

# Recent Archaeoacoustic Results at Multiple Rock Art Sites, and Implications

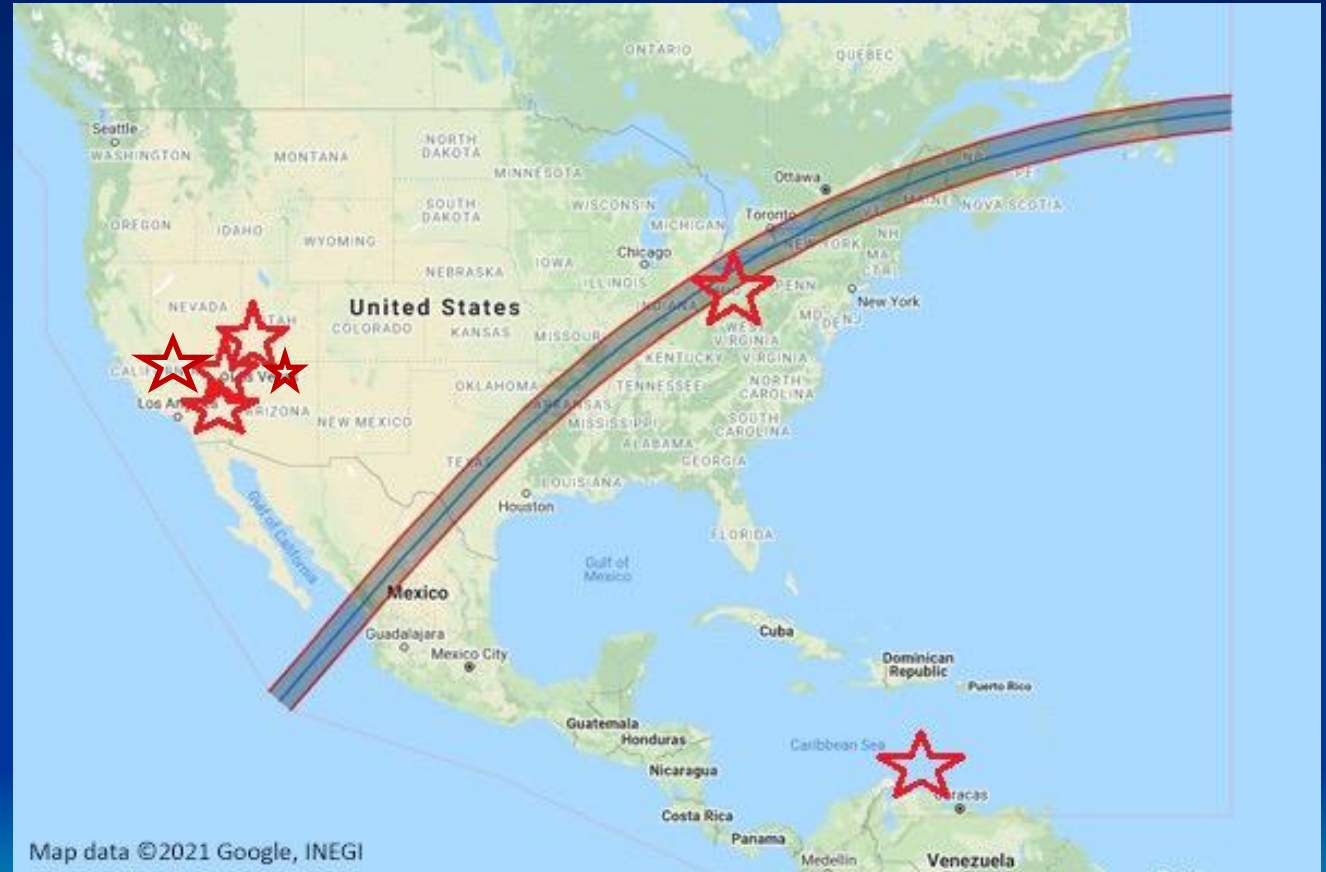
Steven J. Waller, Ph.D. (Biophysics)





# Rock Art Acoustic Research 2025 & 2024

- Utah
- California
- Aruba
- Ohio
- Nevada





# UT (Kanab) -- Oct 2025:

Bunting Ranch (Windmill site)





# UT (Kanab) -- Oct 2025:

Bunting Ranch (Windmill site)





# UT (Kanab) -- Oct 2025:

Bunting Ranch (Windmill site)





# UT (Kanab) -- Oct 2025:

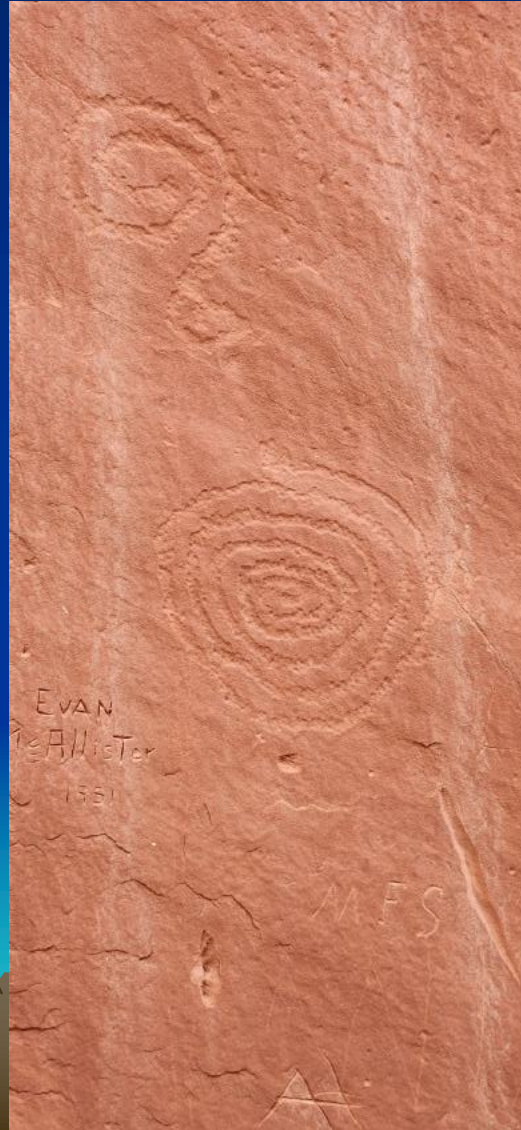
Bunting Ranch (Windmill site)





# UT (Kanab) -- Oct 2025:

Bunting Ranch (Windmill site)





# UT (Kanab) -- Oct 2025:

Bunting Ranch (Windmill site): vocal





# UT (Kanab) -- Oct 2025:

Bunting Ranch (Windmill site): vocal





# UT (Kanab) -- Oct 2025:

## Holland Site





UT (Kanab) -- Oct 2025:

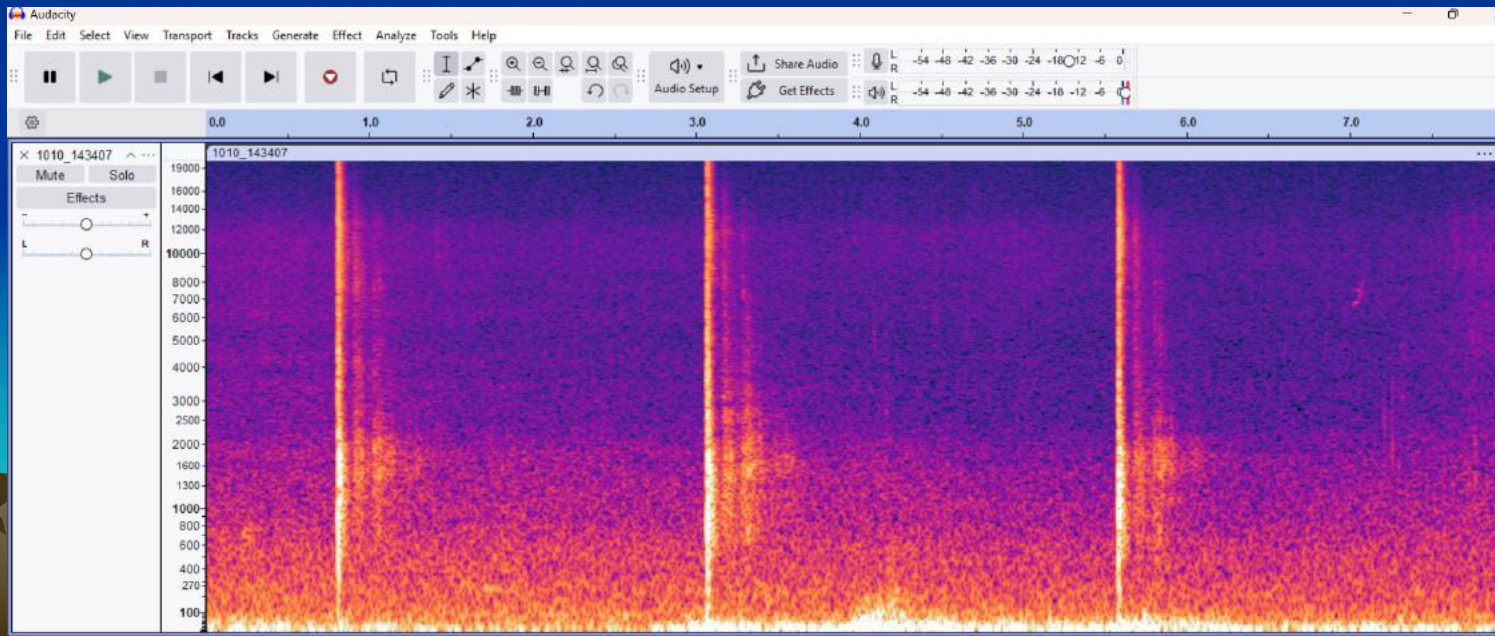
## Holland Site





# UT (Kanab) -- Oct 2025:

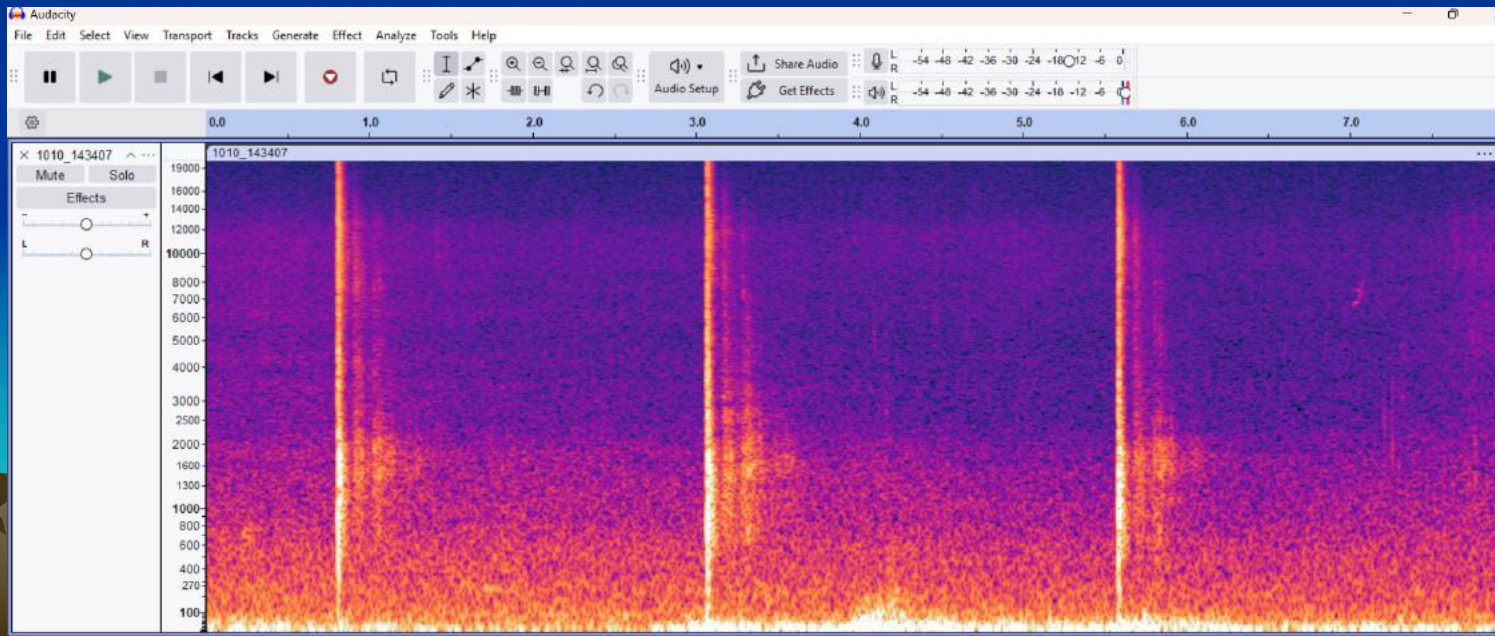
## Holland Site: clapping





# UT (Kanab) -- Oct 2025:

## Holland Site: clapping





UT (Kanab) -- Oct 2025:

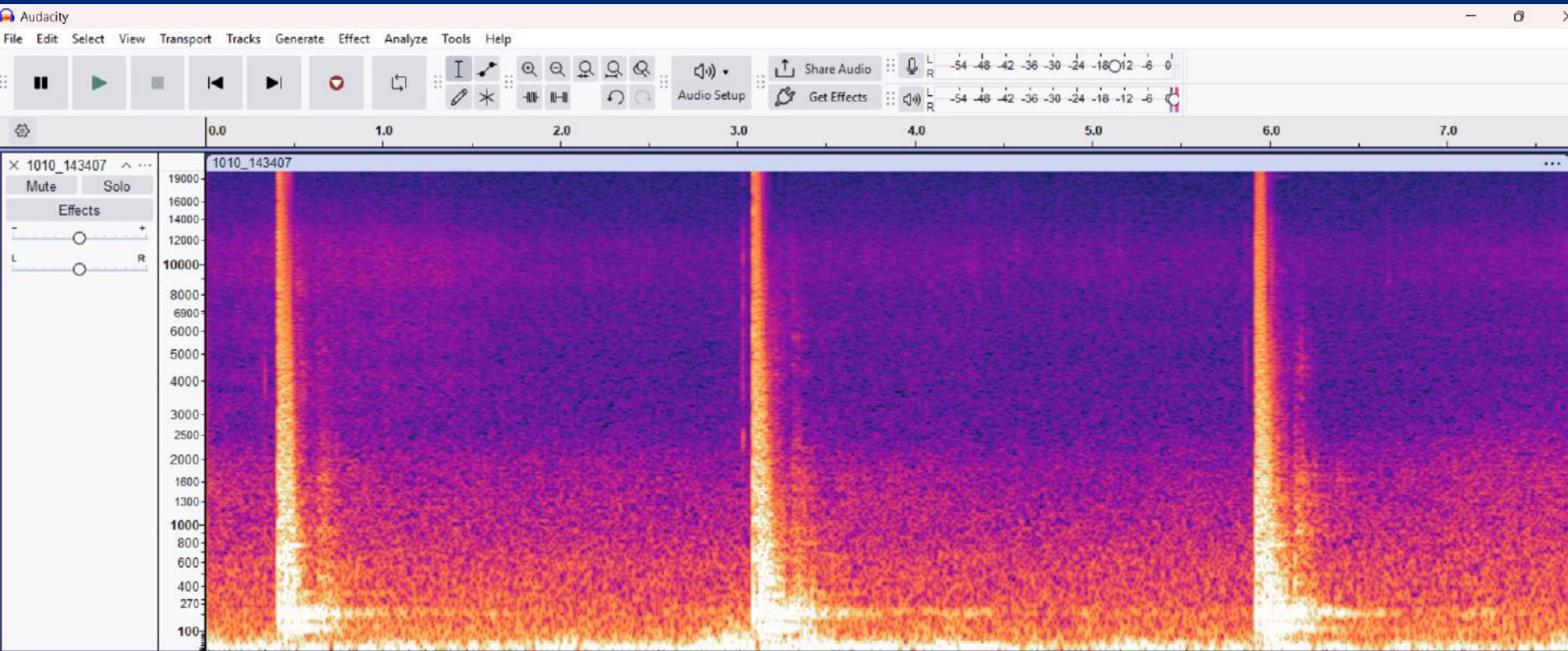
## Mansard Alcove





# UT (Kanab) -- Oct 2025:

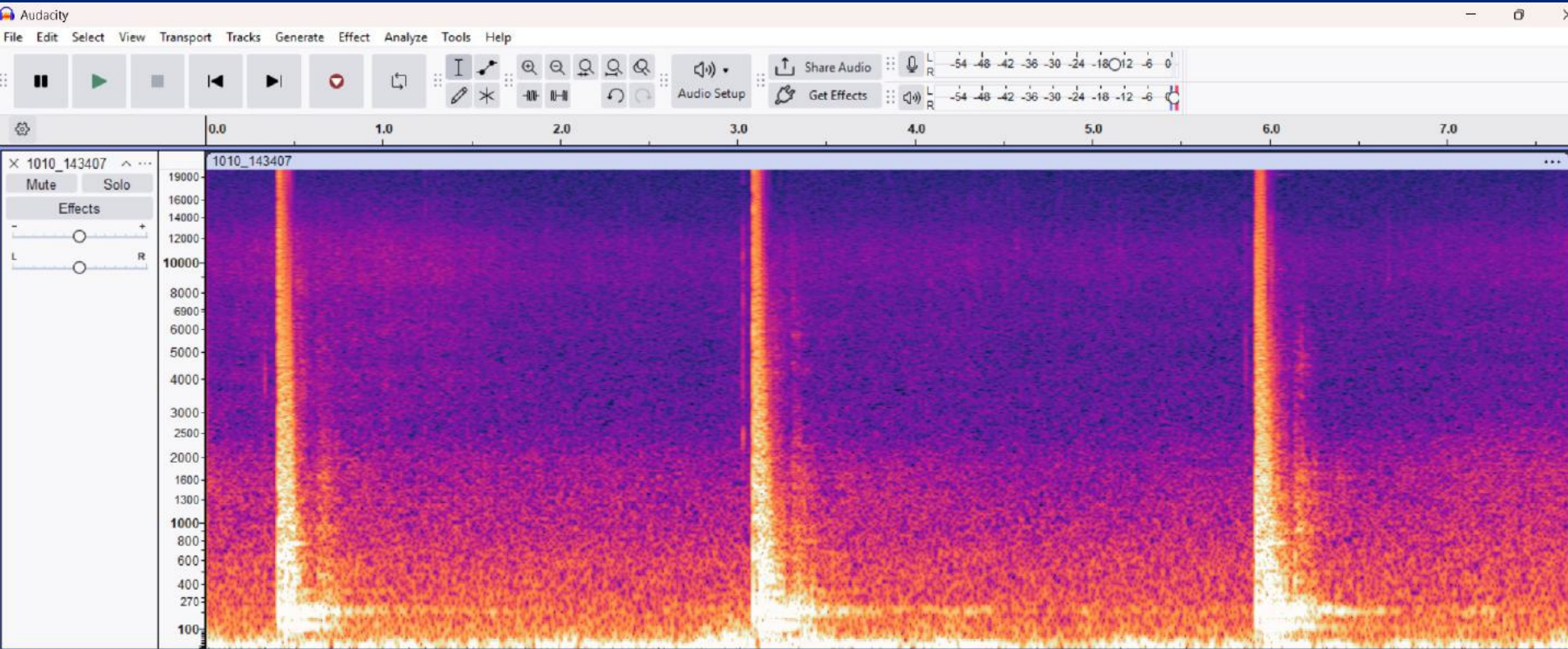
## Mansard Alcove: drumming





# UT (Kanab) -- Oct 2025:

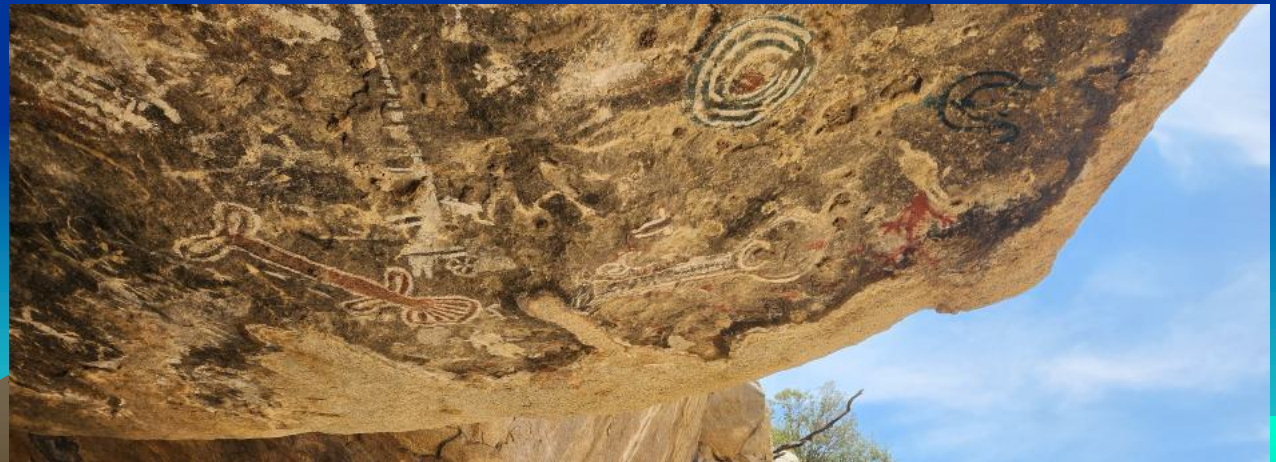
## Mansard Alcove: drumming





# CA (Visalia) -- May 2025:

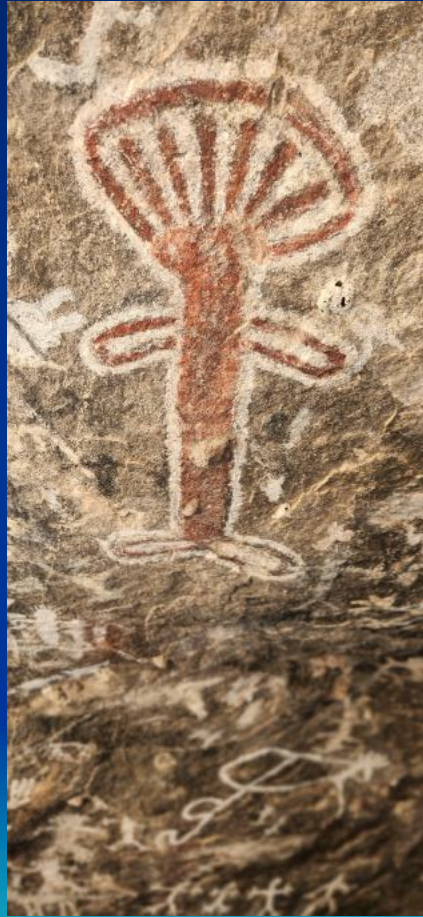
Rocky Hill (Gill) Tulare 26 = CA-TUL-26





# CA (Visalia) -- May 2025:

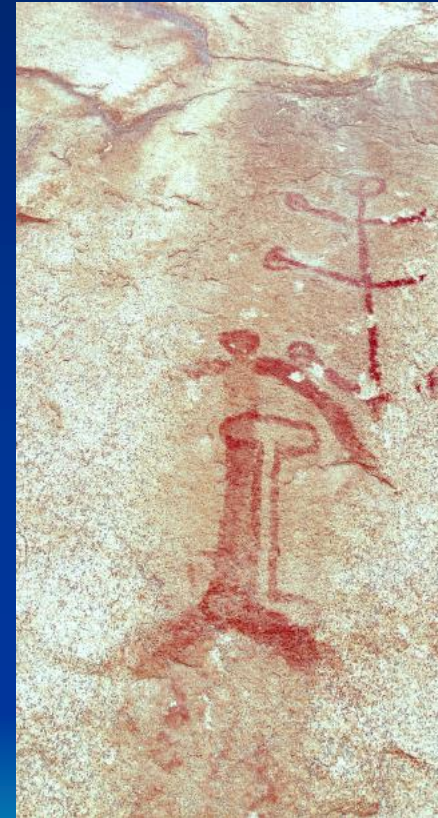
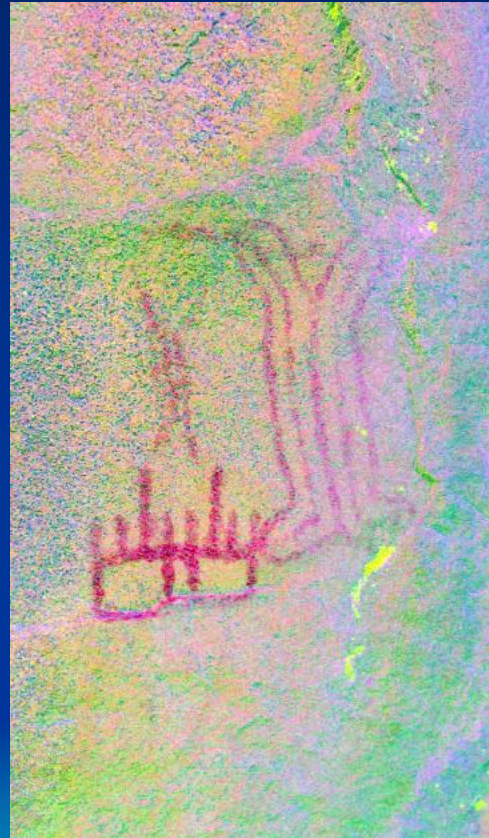
Rocky Hill (Gill) Tulare 26 = CA-TUL-26





# CA (Visalia) -- May 2025:

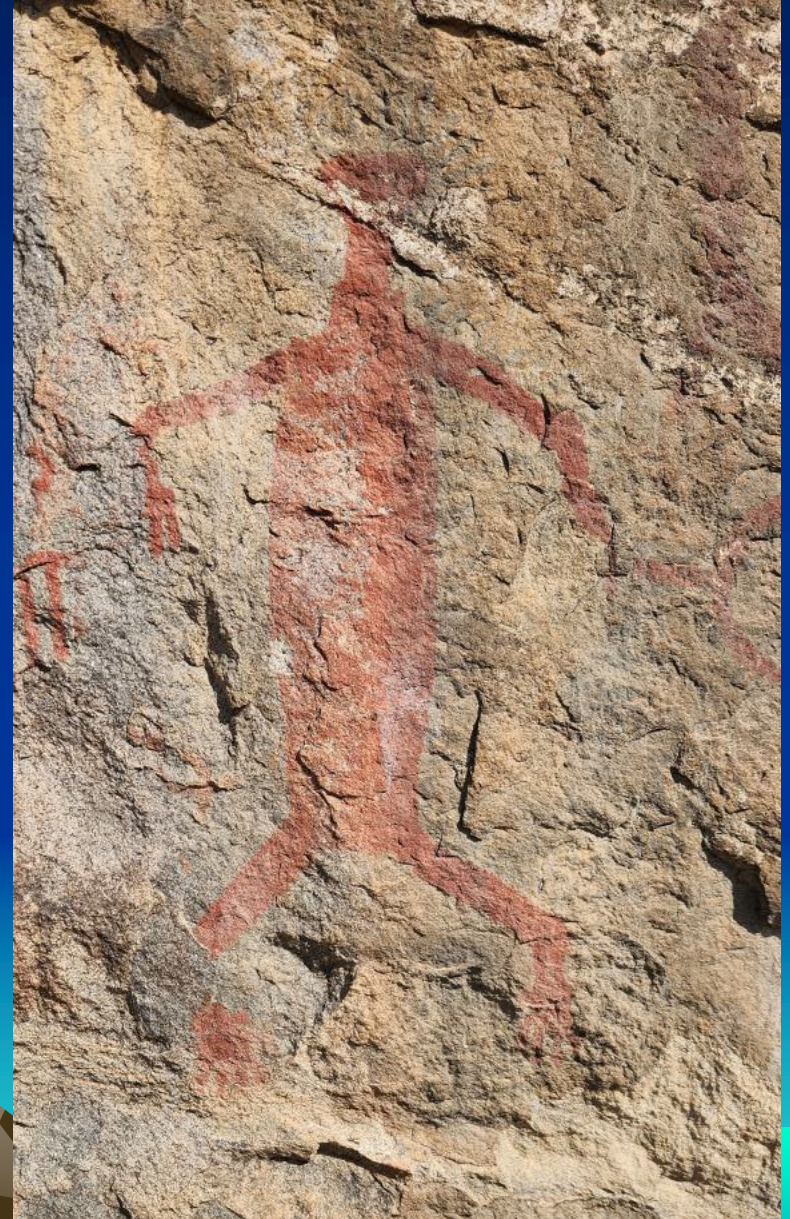
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# CA (Visalia) -- May 2025:

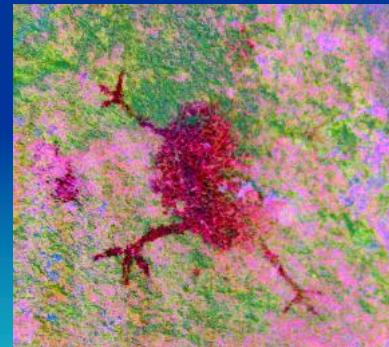
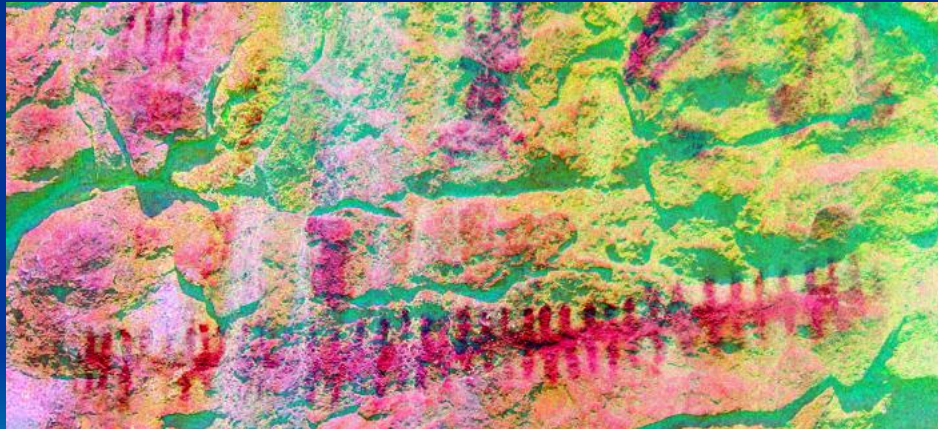
Bacon Hill





# CA (Visalia) -- May 2025:

Twin Buttes [*D-Stretched*]

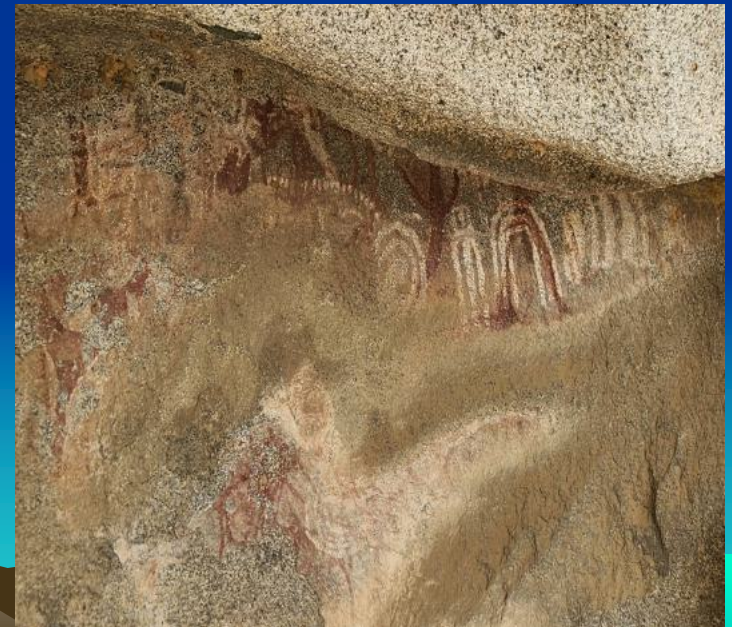
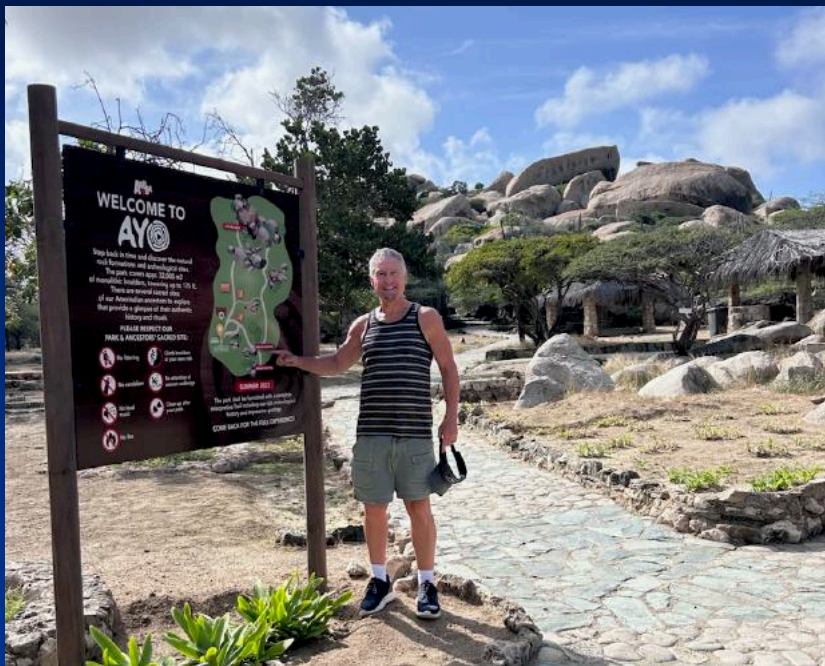




# ARUBA – Mar 3, 2025

## Ayo Rock Formations

“Arawak visited to hear  
incoming thunderstorms”





# UT (Milford) – Oct 11, 2024:

Black Rock area





# UT (Milford) – Oct 11, 2024:

Black Rock area





# UT (Beaver) – Oct 13, 2024:

Beaver area





# UT (Beaver area) – Oct 13, 2024:





# UT (Cedar City) – Oct 14, 2024:

Parowan Gap, Black Point





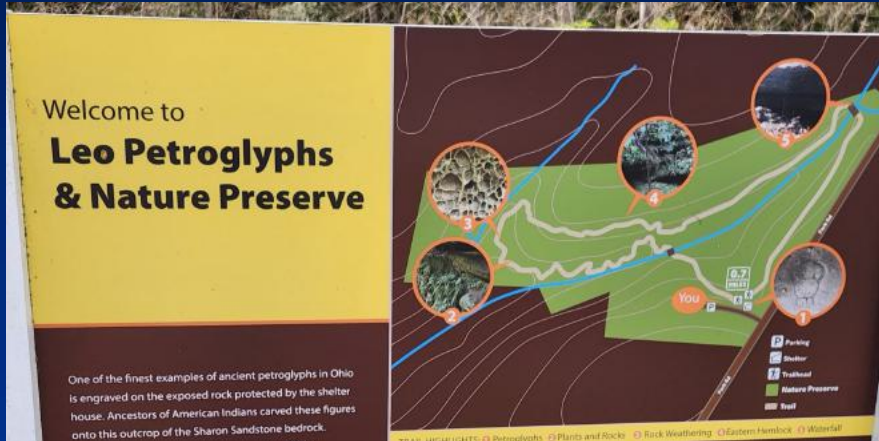
# UT (Cedar City) – Oct 14, 2024:

Parowan Gap, Black Point





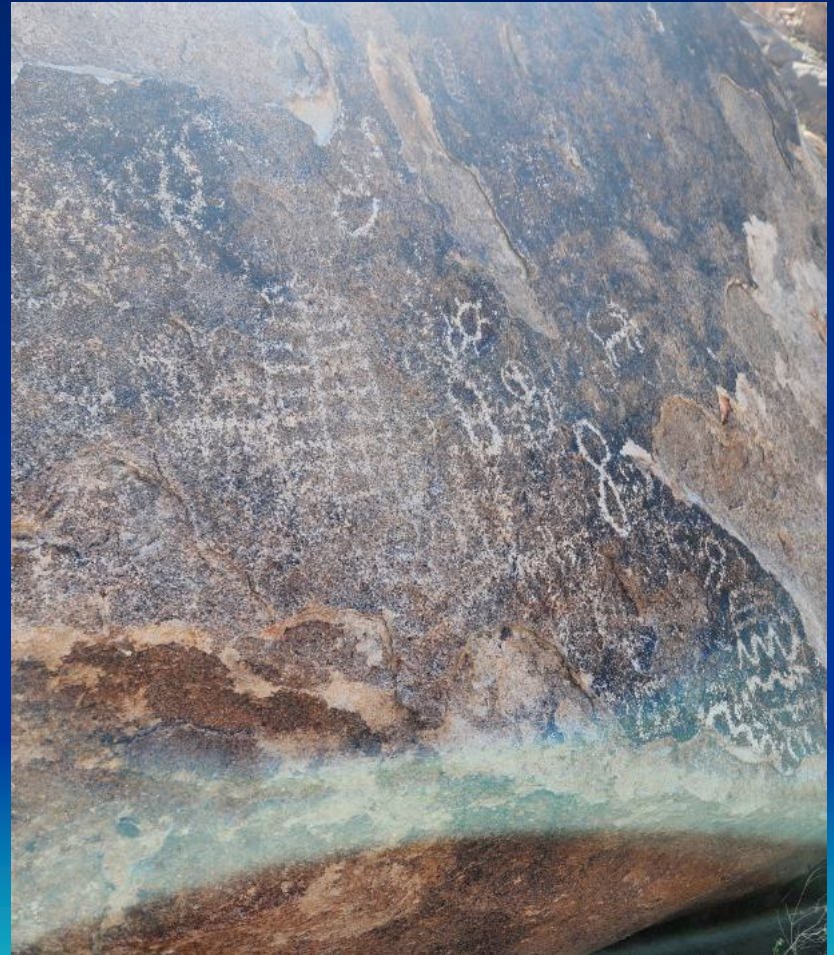
# OH (Leo) – Apr 7, 2024:





# NV (Laughlin) -- Mar 26, 2024:

Keyhole Canyon; Upper and Lower Hiko Springs; Grapevine Canyon





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# CA (Mojave) -- Mar 27, 2024:

Indian Well, Camp Rock Spring, Counsel Rocks, Mary's Cave.





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# CA (Mojave) -- Mar 28, 2024:

Aikens Arch, Black Wash / Cow Cove





# CA (Mojave) -- Mar 28, 2024:

Aikens Arch, Black Wash / Cow Cove





# Rock art themes / Echo myths

## 1. Anthropomorphs

[human forms]

## 2. Zoomorphs

[animal forms]

## 3. Therianthropes

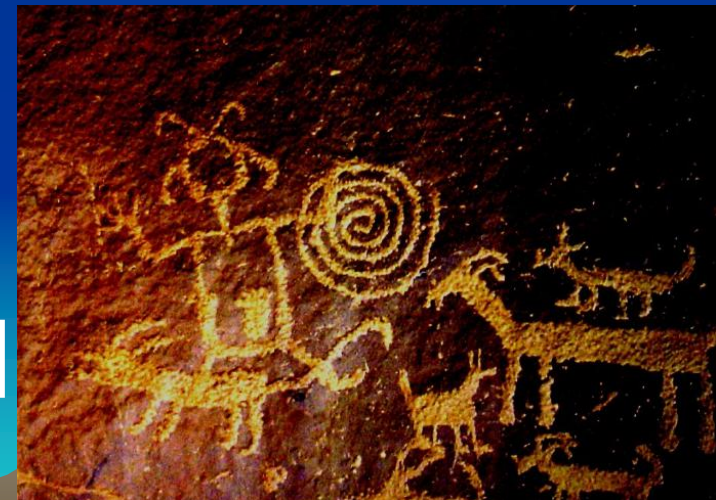
[part human - part animal]

## 4. Representational

[inanimate objects]

## 5. Non-representational

[abstract; indeterminate]





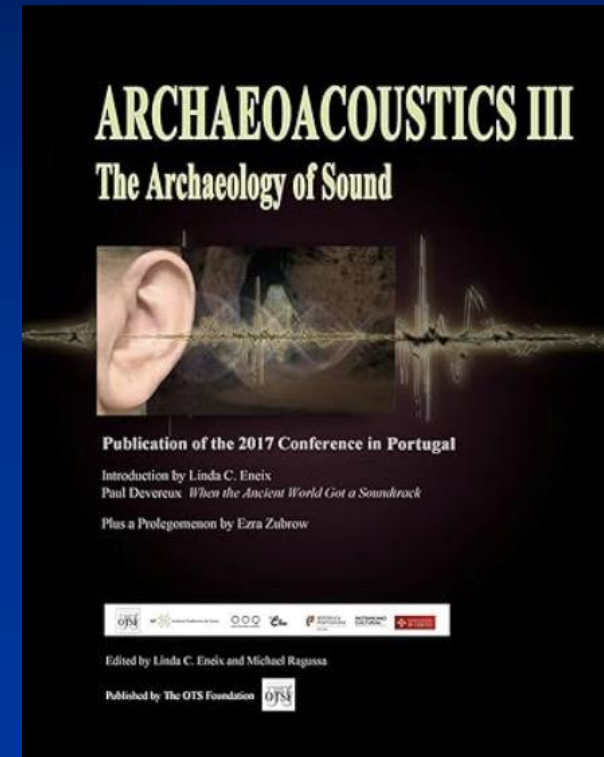
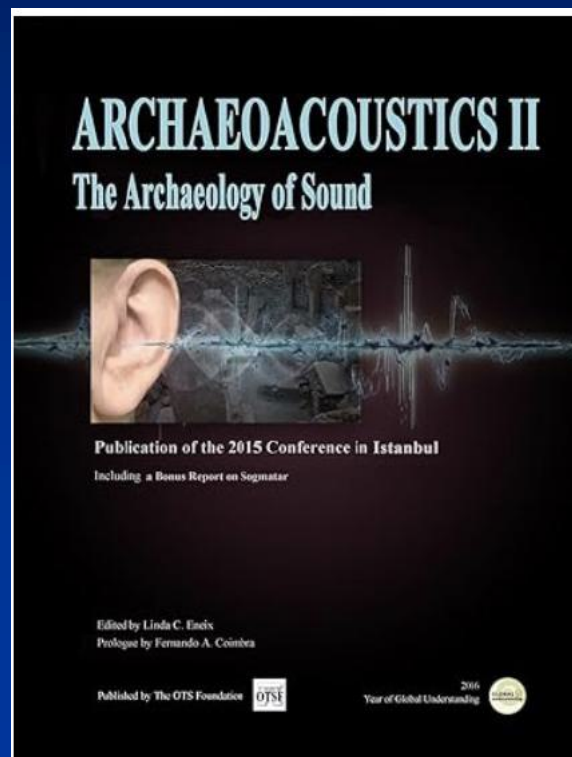
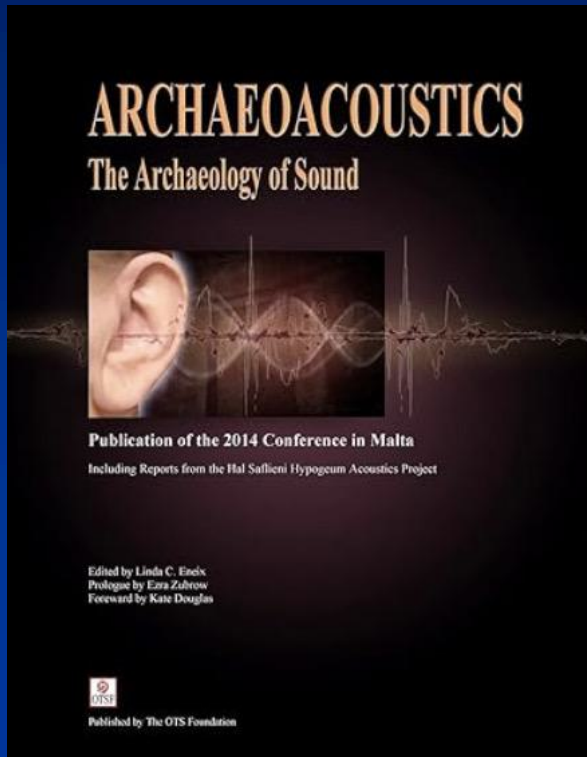
# Conclusions

- Auditory illusions: PERCEPTION
- Ambiguity
- Interpretation
- Paradigms, beliefs
- Supernatural
- Physical evidence
- Rock art acoustics theory
- **PRESERVE SOUNDSCAPES**





# Thank You for *Listening*





# Recent Archaeoacoustic Results at Multiple Rock Art Sites, and Implications



Steven J. Waller, Ph.D.

Recent results will be presented for acoustic studies at multiple rock art sites in California, Nevada, Ohio, Utah and Aruba. Implications will be discussed, including future research directions.









# Auditory Illusions at Archaeological Sites

- Echoes = spirits in rock
- Reverberation = Thunder gods





# Mystery of Rock Art: Why?





“AHA!”

**BEDEILHAC**

GROTTE  
PRÉHISTORIQUE

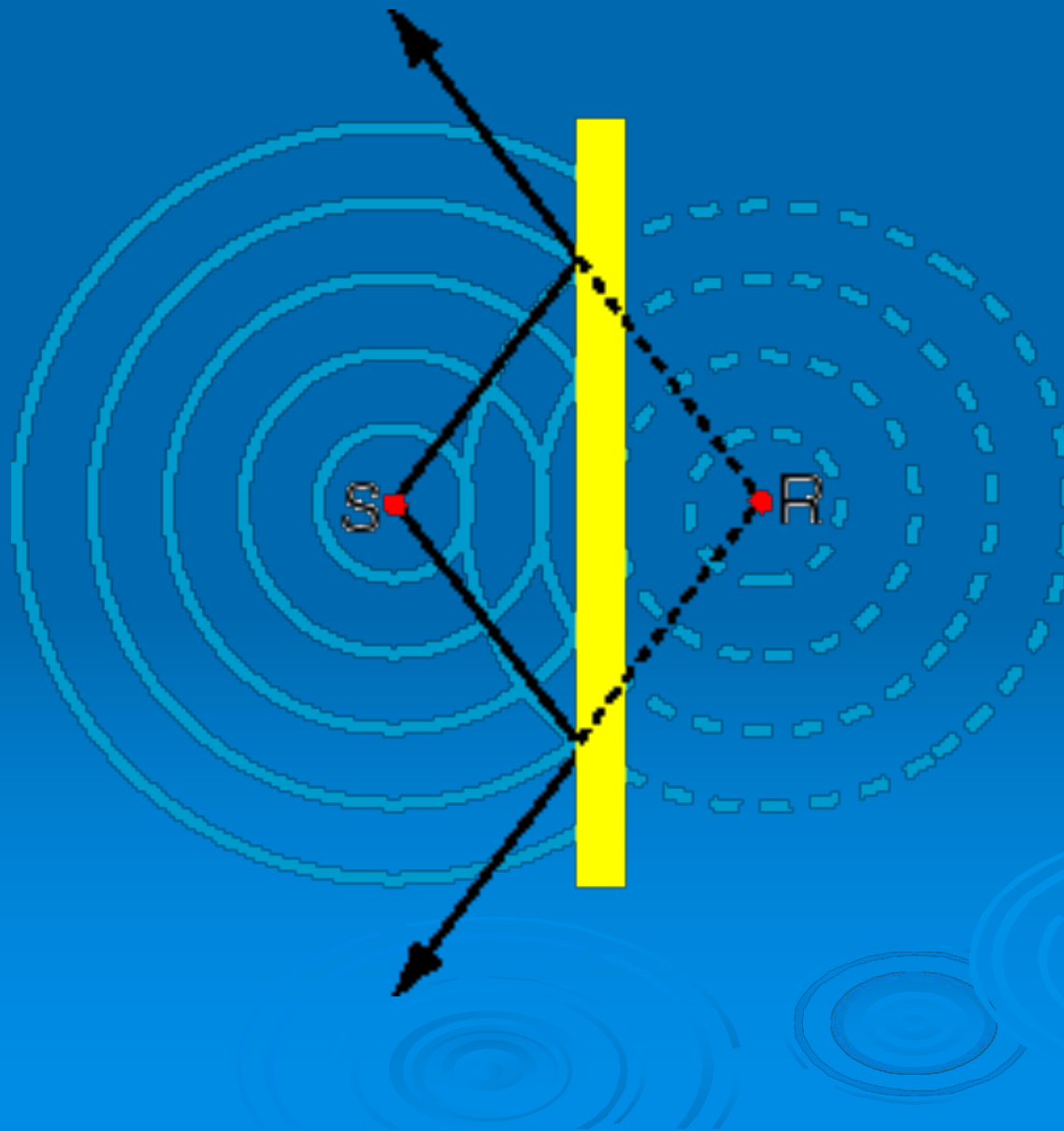
**GIGANTESQUE**

VERS COL DE PORT →



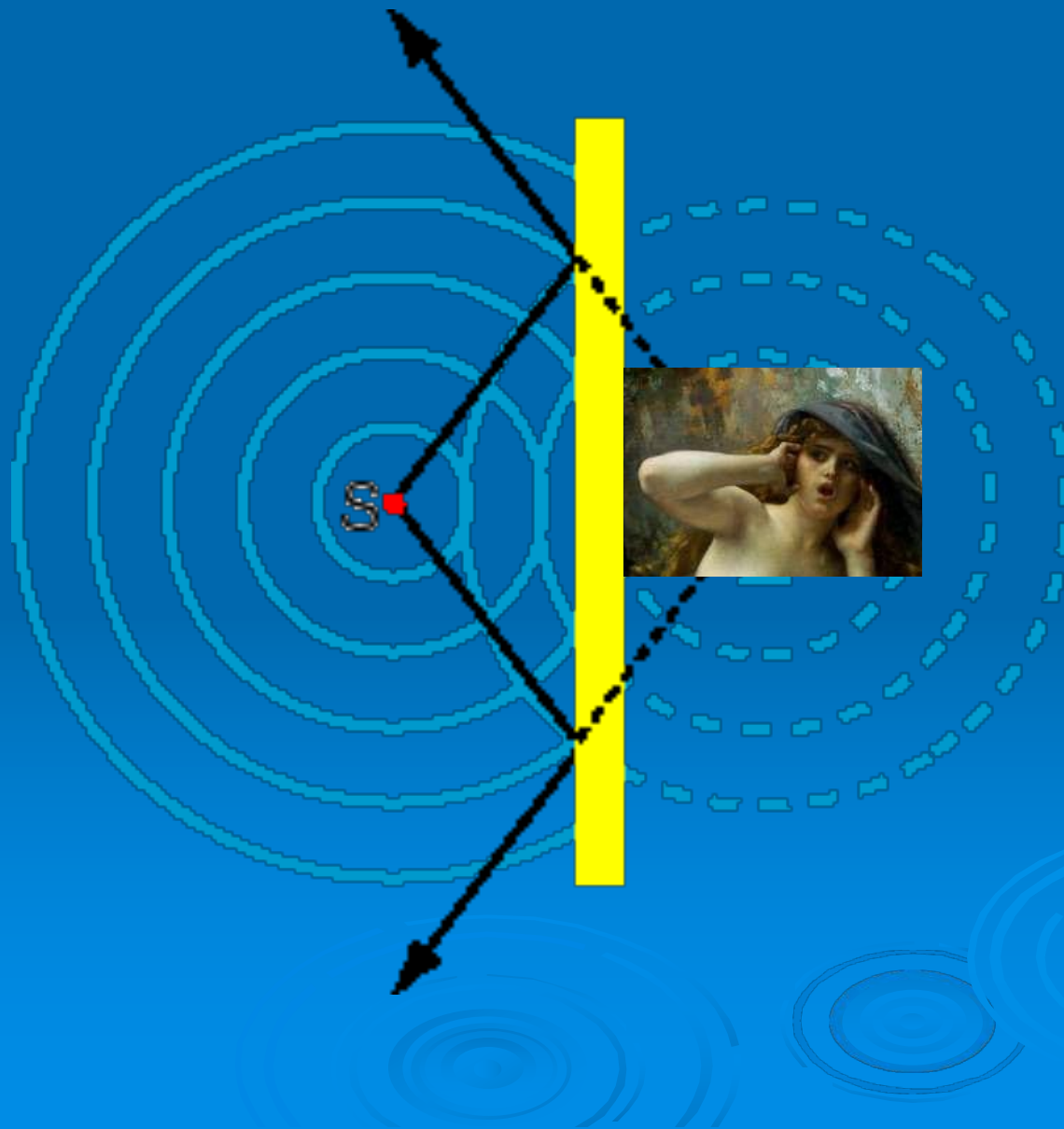


# Reflection: Virtual Source





# Echo: Non-Corporeal Spirit





# Personification of the Echo





# Personification of the Echo



- Tepeyollotl, the earth and cave god called “Heart of the Mountain” causes earthquakes and also the **echo** is thought to be made by him. The jaguar is his animal.

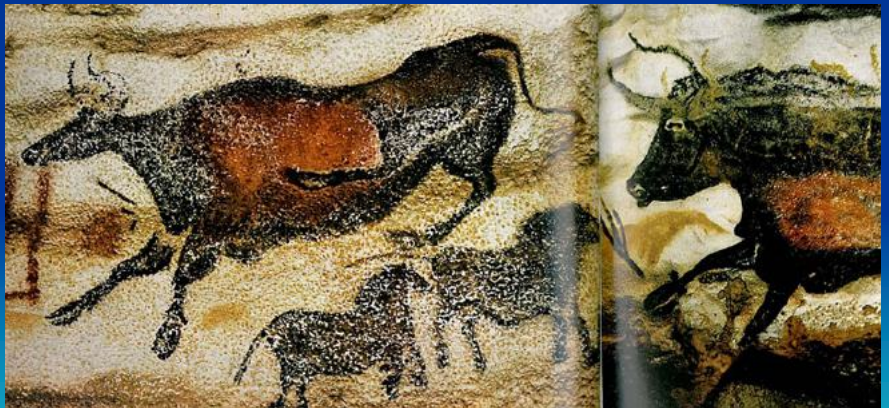


# Global Rock Art, Echoes





# Thunderstorms and Hooved Thunder Gods in the Sky



Thunderous Reverberation and Ungulate Cave Paintings



# Conclusions

- Echoes, Whisper Gallery Effects
- Thunderous Reverberation
- Interference Pattern Illusion
- Mysterious sounds: *Sacred*
- **PRESERVE SOUNDSCAPES**





# “So much of who we are is where we have been.”

*William Langewieche*



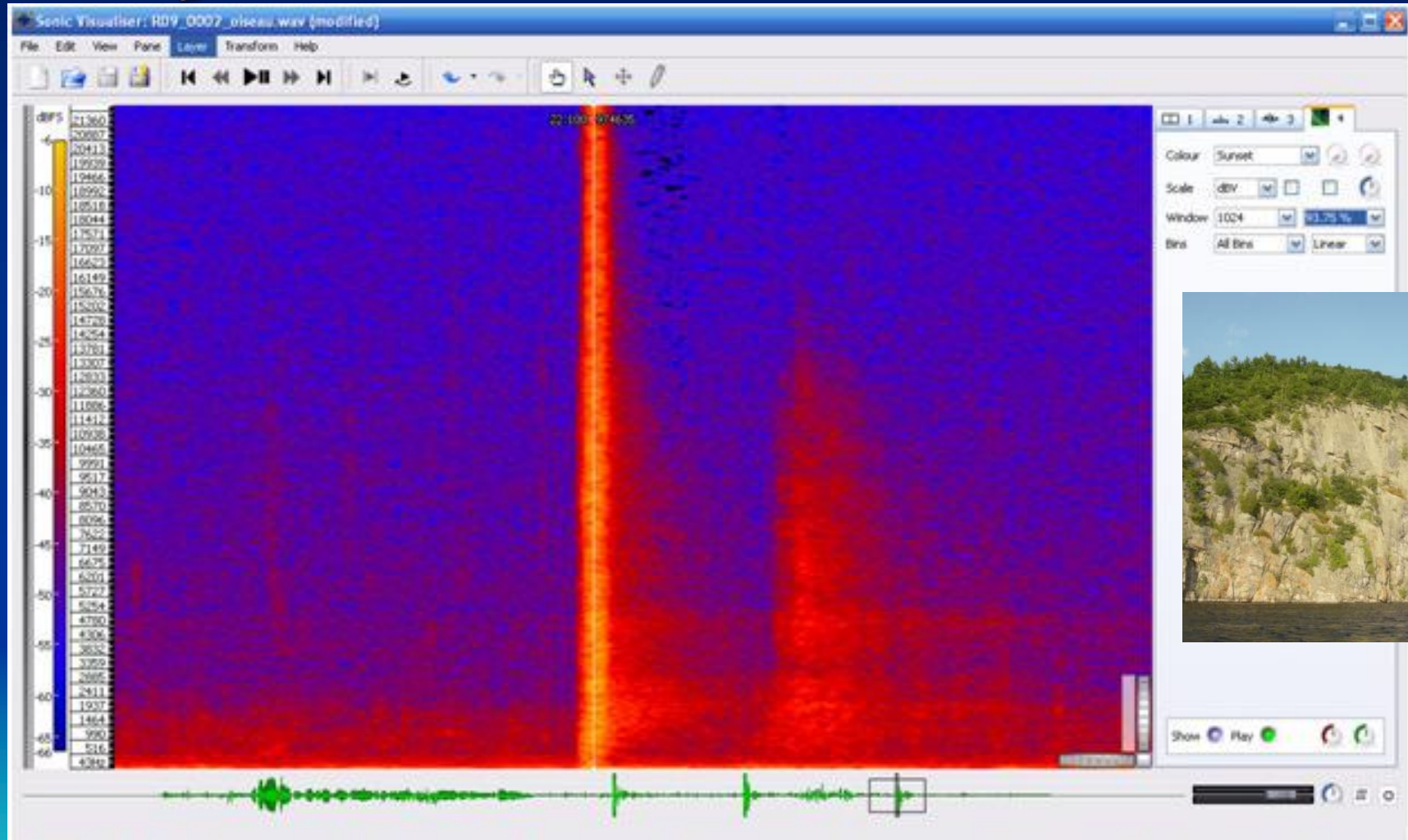


# Rock Art Recording





# Objective Data: spectral analysis



Rocher à la Oiseau

Sonic Visualiser



# PRESS COVERAGE



## Did 'spooky sounds' prompt prehistoric art? Echoes resembling spirits' calls may have inspired ancient paintings

- Dr Steven Waller thinks that sound waves bouncing off cave walls produced echoes which could have been interpreted as voices by our ancestors

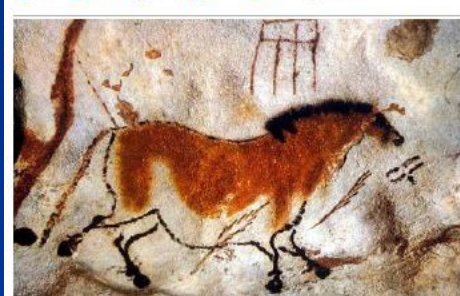


This no-cost, smart thermostat helps over 7,000 businesses save energy and money. [I'm interested >](#)

**Was prehistoric rock-art inspired by ghostly sound of stampeding animals?**

Prehistoric cave painters may have been trying to capture the echoes of clapping which blurred together into a thunderous cacophony of stampeding animals

Facebook 66 | Twitter 11 | LinkedIn 0 | Email





# THE CAVE SPOKE BACK

by Steven J. Waller, Ph.D.

- Email: **wallersj@yahoo.com**
- For Dropbox link to free ebook
- collected peer-reviewed publications:
- <https://www.dropbox.com/scl/fo/zx0sc652ybovt6ijf5nl0/AC2bHC3yQbTvF8lhWj5yhSc?rlkey=6je6s4zmgc9ygqme599q4c40x&st=62vrgw3f&dl=0>







# Ethnography:



- “Upon the stone were tracings of chickens ...a rooster daubed with red ocher...
- The War Chief ...to have good luck with chickens... **crowed loudly**, and set up an **echo** along the rim of the canyon.
- I... crowed loudly, and **heard many roosters answer** along the rim.”

*Talayasva (Sun Chief, Autobiography of a Hopi Indian, 1942)*





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# “Echo of Water on Rocks”





# Echo myths: supernatural spirits

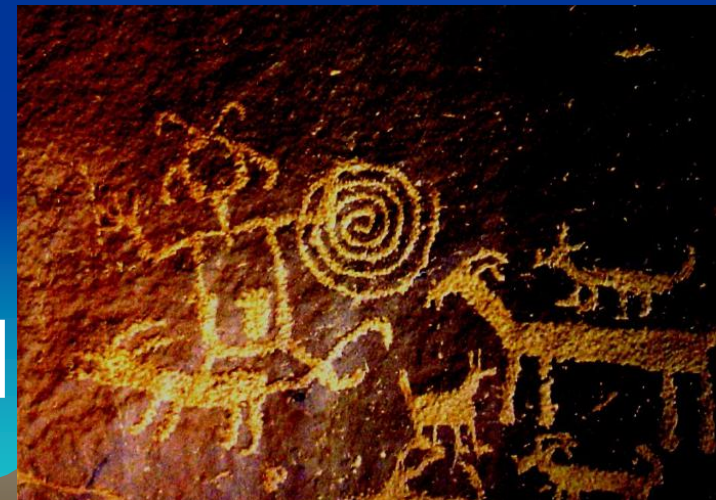
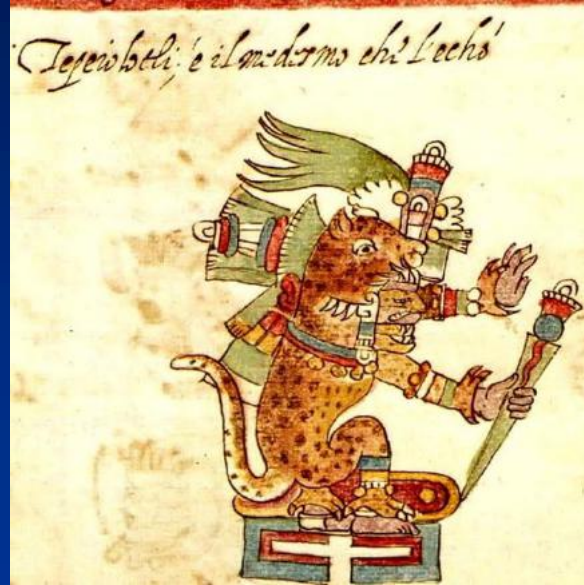
1. Anthropomorphs  
[human forms]

2. Zoomorphs  
[animal forms]

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[part human - part animal]

4. Representational  
[inanimate objects]

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[abstract; indeterminate]





# CALIFORNIA: Palo Verde





# Fish Slough, CA





# Little Lake, CA





# NEW MEXICO: Hembrillo Canyon





# OREGON: Tumalo; Picture Gorge





# WYOMING: Dinwoody





# PORTUGAL: Vale do Côa

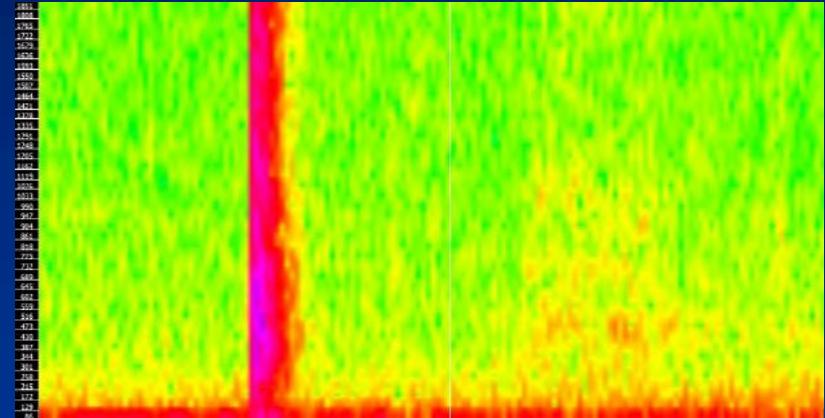


*Obrigado, António Batarda*





# PORTUGAL: Vale do Côa





# SPAIN: Cantabrian Caves



El Castillo



Las Monedas



La Cullalvera



Covalanas

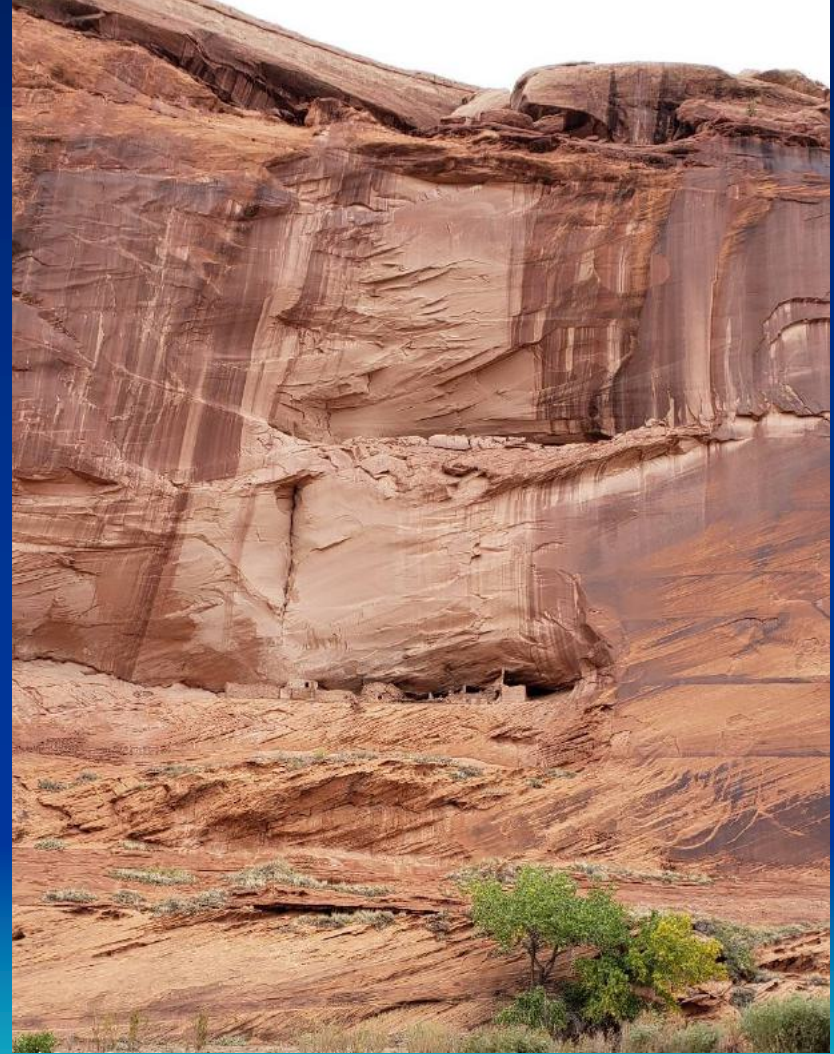
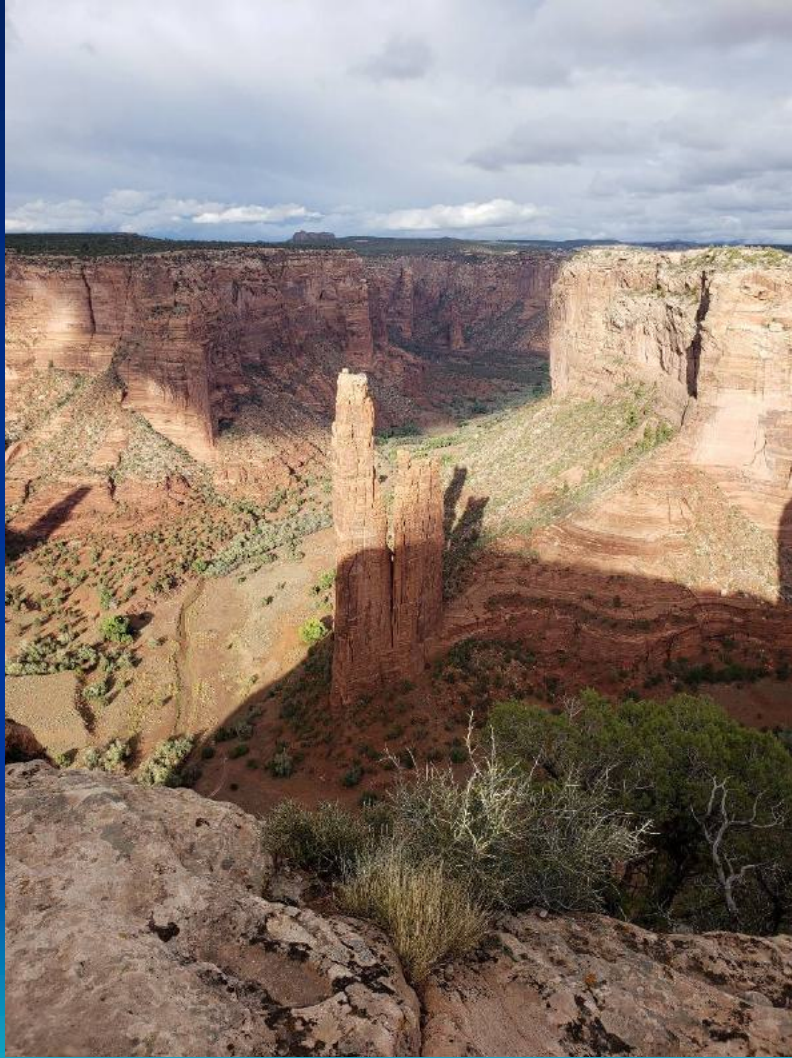


# Canyon del Muerto, AZ





# Canyon de Chelly, AZ





# Canyon de Chelly, AZ





# Canyon de Chelly, AZ





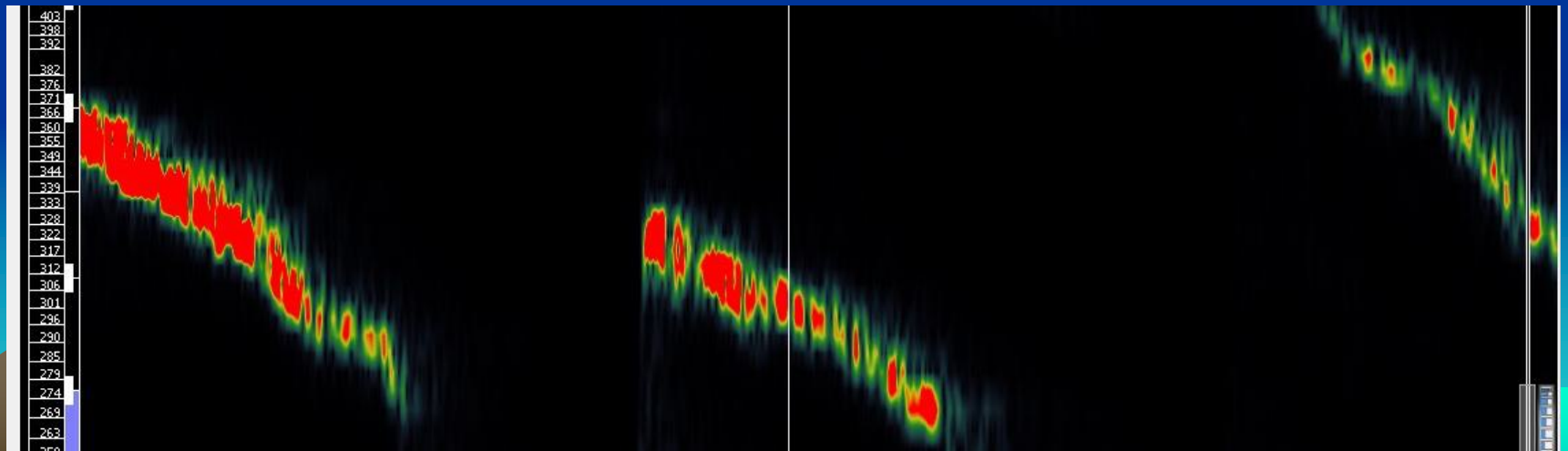
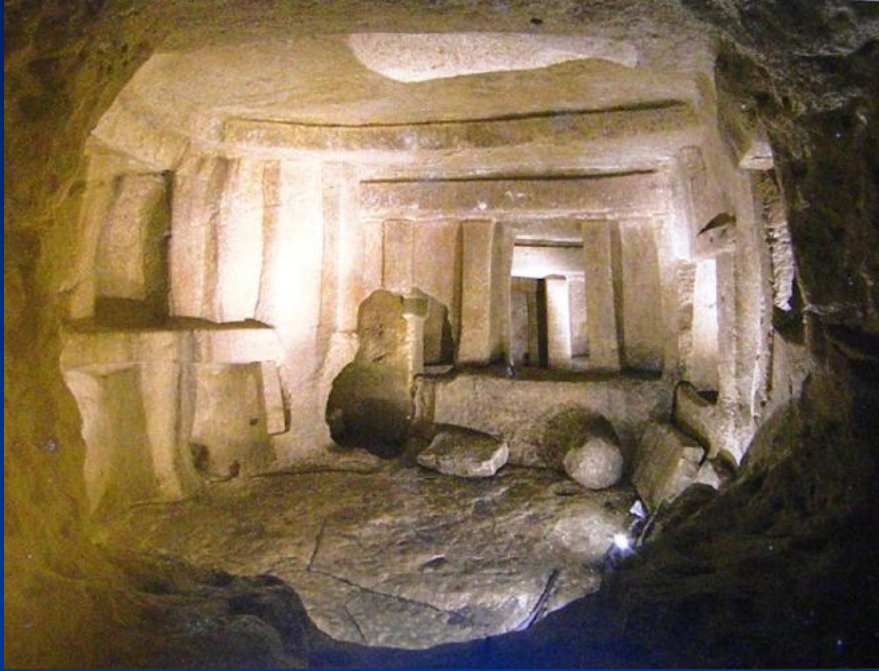
# Implications relative to understanding the workings of the human mind



- Meaning / motivation
- “Vision” on rock / worldview of artists
- “Vision” on rock / worldview of researchers



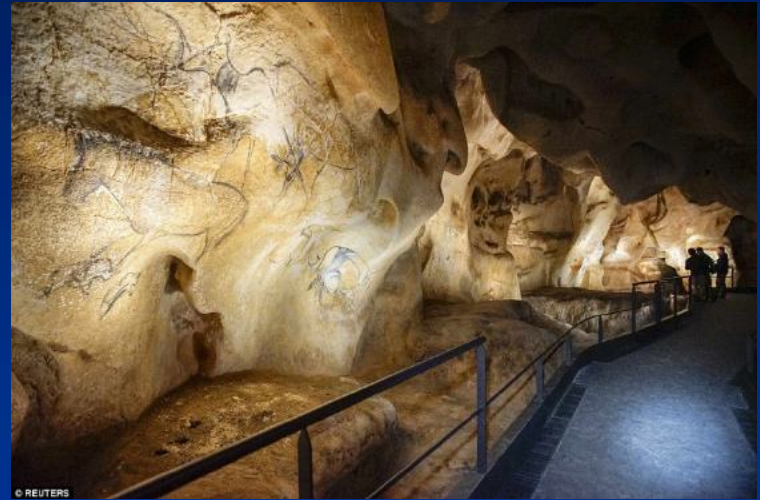
# Malta: Hypogeum





# Importance of Sound

- Chauvet cave facsimile opened April 2015.
- Incorporates sound engineering for immersion in the distinctive auditory characteristics of the original cave.
- Serves as a symbol of the coming-of-age for the field of Archaeoacoustics.





## Acoustical Characteristics of Valcamonica Rock Art Sites

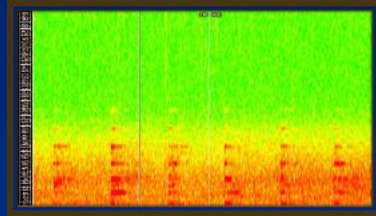
- 1 Foppe di Nadro
- 2 Seradina
- 3 Bedolina
- 4 Grosio Rupe Magna
- 5 Sonico Coren de la Fate
- 6 Luine
- 7 Corni Freschi
- 8 Naquane
- 9 Massi de Cemmo 1 & 2





# ITALY: Valcamonica Rock Art Sites

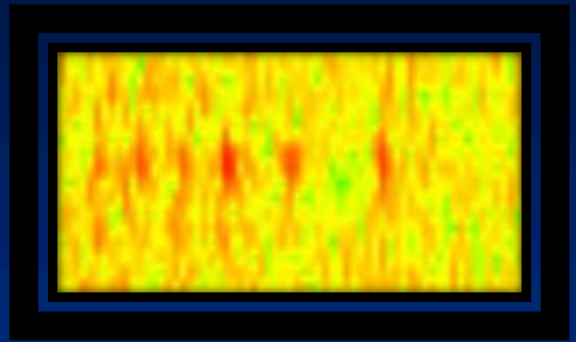
## 1 Foppe di Nadro







## 2 Seradina



Can hear dogs barking

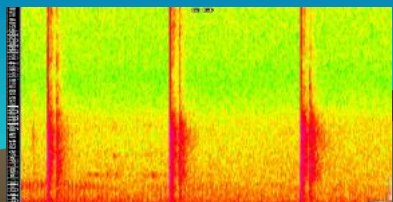
depiction of musical wind instruments

dance.



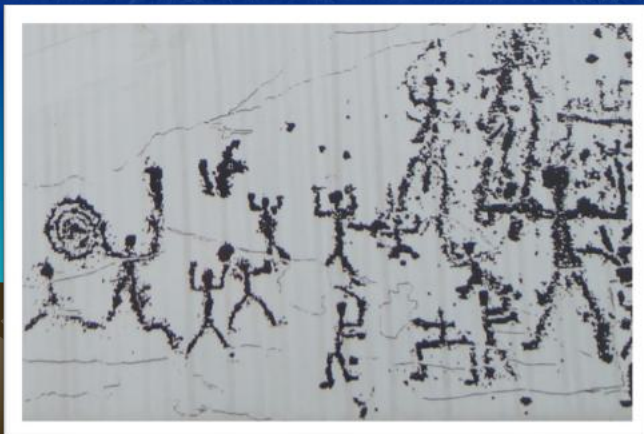
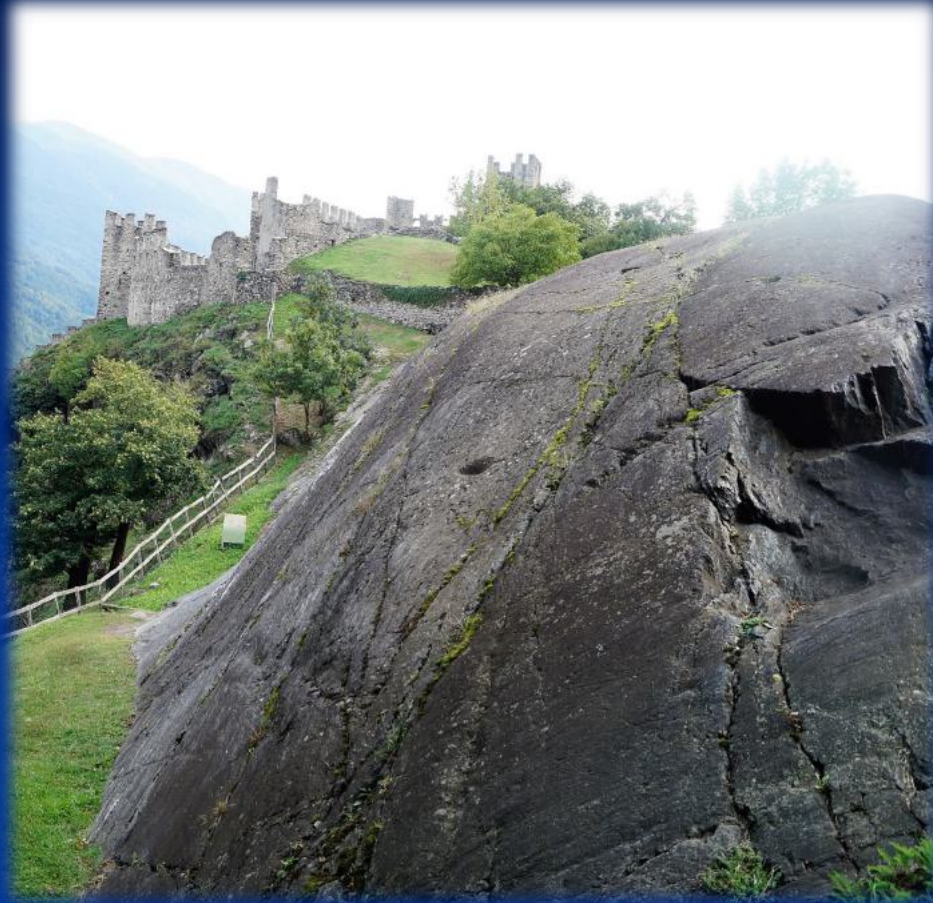


### 3 Bedolina



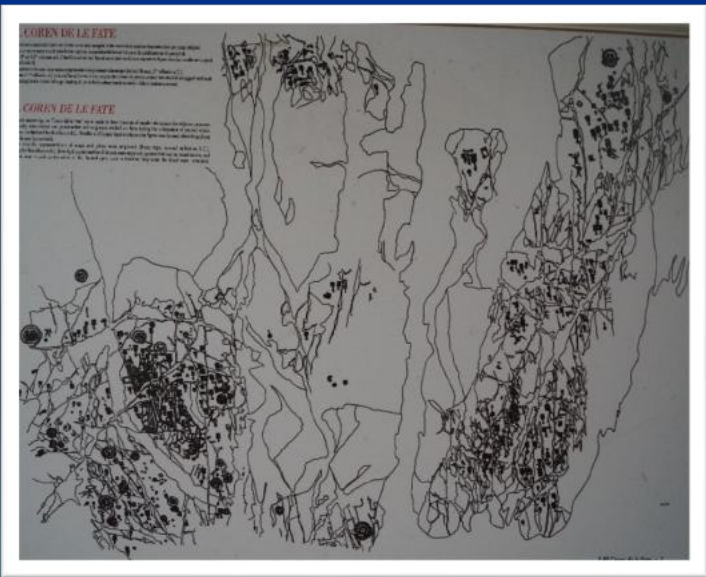


## 4 Grosio Rupe Magna



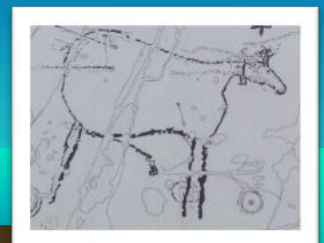
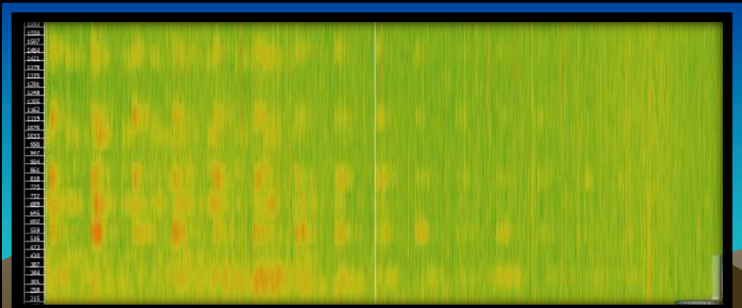


## 5 Sonico Coren de la Fate





## 6 Luine





# 7 Corni Freschi



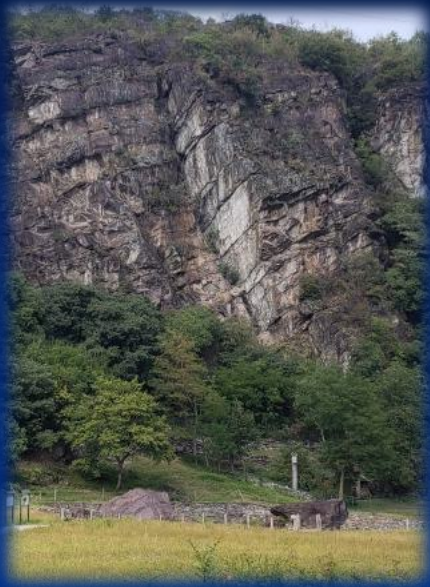


## 8 Naquane



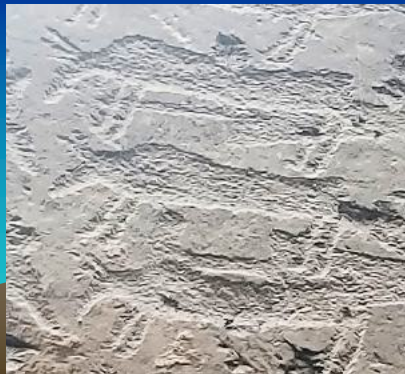
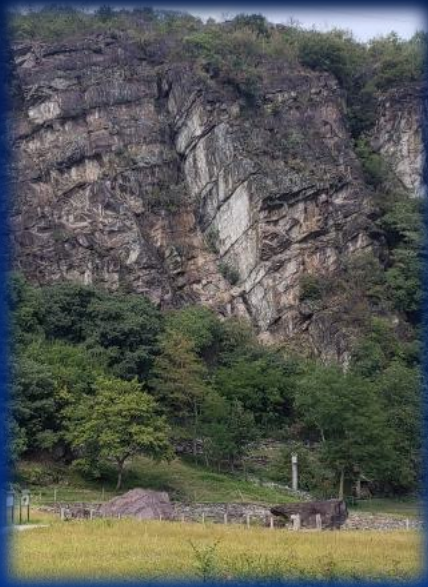


## 9 Masso Cemmo 1

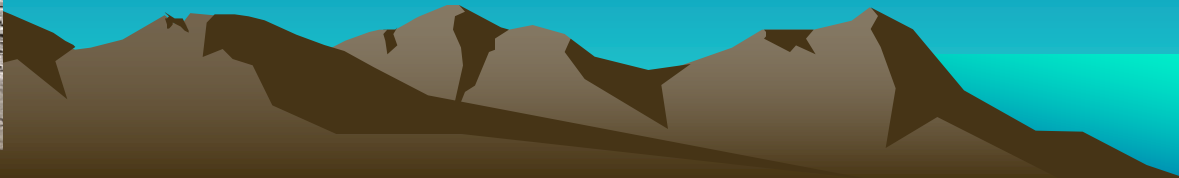




## 9 Masso Cemmo 2



The Camonica Valley acts like a giant megaphone to reflect, collect and amplify sounds. The iconography depicts several types of sound-making subjects, such as musical instruments.







20th INTERNATIONAL  
ROCK ART CONGRESS  
**IFRAO**  
2018

VALCAMONICA (Italy) 29 August - 2 September 2018

**STANDING ON THE SHOULDERS OF GIANTS**

## Archaeoacoustics for rock art studies (Steven J. Waller, Igor Reznikoff) .....





## Rock Art Portraying the Sounds of the Site: iconography as an expression of auditory perceptions (and session introduction)

Steven J. WALLER, *Rock Art  
Acoustics*  
Contact email:  
wallersj@yahoo.com

Keywords: archaeoacoustics,  
sound, mythology,  
anthropophonic, zoophonic,  
geophonic

Since no instrument can definitively prove the artists' intended identity of rock art images, researchers relying on visual recognition use the convention of describing motifs as "Anthropomorphic" if they appear human-shaped, "Zoomorphic" if animal-shaped, and "Geomorphic" if inanimate or unrecognizably abstract. In a similar fashion, the author has noted that echoes are typical at rock art sites, and these auditory characteristics can be described as "Anthropophonic" for sounds duplicating human voices, "Zoophonic" for sounds mimicking animal noises such as hoofbeats, and "Geophonic" for sounds of inanimate objects or for unrecognizable sound effects. Superior pattern processing is considered a hallmark of the evolved human brain. However, visual and auditory recognition in humans is not a perfect process. Because we rarely experience the exact same sensory input twice, some degree of perceptual plasticity is evolutionarily advantageous to allow for this variability during cognitive interpretation of the environment. This involves relating new sensory input to prior experience. The recognition process comprises template, prototype, and feature matching. Case studies will be presented in which the sounds that can be heard at specific rock art sites correspond to the images the artists depicted. Ancient mythology of echo spirits and hooved thunder gods support this connection.



Zoom out (Ctrl+Minus)



## Sound as a Phenomenal Attribute at the Eagle's Nest Vision Quest and Rock Art Site

Herman E. BENDER, *Hanwakan  
Center for Prehistoric  
Astronomy, Cosmology and  
Cultural Landscape Studies,  
Inc.*

Contact email:  
ashco@charter.net

Keywords: Eagle's nest,  
escarpment, sound  
amplification, whistling

The Eagle's nest is a vision quest and rock art site located on the extreme top edge of the Niagara escarpment in southern Fond du Lac, Wisconsin (USA). The vertical cliff face of the escarpment is approximately 35m (120 feet) in height. Sound at the base of the escarpment traveling up the rock face is amplified and can be heard coming from a distance, often times kilometers away. Other acoustic properties at the Eagle's nest site vary from the subtle sound of the wind whispering in the cedar trees that surround the pit/nest to whistling sounds heard as the wind blows through holes and a V-shaped notch in the rocks, the whistling perceived to be the sound of spirits as they enter and exit this reality and the next. In addition, the loud cries of birds such as hawks, turkey vultures and other birds riding the thermals produced by the up-sloping wind add to the phenomenal attribute that sound provides in this unique setting.





## “Sound visions”: musical inferences in Serra da Capivara, Piauí, Brazil

Cristiane BUCO, IPHAN -  
*Instituto do Patrimônio  
Histórico e Artístico Nacional,  
Brasil*

Contact email:  
archeocris@icloud.com

**Keywords:** sound visions, rock  
art, Serra da Capivara National  
Park, musical archaeology,  
interdisciplinary research

This paper will present the results of an interdisciplinary research in the archaeological context of 140 rock art sites located in Serra da Capivara National Park, Piauí, Brazil. The chosen theme was the pre-colonial musical practice in this region. The analysis of rock figures allowed us to infer the direct presence of music through objects coupled to human figures and, indirectly, by the assumption of the existence of music in scenes in which the gesturality of human figures represent dance movements. Also found was a wooden flute, with the air circulation tube filled with sediments. Effectively, there is no original sound; for this reason, we use the term “sound visions”. To accomplish this work, bibliographical research on the subject in related areas was undertaken as well as field research, including the photographic survey of the pictorial corpus of the archaeological sites and laboratory analysis of the associated archaeological material. Interdisciplinary research allowed us to infer the presence of pre-colonial music in this region, as well as to create a “sound vision” focused on the contemporary artistic-musical re-reading of rock art through the analogy of languages and the use of information technology, resulting in Musical Archeology.



Fig.1 - Toca da Entrada do Babão  
da Vaca archaeological site - Serra da  
Capivara National Park, Piauí, Brazil.  
(photo Cristiane Bucó)



20th INTERNATIONAL  
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VALCAMONICA (Italy) 29 August - 2 September 2018

## STANDING ON THE SHOULDERS OF GIANTS

Echoes and their  
rock-art context  
in the pitoti, the  
later prehistoric  
rock-engravings of  
Valcamonica (BS),  
Italy: a breakthrough  
discovery?

Christopher CHIPPINDALE,  
*McDonald Institute for  
Archaeology, University of  
Cambridge, UK*

Frederick Baker, Christoph  
Well, Astrid Drechsler, Hannes  
Raffaseder

Contact email: cc43@cam.ac.uk

Keywords: archaeoacoustics,  
Valcamonica, rock-art

A decade ago, during the prize-winning PITOTI project, we searched for acoustic effects at Valcamonica rock-art sites. Led by Well, a professional musician playing a vast wooden Alphorn – what else in the Alps? – and high trumpet, we started at the most famous site, the Massi di Cemmo. Results were immediate, unambiguous, astounding: a strong echo rebounding from the high curving cliff behind the small boulders which carry the art. We found the same effect at the Massi's famous sistersites: the Capitello dei Duipini, near Paspardo; and the Cornù Freschi, near Boario Terme. Although they are at middle, high and low positions within the valley, respectively, all three are in similar acoustic positions. The art at each is similar, and of the Chalcolithic (Copper Age) period, around 3000 BC. So an archaeoacoustic aspect is evident at three sites. We have found none at any other of the hundreds of Valcamonica art sites. Is this a chance effect meaning nothing? Or a breakthrough discovery? Analysing the three locations topographically, and studying the statue-stele, portable boulders of the same period and carrying similar art, we show decisively that the discovery was and is real, significant and a breakthrough.





20th INTERNATIONAL  
ROCK ART CONGRESS  
**IFRAO**  
2018

VALCAMONICA (Italy) 29 August - 2 September 2018

**STANDING ON THE SHOULDERS OF GIANTS**

The SONART project  
(2014-2016):  
an overview of  
archaeoacoustic  
investigations on a  
sample of Schematic  
rock art sites in  
Spain, France and  
Italy

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**Keywords:** acoustics,  
schematic rock art,  
soundscapes, Mediterranean,  
auditory perception

In the last few years the authors of this paper have worked on the project "SONART - The Sound of rock art: Archaeoacoustics and post-Palaeolithic Schematic rock art in the Western Mediterranean". The aim of this project is to analyse the relevance of acoustics as a factor for the production, location and active use of post-Palaeolithic rock art sites and landscapes. A comparative study of acoustics and the location of rock art in different regions of the Western Mediterranean is being undertaken in order to explore the auditory perception and sensorial experiences sought by prehistoric communities. The potential use of landscape acoustics to produce music in the past is one of the other aspects covered in this project. In this paper we will present an overview of the results obtained so far in a sample of rock art areas in Spain, France, and Italy. We will also discuss on the new and portable equipment for performing acoustic measurements in rock art landscapes





## Music and musical instruments in the rock art of Valcamonica

Within the rock art of Valcamonica, among other themes, several representations of musical instruments are evident that only occur from the Middle Bronze Age (16th cent. BC) and throughout the Iron Age (1st millennium BC). In previous periods only figures that can be interpreted as dance scenes have been located, these are dated to the end of the 3rd A style period (2500-2000 BC). These consist of depictions of parallel rows of anthropomorphs that seem to dance in a circle with open arms, juxtaposed or connected together. Dance scenes also appear late in the 2nd and in the 1st millennium B.C., occasionally accompanied by human figures playing rhythmic or melodic musical instruments. In fact, several female figures play wooden sticks, but also horns, and aulos. During the art of warriors, the so-called 4th style of Valcamonica rock art (1st millennium BC), there are numerous images of musical instruments, including carnyxes, cornua and harps depicted isolated or associated with warrior figures. The possible chronology and interpretation of these instruments and themes are discussed here.

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**Keywords:** musical instruments, Valcamonica, Bronze Age, Iron Age, dance



Fig. 1 - Paspardo, In Valle, Rock 4. Figure of warrior playing a buccina. (photo by A.E. Fossati - Le Orme dell'Uomo)



Fig. 2 - Paspardo, In Valle, Rock 4. Figure of woman playing wooden sticks. (photo by A.E. Fossati - Le Orme dell'Uomo)



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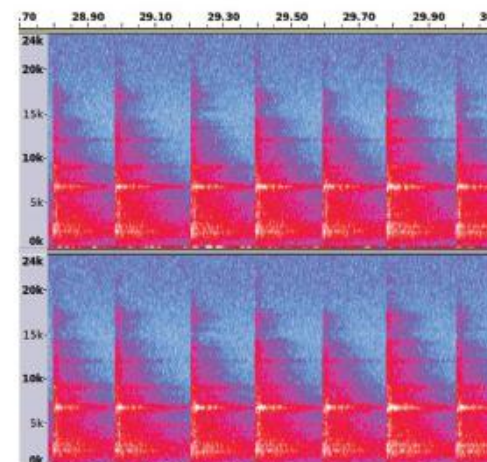
## STANDING ON THE SHOULDERS OF GIANTS

### The Rock Opera Experience: a multisensory phenomenology of petroglyph engagements in the Mojave Desert, California, United States

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Keywords: archaeoacoustics, ethnoarchaeology, experimental archaeology, cognitive archaeology, interdisciplinarity, phenomenology

Many competing models for explaining the placement and symbolism of Western North American petroglyphs have been proposed, but these have often been difficult to unequivocally substantiate. One of the more promising models melds emic and etic perspectives, examining related oral traditions (song and narrative) through neuropsychology theory. The resultant cognitive approach considers a phenomenology of petroglyph production and interaction as an inherently multi-sensory embodied experience. This study employs the aforementioned cognitive approach to two slot canyon petroglyph sites at the convergence of the Mojave Desert and Great Basin. Employing emergent zero-impact experimental methods, this project explores socially weighted psychological implications of spatially-contextualized petroglyph production methods. This paper argues that far from accidental choices, production methods at the study locations enhanced sensory manifestation of culturally significant components of connected oral tradition. Specifically, the percussive marking technique is intrinsically an audible experience enacted judiciously at choice soundscapes. Quantitative datasets characterizing novel acoustical attributes belonging to key loci within each site are curated and contextualized in a 3D digital environment. These data are reported alongside relevant oral traditions, and connections are reinforced through iconography. While not exhaustive, this study demonstrates means of producing socially significant interpretations through systematic practices of non-destructive data collection.





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# Questions of Methodology in the Archaeoacoustics of Resonant Spaces

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Keywords: archaeoacoustics,  
painted caves, rock art,  
resonance, echoes, human  
voice

It has been a few years since Archaeoacoustics has emerged as a field of research, although the subject existed long ago, e.g. since Vitruvius (see The evidence of the use of sound resonance from Palaeolithic to Medieval times, Acoustics, Space and Intentionality, Lawson, G. and Scarre, C. eds., Cambridge (McDonald Institute for Archaeological Research, Monographs), 2006, p.77-84). Archaeoacoustic research is now very prolific, and it is time to make an appraisal in order to improve studies in this field. There are many different facets to this research including the study of ancient instruments (flutes, lithophones, etc.), closed spaces (caves, temples), and open spaces and sites. We will limit the discussion to the methodology needed to study resonant spaces, such as painted caves, temples or open echoing spaces.



Fig.1 - Solsemhula cave, West coast of Norway. (photo Adjun Selfjord 2011)



**EAA 2018**

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REFLECTING FUTURES



European  
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# “Archaeoacoustics – Discussing Sound in Archaeological Contexts”



## **01 STUDIES IN THE SOUND DIMENSION OF PAINTED CAVES AND OUTDOOR PAINTED ROCKS**

- Reznikoff

## **02 ARCHAEOACOUSTICS AND THE SINGING STONES - Devereux**

## **03 EXPLORING AUDITORY PERCEPTION AT PREHISTORIC ROCK PAINTINGS IN FINLAND**

- Lassfolk, Rainio, Lappi, Pekkanen

## **04 SOUND AND THE LANDSCAPE LOCATION OF SCANDINAVIAN ROCK ART - Dodd**

## **05 THE ACOUSTICS OF POST-PALAEOLITHIC ROCK ART LANDSCAPES IN SOUTH FRANCE**

- Mattioli, Hameau, Diaz-Andreu

## **06 SOUND AND SONG IN THE TWILIGHT ZONE: MULTIMEDIA IMMERSION FOR A MULTISENSORY PHENOMENOLOGY OF MOJAVE DESERT ROCK ART LABYRINTHS - Liwosz**

## **07 CHRONOLOGICAL NOISE: ARCHAEOACOUSTICS AND ROCK ART SITES IN THE PRADES MOUNTAINS - Diaz-Andreu, Vinas, Mattioli**

## **16 DOWNTOWN CHACO: PERFORMANCE SPACE, POLITICAL THEATER, AND AUDIBILITY**

- Witt, Primeau







## SAA 85th Annual Meeting

Austin, TX, U.S. | April 22 - 26, 2020

### Archaeoacoustics: Sound, Hearing, and Experience in Archaeology

#### Session Organizers:

Kristy E. Primeau

Margarita Díaz-Andreu

Tommaso Mattioli

Sound has always been an omnipresent component of human experience, and recent trends in archaeological inquiry seek to explore the importance of acoustics, instruments, and what was heard in the past. More than a mere channel of communication, sounds, performances, and music conferred connotations of power, contributed to the formation of identities, and were an important part of all activities, including recreation, aesthetics, and ritual praxis.

This session presents case studies in applied archaeoacoustics, psychoacoustics, soundscapes, and archaeomusicology from a variety of scales and cultural perspectives. Defined by Scullin and Boyd (2014:363) soundscapes consist of "all sounds present in any given environment and how these sounds interact within that environment."

Submissions are welcome on a variety of archaeoacoustical topics, including: discussions of natural and anthropogenic places which affect the propagation of sound waves; the sonorous landscape; speech intelligibility; theoretical, psychological, and cognitive sonic studies; the conservation and promotion of auditory heritage; and studies of instruments used to produce music and/or signals.



# Acoustics in Valltorta, Spain

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## Acoustics and Levantine rock art: auditory perceptions in La Valltorta Gorge (Spain)

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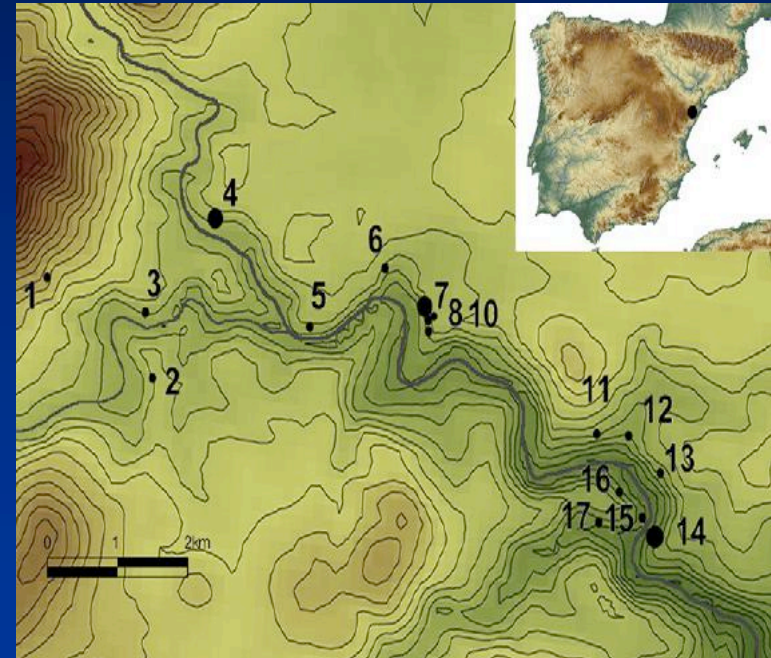
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### ABSTRACT

This article explores the relevance of acoustics as a factor for in the production and active use of levantine rock art in Spain. The renowned rock art area of La Valltorta Gorge serves as a case study. Two experiments are described: the first assessed whether the sites with the most painted motifs had better acoustics than those with fewer motifs. The second tested which areas in La Valltorta Gorge had better acoustics and whether there was a difference between the acoustics of the decorated area and the contiguous sectors of the Gorge where no paintings have been found. In both experiments different sounds and pitches were used. The results suggest a strong relationship between the painted areas and the sonority of the place, with the major sites generally having provided the best results, with the exception of the sonority when facing the rock art panels. It is suggested that La Valltorta Gorge was chosen to be decorated with a view to increasing the perceptual impact of the rituals that may have been held at rock art sites due to the amplification caused by the echoing and resonance.

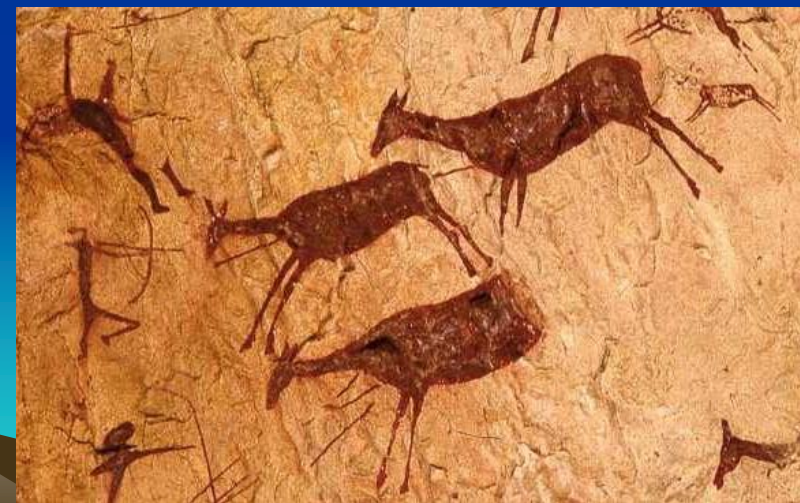
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**Table 2**

Resonance when facing the Gorge. 1. Short and soft resonance (1 s or less), 2. Long and hard resonance (more than 1 s).

Resonance (towards Gorge)	Mega-sites				Minor-sites		
	Saltadora (S)	Saltadora (N)	Cavalls	Civil	Lledoner	Mas d'en Josep	Tolls del Puntal
Clapping	1	1	1	1	1	1	2
Both whistles	2	2	2	2	2	1	2
One intermittent whistle	2	2	2	2	2	2	2
Voices	1	2	2	1	2	1	2
Male voice	2	2	2	2	2	1	2
Female voice	1	2	1	2	2	1	2





# Acoustics in Valltorta, Spain





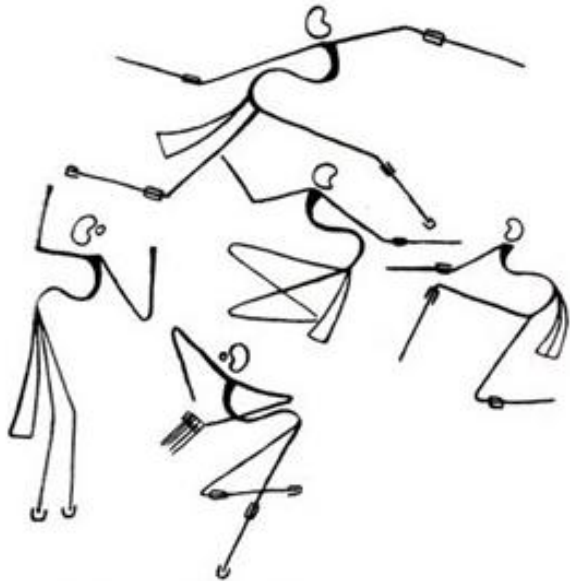
# Musical Instruments in Cave Paintings (India)

impersonate supernatural or mythical beings in their frenzy, a kind of dance.

Musical instruments figure in the cave paintings in the scenes depicting dancing. A Mesolithic painting from Kathotia depicts a harplike musical instrument in the hand of a human figure (Pl. 8). According to Neumayer, some dancing and feasting is going on by the side of a dead bear where the man with musical instruments is sitting. It is a gay party with a one-piece musical accompaniment in attendance. One of a group of five dancers depicted in a Mesolithic painting

## History of Indian Theatre, Volume 1

By M. L. Varad Pande, Manohar Laxman

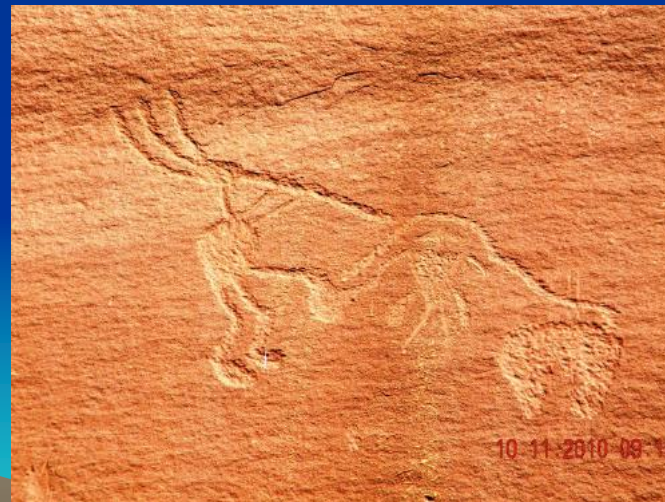


3 Singing dancers, Mesolithic, Lakhajoor.



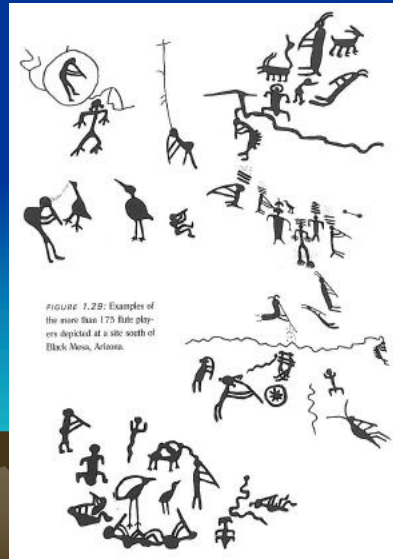


# Music in Rock Art: Flute



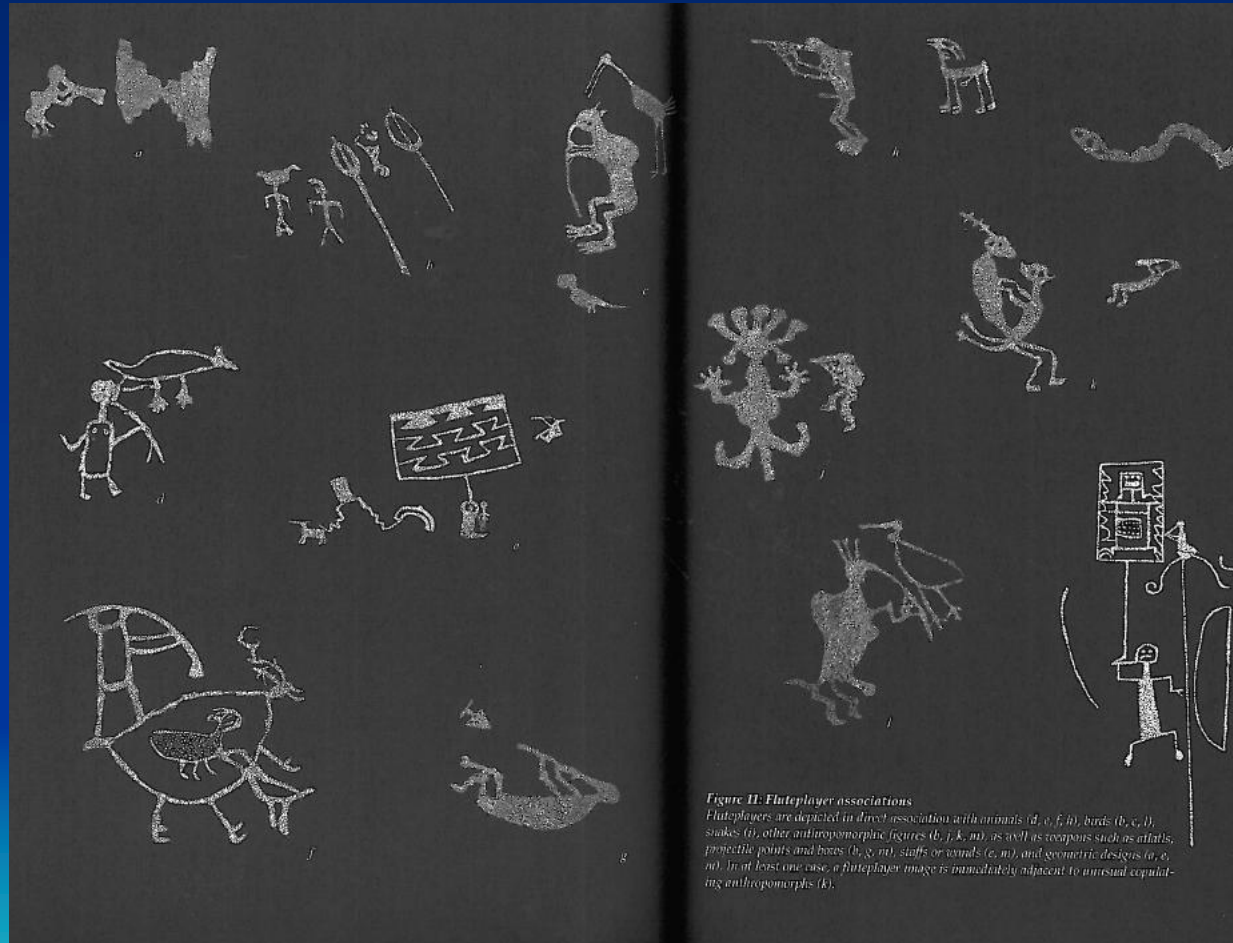


# Flute Players: why so many? Part 1



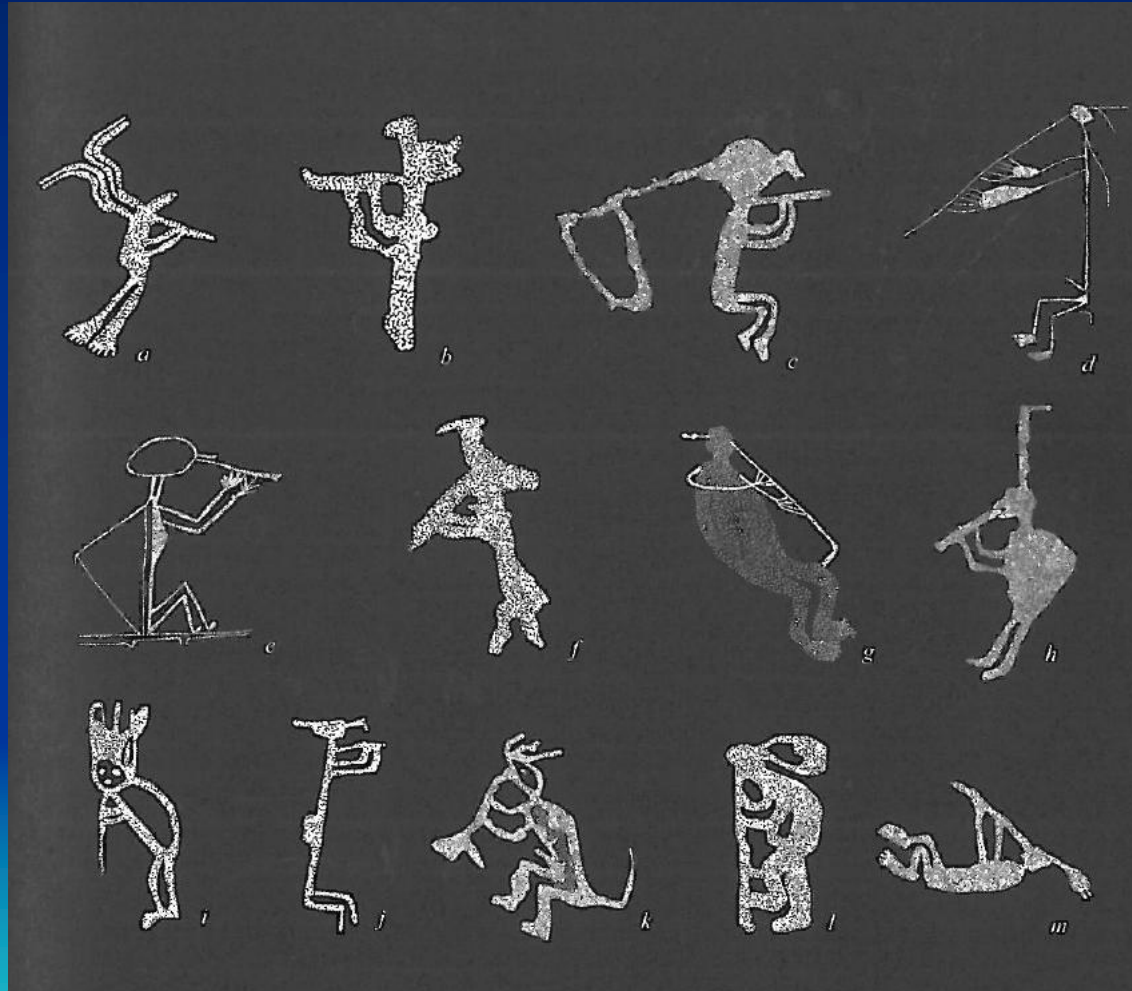


# Flute Players: why so many? Part 2





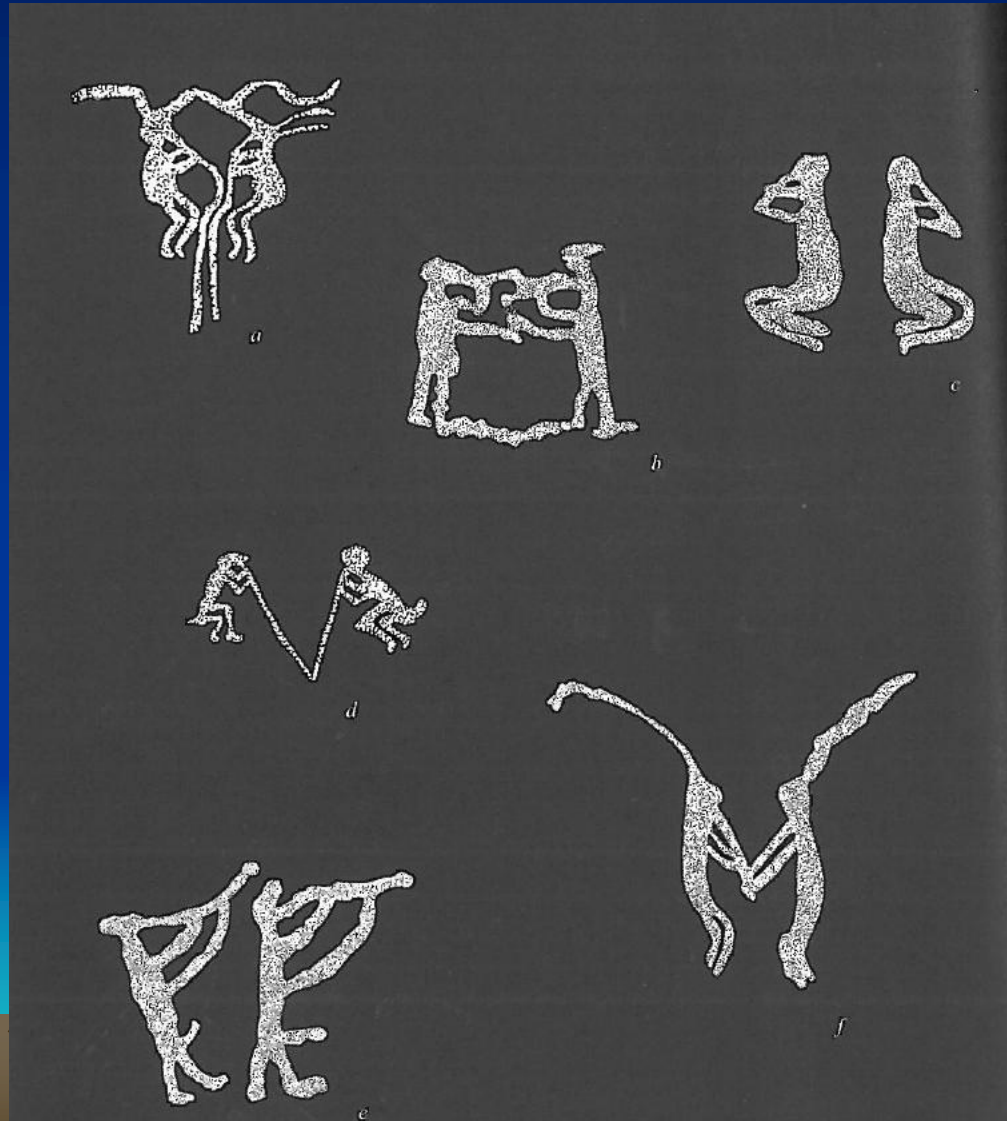
# Flute Players: why so many? Part 3



Malotki

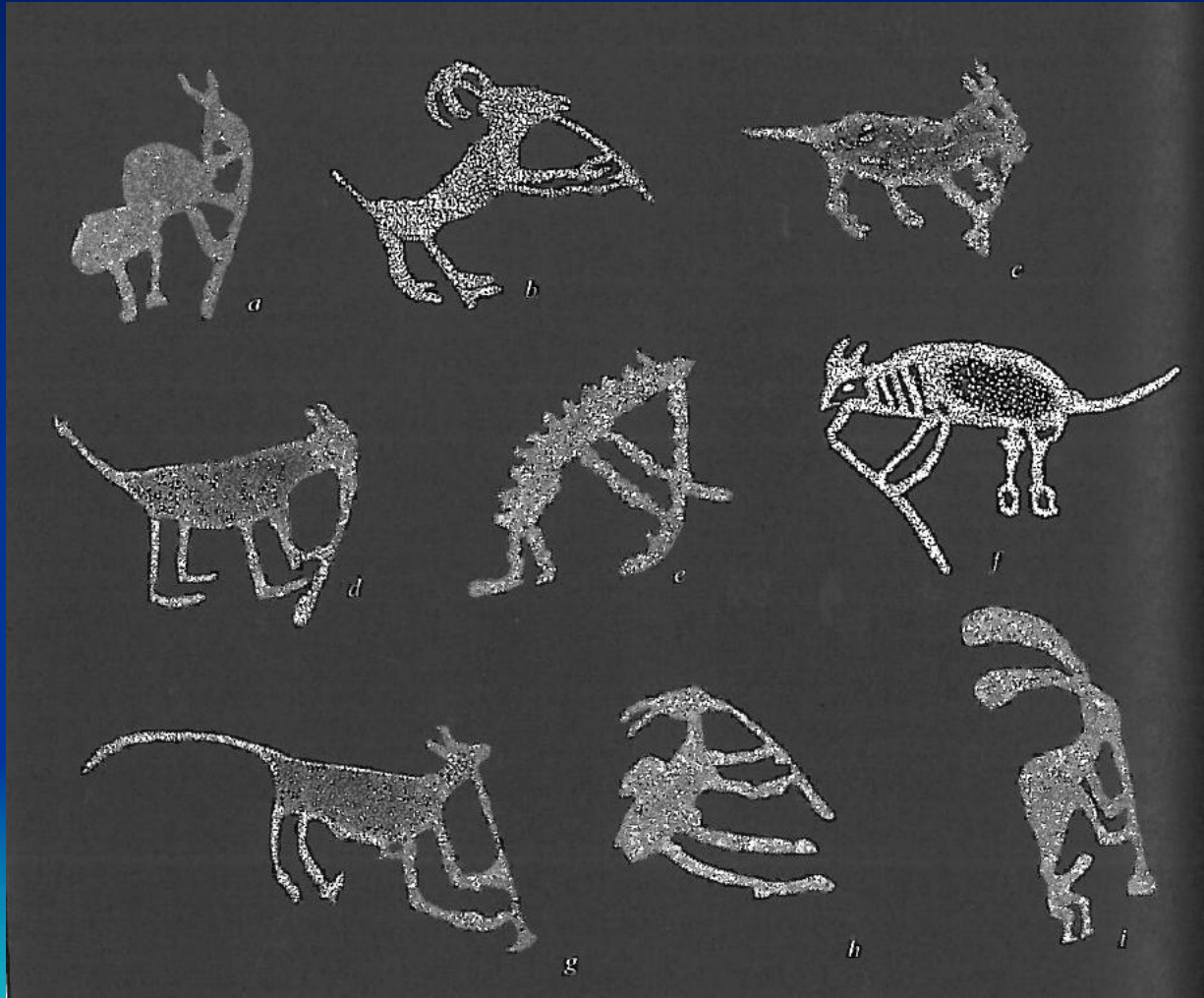


# Flute Players: why so many? Part 4



Malotki

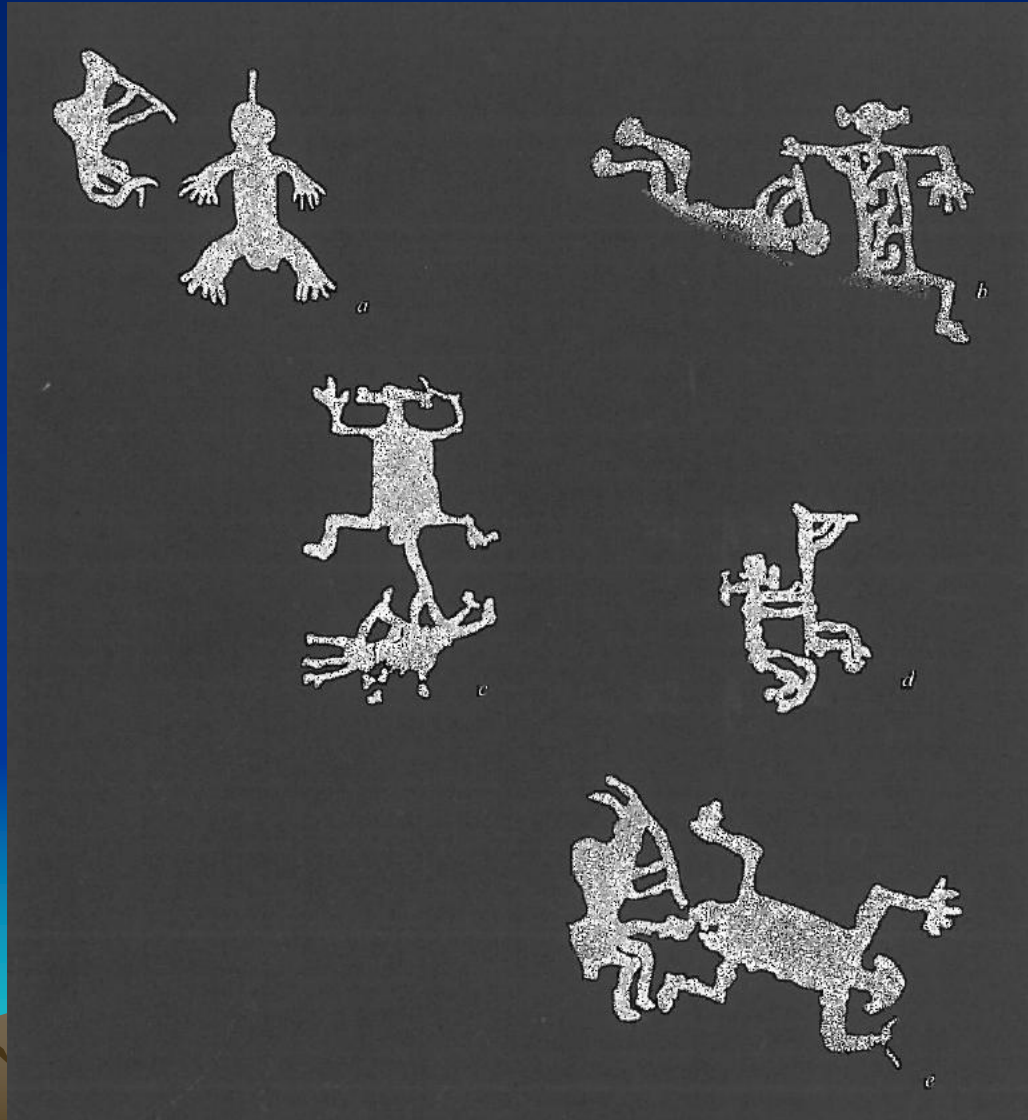
# Flute Players: why so many? Part 5



Malotki



# Flute Players: why so many? Part 6



Malotki

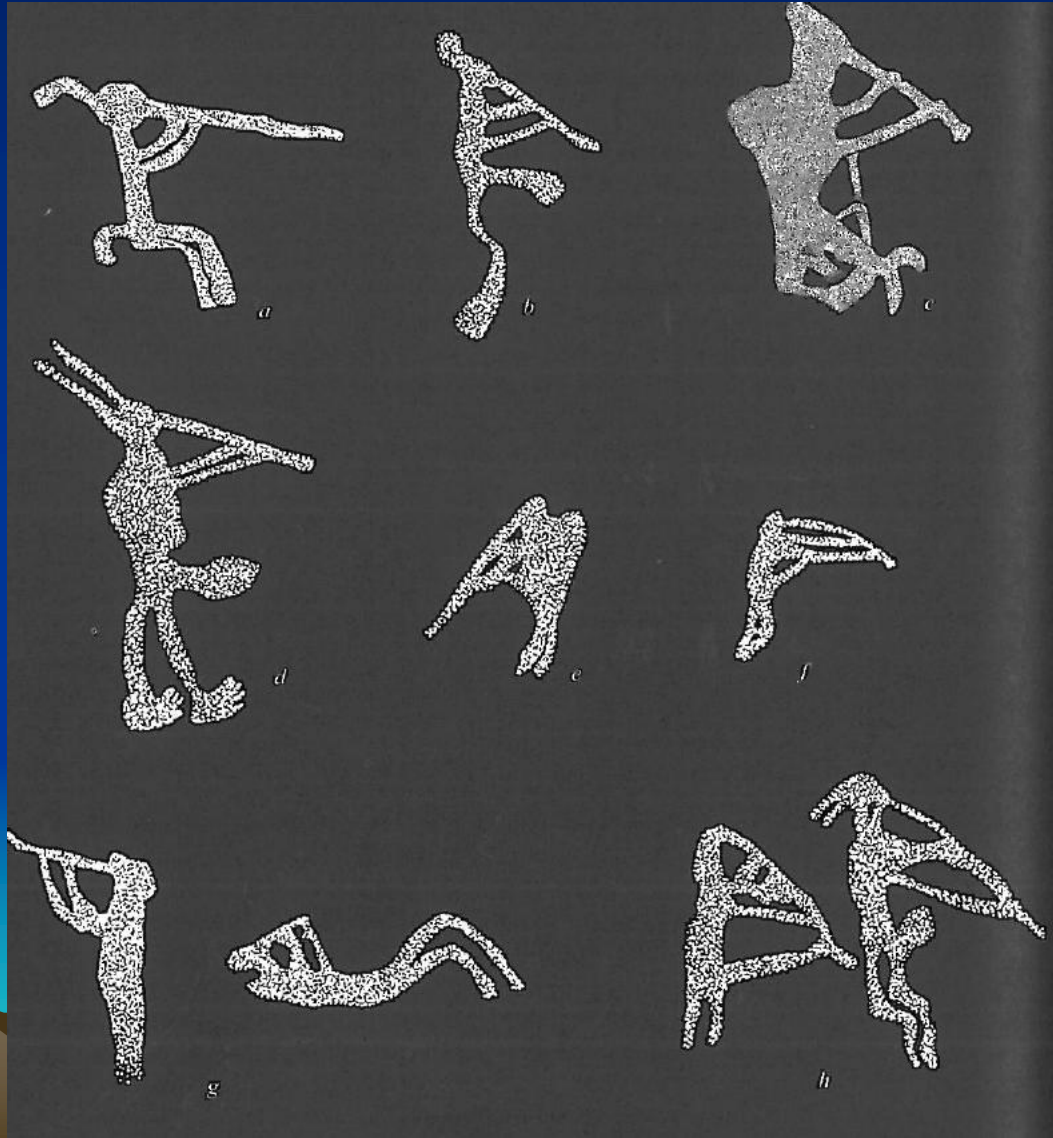
# Flute Players: why so many? Part 7



Malotki

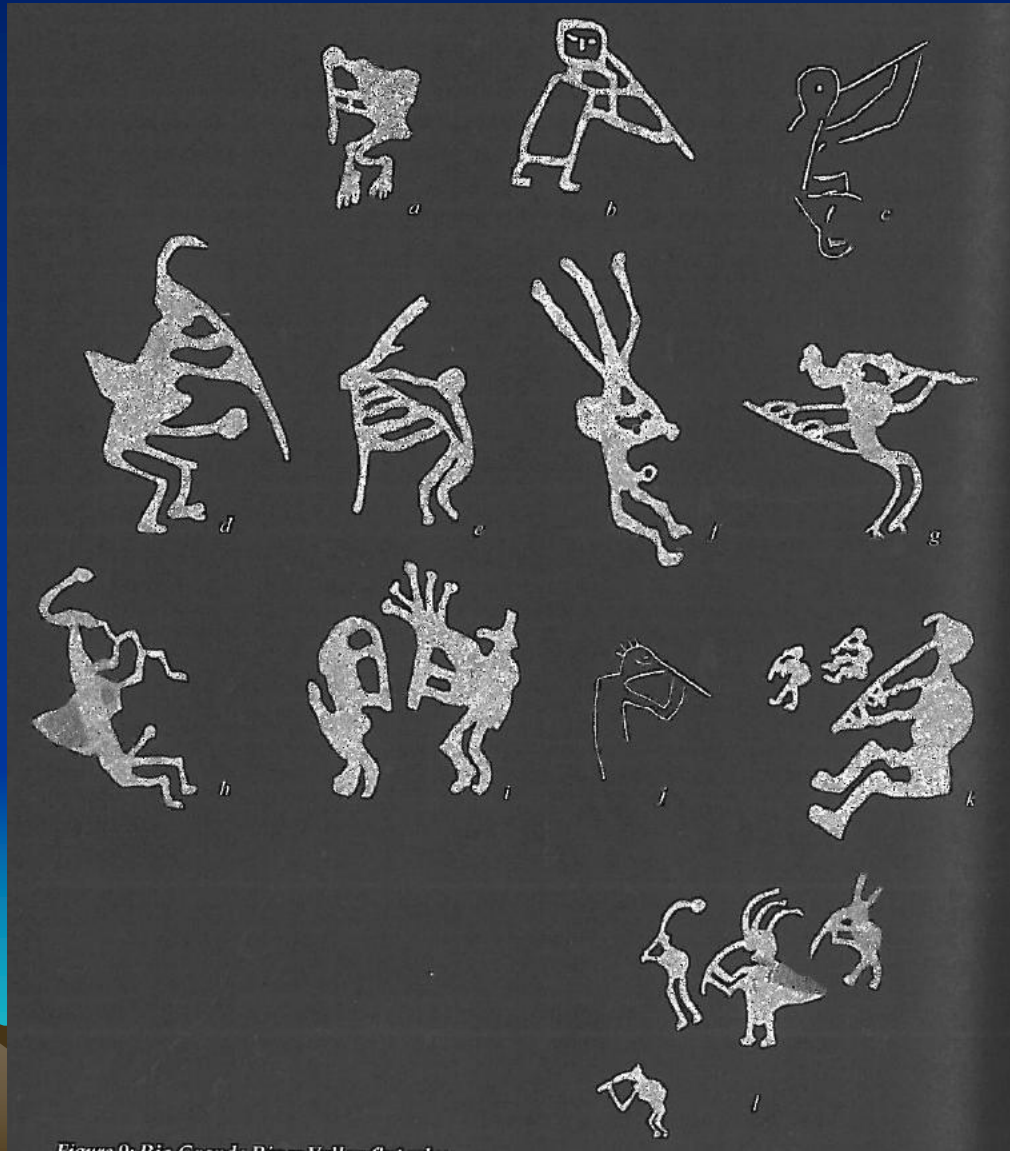


# Flute Players: why so many? Part 8



Malotki

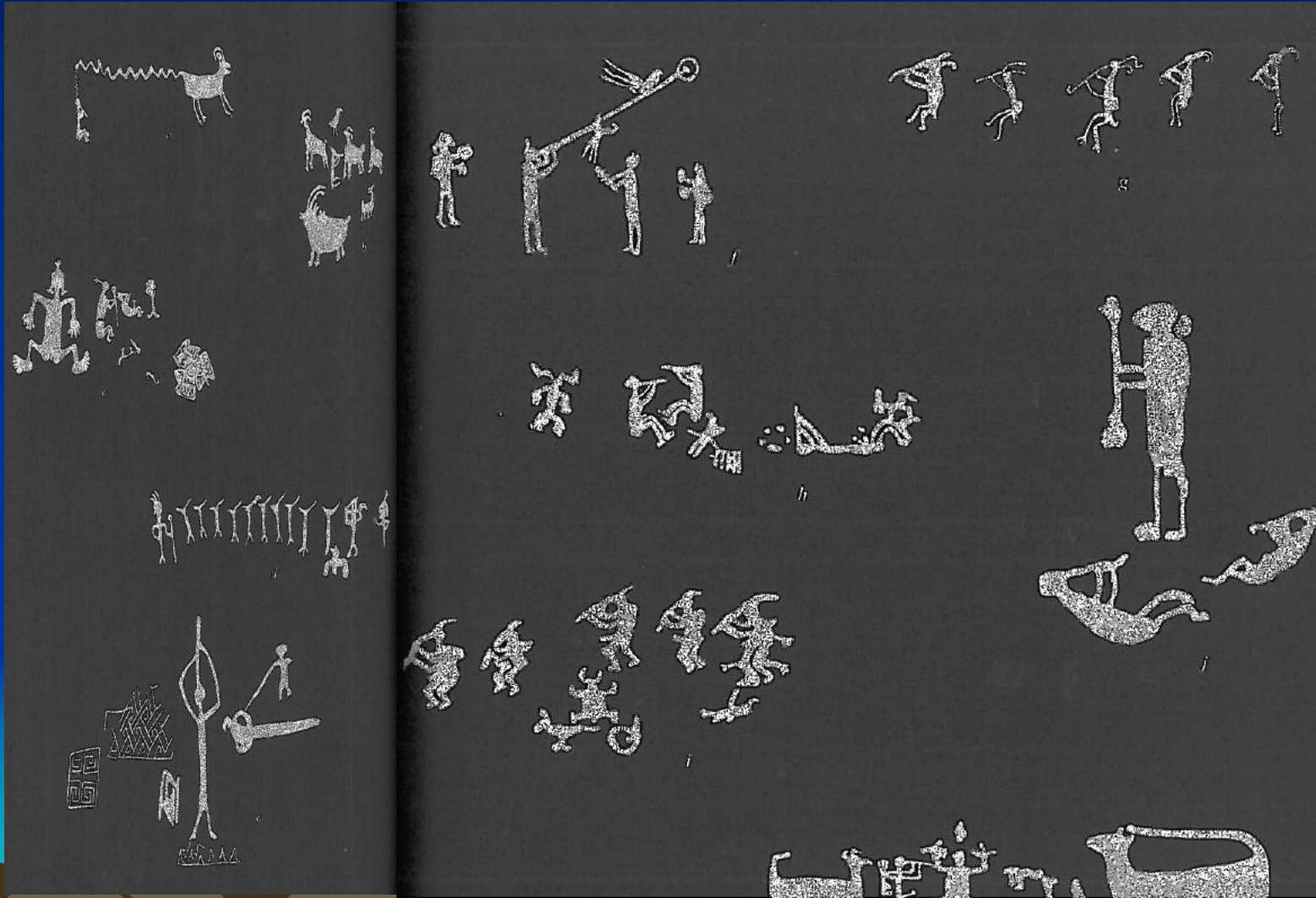
# Flute Players: why so many? Part 9



Malotki



# Flute Players: why so many? Part 10







# Flute Player (Dinosaur National Monument, UT/CO)





# Flute Player (Petroglyph National Monument, NM)





# Flute Player (Khota Circus, NV)





# Flute Player (Kane Creek, UT)



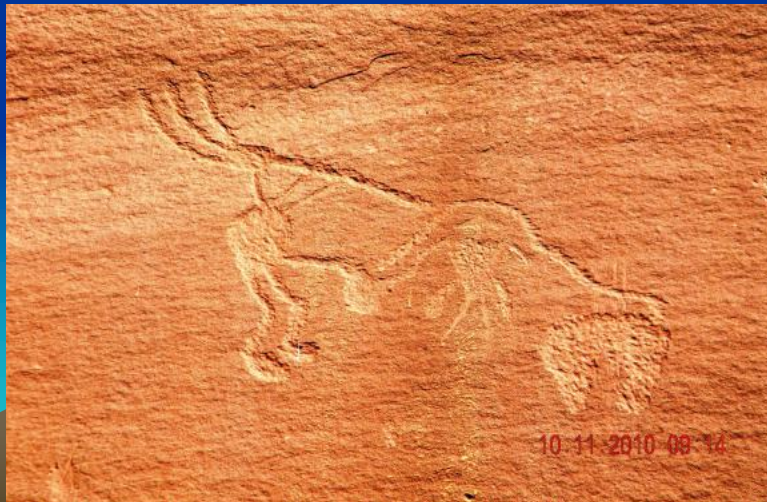
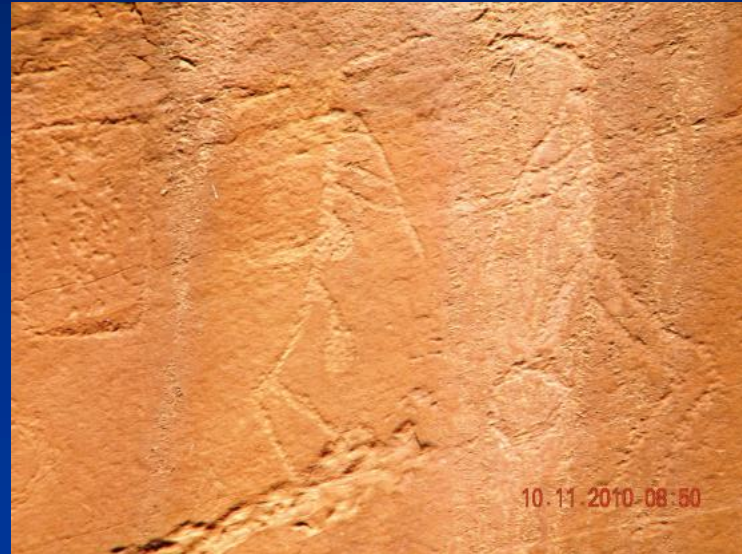
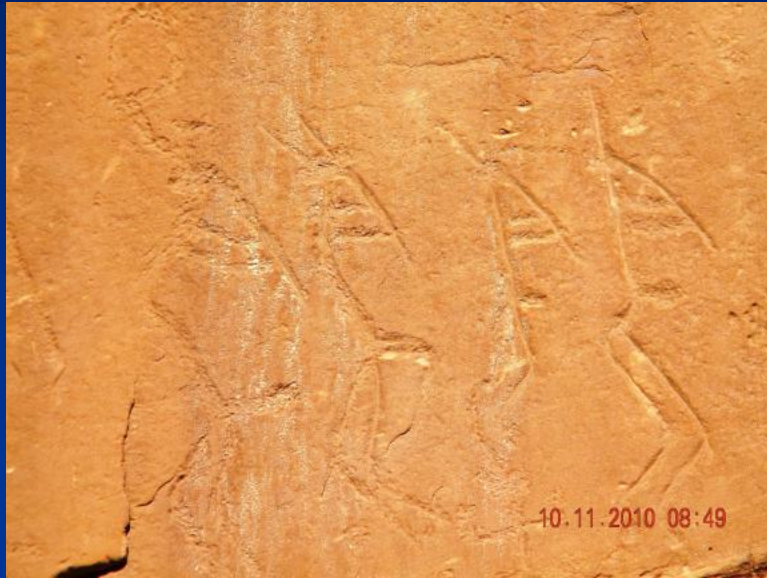


# Flute Players (Sand Island, UT)





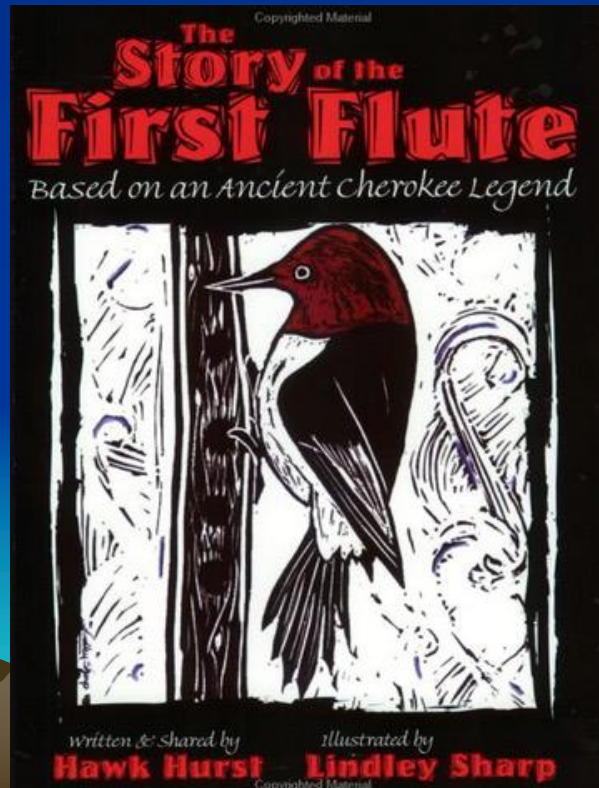
# Flute Players (Sand Island, UT)





# First Flute myths

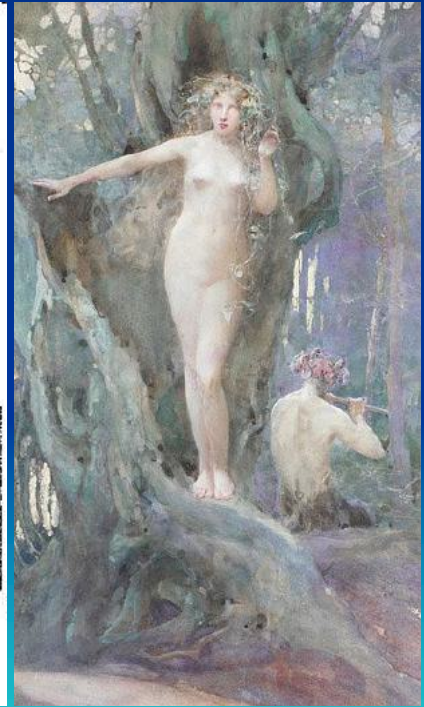
Zuni: The Four Flutes were a Gift of **Paiyatuma**, God of Dew, from the Cave of the Rainbow



Cherokee: The Flute was a Gift of **Grandfather Cedar** and **Woodpecker**

# First Flute myth

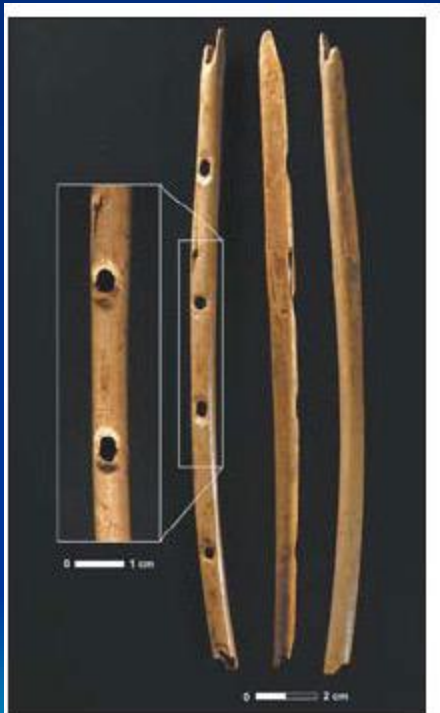
Syrinx was pursued by the amorous god Pan, and to avoid his embrace was transformed into a reed, from which the god crafted his famous pan-pipes... imitating Echo returned the sounds of his pipes.





# 35,000-year-old Flutes in caves

“The acoustics in Hohle Fels are fabulous. The perfect place to play music” -Nicolas Conard



New evidence for Paleolithic music in the form of the remains of one nearly complete bone flute was discovered in an archeological dig in Germany. AFP



# Cupules / Rock Gongs





# Auditory Illusions in the Soundscapes of Rock Art and Stonehenge

- Echoes = spirits in rock
- Reverberation = Thunder gods
- Interference = megalithic stone circles

