

Sound-reflecting shelters inspired ancient rock artists

By **jihedovsky** - June 27, 2017

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Ancient rock artists have been drawn to echo chambers. Members of early farming communities in Europe painted pictures in rock-shelters the place sounds bounced off partitions and into the encircling countryside, researchers say.

Rock-shelters [lacking such sound effects were passed up](#), at the very least within the central Mediterranean, report archaeologist Margarita Díaz-Andreu of the University of Barcelona and colleagues within the July *Journal of Archaeological Science*. In landscapes with many potential rock artwork websites, "the few shelters chosen to be painted were those that have special acoustic properties," Díaz-Andreu says.

Some hunter-gatherer and farming teams studied over the previous couple centuries believed in spirits that dwell in rock and reveal their presence through echoes. But acoustic proof of particular echoing properties at rock artwork websites is uncommon.

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Díaz-Andreu's group studied two rock artwork websites in 2015 and 2016. Baume Brune is a kilometer-long cliff in southeastern France. Of 43 naturally shaped cavities within the cliff, solely eight comprise work, which embody treelike figures and horned animals. Rock artwork within the Valle d'Ividoro, on Italy's east coast, seems in an 800-meter-long part of a gorge. Only three of its 11 pure shelters comprise painted pictures. Researchers usually date these French and Italian work to between roughly 6,500 and 5,000 years in the past, a number of thousand years after the Stone Age had ended, Díaz-Andreu says.

To examine the acoustics of the embellished and unadorned shelters, the researchers developed a brand new method for figuring out the path, depth and timing of sound waves arriving at a specific level from each path. A particular microphone linked to a digital recorder measured the acoustic properties of any echoes set off by balloons popped simply exterior every rock-shelter. This setup was moved to numerous spots exterior the caves to file the acoustic attain of mirrored popping sounds. Echo measurements in France have been taken at distances starting from 22 to 36 meters from cliff shelters. Due to rougher terrain in Italy, measurements there have been taken at distances starting from 77 to 300 meters.

Story continues after picture

BRANCHING OUT A cliff cavity in southeastern France that incorporates ancient rock artwork, together with this treelike picture, additionally possesses good acoustics for producing echoes. Sound performed an important function in figuring out the place early farmers selected to create rock artwork, scientists suspect. ~~ M. Díaz-Andreu"/>

Then, the acoustic information have been reworked into Three-D, slow-motion depictions of echoes, represented by shifting circles, indicating the place sound reflections originated. At each websites, shelters with rock work displayed higher echoing properties than undecorated shelters, Díaz-Andreu says. And in every location, the shelter that finest mirrored echoes had the very best variety of work.

"This novel technique shows a clear correlation between audible echoes and decorated shelters," says music archaeologist Riitta Rainio of the University of Helsinki in Finland, who didn't take part within the new examine.

Echoes that bounce off steep rock cliffs bordering three lakes in northern Finland additionally attracted ancient artists, Rainio says. She and her colleagues took acoustic measurements at Finland's painted cliffs from 2013 to 2016. Microphones positioned on boats positioned at completely different spots on close by lakes measured sound waves generated, in most trials, by a starter's pistol. These Finnish work date to between round 7,200 and three,000 years in the past, Rainio says.

In some instances, echoes replicate immediately from cliff work. "That, and possible drumming figures painted on the cliffs, suggest that sound played some role in rituals at these sites," Rainio says. Her group will report its findings in an upcoming *Journal of Archaeological Method and Theory*.

Creators of older Stone Age cave artwork additionally seem to have targeted on websites the place echoes abounded, says archaeologist Paul Pettitt of Durham University in England. For occasion, many roughly 14,000- to 12,000-year-old animal drawings and engravings at France's Niaux Cave cluster in a cathedral-like chamber the place sounds echo loudly.

"The new study provides convincing evidence that echoes, which were scientifically inexplicable to prehistoric people, played a determining role in how art was created," Pettitt says.

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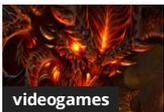
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