated rock surface of this towering cliff face.
1.3. Hueco Tanks, Texas

The Haudenosaunee (Iroquois) in northeastern North America believed in a spirit called Hinon (Thunderer): a divinity associated with thunder and torrential storms who lives within a cavern behind Niagara Falls (Obsidian’s Dictionary of Pantheons 2010). This suggests an association of thunder and the thunderous reverberation of a cavern.

Many of the rock shelters in Hueco Tanks in Texas contain rock art figures identified as Tlaloc figures, recognizable due to their resemblance to the wide eyed Mesoamerican rain and thunder deity. “Rites of Tlaloc, associated with lightning, rattlesnakes and the underworld, are accompanied by instruments containing bells or rattles to attract rain and thunder” (Hosler 1995: 100-115). During field work in Hueco tanks, at which distinct echoes were noticed to be remarkably strong and plentiful, I also noted that the Tlaloc figures occur most often in shelters that are particularly reverberant, as if the figures were indicative of the thunder-like reverberation at the spots in which they are situated. Tlaloc and Chaak figures appear in many rock art sites of Mesoamerica and the American Southwest, so my idea of a general correlation of Tlaloc/Chaak with measurable thunderous reverberation is scientifically testable and deserves further study.

1.4. Three Rivers, NM (and Twin mythology related to thunder)

Multiple sound reflections reminiscent of thunder were noted at the amphitheatre-like Three Rivers rock art site, which contains not only the Thunderbird (Schaafsma 1980: 230), but also depictions interpreted as the mythical Sacred Twins. Associations of lightning/thunder and twins (who perhaps are representative of paired cause and effect?) that have been documented (Frazer 1922; Hosler 1995) include:

1. (Mesoamerican) The Twins are associated with the plumed serpent Quetzalcoatl, who is often depicted with “mist-bringing rattles”, which reproduced the sounds of the thunder of Tlaloc, who is a rain deity in one aspect and a deity of the earth, caves and the underworld in another (Hosler 1995: 100-105).
2. (Northwestern coastal) Enumclaw became lightning, and his twin brother Kapoonis became thunder. From a fire-spirit, Enumclaw learned the skill of hurling fragments of fire as if they were spears.
3. (Cherokee) Thunder, called Tame Boy, played rumbling games of ball across the sky with his twin brother Lightning, called Wild Boy.
4. (Wintu) Thunder was human in form and appeared as twin boys born of Bear Woman and Chicken Hawk. The older boy was thunder, the younger one lightning.
5. (Tsimshian) Twins are believed to control the weather.
6. (Navaho) Father Sun-Carrier gave the War Twins Nayanezgani and Thobadzistshini flint armour that flashed the four lightnings from every joint, a great stone knife, and arrows of lightning, of sunbeams, and of the rainbow. The brothers returned to earth on a lightning flash. Since flint generates fire when struck percussively, it is connected with lightning by many tribes, and flint-tipped arrows correspond to the lightning arrows shot from the sky. The noise emitted by striking together two pieces of flint was said to resemble the thunder.
7. (Nootka) Twins are related to salmon, can make fair or foul weather, and can cause rain to fall by painting their faces black and then washing them, which may represent the rain dripping from the dark clouds.

8. (Shuswap) Twins are called “young grizzly bears” and are endowed with supernatural powers, such as raising storms.

9. (Chumash) Twin gods known as the Thunderers shoot lightning from their eyes. (Grant 1967: 59).

See Waller 2006 for further discussions of depictions of Twins at sound-reflective rock art sites.

1.5. Multiple rock art sites with meandering lines or snake depictions

In “An Archaeology of the Senses: Perception and Cultural Expression in Ancient Mesoamerica”, Houston & Taube (2000), include detailed descriptions of Mayan thunder gods.

“Pure, resonant sound occurs as thunderous reverberations from the mouth of the rain and lightning god, Chaak [...] The undulating or jagged lines seem to denote powerful, rumbling sound. A similar convention occurs in Mixtec codices. The face of the Mixtec rain and lighting god emits meandering lines as a probable reference to thunder.” (Houston et al. 2006: 163)

The snake deity is considered the water god of the Moquis (Hopi), who, because of his likeness to lightning in the sky, associate him with that phenomenon... “To the Moquis' mind lightning is the snake’s tail striking the clouds, and thunder the report of the blow; rain is the effect.” (Farish 1918: 191) According to the Mohave Account of Origins (Kroeber 1906), the immense snake Humasereha came northward, rattling with his tail and making rain and thunder.

I have recorded percussive sound reflections at many rock art sites throughout the American Southwest with either meandering lines that might represent thunder sounds (as they do in Mesoamerican codices), or snake designs that can represent lightning and thus could be an associated sign for the thunderous sound that can be heard at those locations.

2. Thunderstorms in Africa

2.1. Thunder myths of Africa

African thunder mythology includes the following:

1. (Zimbabwe/Beitbridge) In the Sacred Forest, the thunder and lighting bird called Ndadzi flies on the wings of thunder. Ndadzi’s eyes flash lighting, in its beak it bears rain and when it drops an egg at a foot of a tree this tree will be destroyed by fire (Oxley 2010).

2. (Bantu) Sudika-Mbambi the Invincible was the son of the daughter of the Sun and Moon. Scarcely had he made his appearance when another voice was heard, and his twin brother Kabundungulu was born. Sudika-Mbambi is the thunder in the eastern sky and Kabundungulu the echo which answers it from the west (Werner 1933).

3. “[...] The Zulus conceive of the thunder-clouds and lightning as actual creatures, capable of being herded like sheep. There is no metaphor or
allegory about the matter, and no forgetfulness of the original meaning of words. The cloud-herd is just like the cowherd, except that not every man, but only sorcerers, and they who have eaten the ‘lightning-bird’ (a bird shot near the place where lightning has struck the earth), can herd the clouds of heaven.” (Callaway1868: 340)

4. The Egyptian Min is an early example of the thunder god, his thunderbolt appearing on predynastic pottery and rock art; the bull was his sacred animal (AEL 1997).

5. (Nigerian Yoruba) The thunder god Shango is accompanied by a ram. Banging of rocks was globally associated with thunder. Neolithic stone axes were equated with thunderstones of Sango the God-King in Africa, and the sound of yams being pounded in a mortar was said to resemble the pounding of thunder in the heavens. The sides of a ritual mortar carved with Sango-associated emblems and figures include a priestess holding a gourd rattle (shere) used to call this deity (Conner 1994). (I have noted at many rock art sites in North America the frequent occurrence of mortar holes located at certain places where one could hear the pounding sounds echo off the decorated rock faces particularly well.)

2.2. Rose Cottage Cave

“Some painting sites [in South Africa] do have echoes and also particular acoustics, e.g., Rose Cottage Cave.” (S. Ouzman, personal communication 15 Nov 1999; see details in Ouzman 1997). This cave is one of many sites in Africa that contain images of the sacred Eland, which was believed to be a rain animal, based on a /Xam quotation from 1878 that “A very long time ago […] the Rain was like an eland” (quoted in Lewis-Williams 1981: 106). Some /Xam maintained their status by threatening to send a destructive thunderstorm and by being associated with a depiction of a rain-bull, which was a violent thunderstorm, with distant columns of rain that were thought of as legs upon which it walks across the countryside, striking people with lightning (Lewis-Williams & Pearce 2004).

2.3. Storm Shelter

An important recent rock art find in South Africa has a prominent depiction of a rain animal, and was given the name “Storm Shelter” (Blundell & Lewis-Williams 2001).

2.4. Rain Animal in Free State, South Africa

The /Xam San/Bushman believed in a hallucinatory/mythical rain-animal called !khwa-ka-xoro, an onomatopoeic denotation of the sound of thunder that means galloper (Sven Ouzman, personal communication 15 Nov 1999).

3. Thunderstorms in Australia

Thunder from Down Under

Rock paintings in Australia are considered to be shadows of the primordial lightning people, and lightning-related subjects such as The Lightning Brothers are of great importance in Australian rock art, including Gudju-Gudju, the Rainbow Serpent
whose voice is the thunder. According to an Aboriginal elder in northern Australia recounting creation stories of the Dreamtime:

“Before the little boy came to split the dog’s ear then the lightning people walked around in the wet mud and left their footprints, but now they are in the rock. See those large emu or bird tracks and kangaroo tracks they were put on the vertical wall when the mud hardened. When the dog sang out that’s the time when everything changed and the shadow of all the lightning people went in to the rock and that’s where they remain today. Later the shadows changed to become different birds, animals, lizards and humans. All these you see here in the rock paintings and they were the creator of this country as told in the stories and the songs […] creation dogs (mudbarongo) […] were all part of the Lightning […] They started making footprints like a kangaroo and called themselves the kangaroo lightning’s.” (Drew & Harney 2004: 1-3)

I have documented strong thunderous acoustics at many rock art shelters in Queensland, including sites depicting subjects related to lightning/thunderstorms, such as the Giant Wallaroo gallery with its paintings of kangaroos (colloquially known as “thumpers”).

4. Thunderstorms in Asia

Rock shelters in India were recorded by me to possess strong sound reflections, including shelters at the Bhimbetka rock art cluster, where elephants, cattle and other hoofed animals are depicted (Fig. 3). The elephant and bull are symbols of Indra/Parjanya, the Thunder God of India, as described below. This acoustic documentation helps confirm that relationships between rock art and thunder myths also occur in Asia.

In Hindu mythology, Indra (also identified with Parjanya) is a famous example of an important thunder god. Parjanya/Indra is often given as the prototypical example of the Indo-European thunder god. Vedic hymns describing Indra offer what has been considered the most comprehensive portrait available of the archaic thunder god. Indra is the most celebrated and the most important god of the Vedas, and is the one who created the lightning in heaven. In the Rig Veda (Hopkins 1895: 473), Indra is invoked as the Kindler “Who fire between the two stones hath engendered” (i.e., created fire by rubbing two stones together). The Atharva Veda recounts this Divine Warrior’s devastating thunderbolt:

“Now will I tell the manly deeds of Indra, the first that he achieved, the thunder-wielder. He slew the Dragon, then disclosed the waters, and cleft the channels of the mountain torrents. He slew the Dragon lying on the mountain: his heavenly bolt of thunder Tvashtar fashioned.” (Griffith 1895: a37)

This battle in which Indra kills the dragon Vritra by hurling a thunderbolt is considered central to the ancient cosmogony of India.

Indra’s thunderbolt was described as “four-edged”: “Bull, hurler of the four-edged rain producer.” (Griffith, ed. Shastri 1973: 215) The thunderbolt of Indra was also sometimes referred to as a rock (parvata) from the heavens (divo asmanam) whirling down from the misty realm of the sun (Surya). A prayer from the Rig Veda epitomizes the fertility and hoofed animal aspect common to many thunder gods:
“Lord Parjanya […] is the Bull of all, and their impregner. […] He smites the trees apart, he slays the demons: all life fears him who wields the mighty weapon. Forth burst the winds, down come the lightning-flashes: the plants shoot up, the realm of light is streaming. Come hither with this thunder while thou pourest the waters down, our heavenly Lord and Father. Thunder and roar: the germ of life deposit.” (Wilson et al. 1854)

Fig. 3. Rock art in a reverberating shelter at Bhimbetka, India, with motifs including elephant and bull, which are symbols of Indra/Parjanya, the Thunder God of India.

Other commonly known Asian thunder gods include:
1. the west Asiatic gods Teshub and Hadad are associated with steer and with lightning;
2. Aplu (Etruscan mythology);
3. Lei Gong (Chinese mythology);
4. Ajisukitakahikone, Raijin (Raiden-sama, Kaminari-sama), Tenjin (kami), Susanoo (Japanese mythology).
5. Thunderstorms in Europe and the Near East

“God’s voice thunders in marvelous ways [...] He loads the clouds with moisture; he scatters his lightning through them.”
Job 37: 5-12

Thunder mythology is well documented and widespread in Europe and the Near East. The most famous thunder gods include the Germanic Thor-Donar (son of Odin), the Celtic Taranis, the Slavic Perkunis, the Greco-Roman Zeus-Jupiter, the Finnish Ukko, the Hittite Teshub (the Bull), the Canaanite Baal, Babylonian Marduk, and the Basque Orko—all who throw their thunderbolts or bundles of lightning. The name Thor derives from the Germanic term for “thunder.” One seventh of our lives in Western society is lived in honor of the Thor, since Thursday (German Donnerstag) is named after this powerful thunder god. The common features of the many similar European thunder myths point to a common belief system rooted in the distant past. Prehistoric beliefs and practices appear to have been focused on a thunder deity. During the Neolithic, the thunder cult grew to prominence in Western Europe, and thunderbolt symbols have been found in Neolithic tombs and painted on rocks (Encyclopaedia Britannica 2010). The pebble or flint stone was used as symbol of lightning; Jupiter was often depicted with a stone in his hand instead of a thunderbolt, and in ancient times a flint stone was symbolic of the thunder god (Smith 1870).

These European thunder gods were closely associated with hoofed animals, especially bulls, goats, rams and horses. Thor’s chariot was drawn by his two large enchanted goats named Tanngrisnir (Old Norse “teeth-barer, snarler”) and Tannnjóstr (Old Norse “teeth grinder”), who made sparks flash from their hoofs. Jupiter, lord of heaven, rain, storms, thunder and lightning, had as an epithet the name Tonan, “the Thunderer”. He was depicted with rams’ horns and he also transformed himself into a bull. The Bull God cult was practiced in virtually every eastern Mediterranean Neolithic civilization. The sacred bull common throughout Anatolia was the hallmark of the thunder god Teshub, represented by a horned crown and triple thunderbolt; his steeds Seri and Hurri drew his chariot. The Greek Pegasus is the winged horse that was bearer of Zeus’ divine Lightning and Thunder. One of the horses drawing the sun-chariot of Helios was named Bronte (“thunder”). Poseidon was creator of both thunder and the wild horse; his name “earth-shaker” is thought to be related to the sound of horses’ hooves, and stories abound of Poseidon’s mating with goddesses in the form of mares (Yenen 1997).

The sound of thunder was ubiquitously reproduced with such noise makers as hoof rattles and bull-roarers as part of rain-making rituals.

“The bull-roarer was used as far back as the Stone Age. Present within the archaic civilizations of all five continents, it is probably the most widespread among all sacred instruments, and in ancient Greece it was sacred to Dionysus. In pastoral civilizations the sound of the instrument is considered to be the voice of a god, and the divinity evoked by the bull-roarer is generally a Bull God (as Dionysus was for the Greeks). In a context of natural magic, the voice of the Bull God (the sound of the bull-roarer) is identified with the roar of thunder. The structure of the bull-roarer is very simple: it is made of a thread a few meters long, to which is attached a wooden or bone elongated object, usually spindle-shaped. André Schaeffner emphasized the fact that the bull-roarer’s shape
alludes to that of a fish; its symbology, in fact, is associated with water. Often used to invoke rain, according to a principle of homeopathic magic, the bull-roarer imitates the sound of thunder; where there’s thunder, there will be water.” (Salvatore 1991)

Thunder and hoof beats are acoustic mimics of each other, thereby giving rise to myths explaining thunder by supernatural hoofed animals belonging to thunder gods such as Thor, Zeus, etc. Reverberation in caves also mimics the reverberation of thunder and hoof beats. Percussive noises such as clapping in caves results in a reverberation that sounds like the thundering of a herd of hoofed animals (Waller 1993a, 1993b).

While researching myths of reverberation and thunder, I noticed a striking similarity between cave art and the depictions of the thunder gods of Europe. The 1872 painting The Wild Hunt of Odin by the Norwegian painter Peter Nicolai Arbo (Fig. 4), who specialized in painting images from Norse mythology (see <http://www.artexpertswebsite.com/pages/artists/arbo.php>) shows the thunder god leading a stampede of hoofed animals through a stormy sky.

Fig. 4. Comparison of a thunderstorm portrayed as The Wild Hunt of Odin by Peter Nicolai Arbo, and stampeding ungulates painted in the reverberating cave of Lascaux.
Fig. 5. Comparison of ancient lightning symbols (left) and cave art forked signs (right, highlighted with red boxes): a-b. Lascaux; c. Gabillou.

CD-1736
This stampede is uncannily reminiscent of the painted hoofed animals stampeding through Lascaux, as shown in Figure 4. This rendition of how thunderstorms were perceived by ancient Europeans helped lead me to postulate that the hoofed animals depicted in reverberant caves represent the very same supernatural hoofed animals thought to cause thunder in the clouds.

If so, one can test this postulate by looking for internally consistent images in the rock art that corroborate this postulate, e.g., the presence of associated lightning images. With this perspective, the various “abstract” strokes and barbed signs that have been previously interpreted at face value as mundane weapons or symbolically as male signs, can now be recognized as depictions of lightning accompanying the thunderous reverberation. Lightning in antiquity throughout the world, but particularly in Europe, was typically represented as phallic spears, arrows, and tridents thrown by the Thunder Gods (Talbott & Thornhill 2010). In my opinion, designs known to be thunderbolts resemble to a remarkable degree many cave art signs (Fig. 5). In addition, Thor’s thunderbolt was represented with crosses and swastika-like forms on ancient memorial stones in Scandinavia beside inscriptions to Thor. Based on the aforementioned evidence from mythology, art history and archaeoacoustic research, I propose that some of the weapons and branched signs among European prehistoric hoofed animal cave art may represent the lightning/thunderbolts associated with thunder spirits.

6. Discussion

Acoustical testing has shown hoofed animal imagery occurs preferentially in the loudest parts of caves (Waller 1993a, 1993b), and previously I hypothesized that the reverberation in European caves was interpreted by the artists as hoof beats. That appears now to be only part of the more complete equation of reverberation in which thunderous noises equal thunder. Scientifically documented acoustic evidence, coupled with myths that inform of the nature of European Thunder Gods who were closely associated with hoofed animals, suggests that European ungulate cave art may represent thunder spirits. Close similarities are evident in comparing prehistoric cave paintings with early paintings and sculptures that depict thunder myths, including ancient symbols used for lightning. Thus, it is possible that the mythical thundering stampedes of hoofed thunder beings rode not only above through the darkened stormy skies of Europe causing thunderclaps, but also these very same hoofed thunder beings were rendered galloping below through dark caves causing thunderous reverberations. To clarify, I am not proposing that reverberation was interpreted as hoof beats globally, since ungulates were not found everywhere. Rather, I postulate that reverberation from rocky surfaces was considered to be caused by the same supernatural spirits that caused thunder to reverberate in the sky. Those beliefs, as found in thunder myths, were regionally specific, e.g., thunderbirds and snakes in the Americas.

Exact interpretations of rock art designs cannot be scientifically proven beyond doubt. However, this proposed relationship between thunder, reverberation and rock art could help serve as a theoretical framework for posing testable propositions. For example, it has previously been noticed that in certain regions the rock art mostly faces a certain direction (e.g., east), but that in other regions it mostly faces a different direction (e.g., north). Thus, this directional observation has not held up
because it is not consistent and therefore not predictive. If some rock art was part of rain-making rituals that involved mimicking thunder, perhaps a hypothesis to test is that rock art related to rain-making would have been preferentially made at locations facing the best direction to listen for and/or watch for the approach of thunderstorms. It would be reasonable for rain making rituals to be held in places where one could best hear or see the earliest signs of success. Perhaps when expressed and examined that way, instead as a fixed cardinal direction, the results of directional testing would be more consistent and therefore predictive.

The possible relationship between rock art, thunderous acoustics and Thunder Gods -- who are intimately connected to legions of other Sky Beings -- also suggests a rich relationship between archaeoaoustics and archaeoastronomy. For example, ancient cultures believed that the gods in the heavens (sun, moon, stars, planets, etc.) travelled underground from the West when they set to return to the East to rise. Via echoes and reverberation, spirits could actually be heard in the underground realm. These results and observations indicate that the acoustics of archaeological sites should be preserved for further study and to be able to appreciate rock art as an audio-visual artifact.

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