

- [Home](#)
- [About DDIG](#)
- [Contact](#)

[Digging Digitally](#)

Archaeology, data sharing, digitally enabled research and education

Thu 2 Sep 2010

[Chavín de Huántar Archaeological Acoustics Project](#)

Posted by Francis Deblauwe under [archaeology](#)

[No Comments](#)

While dabbling in digital music software and technologies, I came across this interesting [set of posts](#) in *The Halls of Valhalla* blog. It turns out that the author, an audio software engineer, was originally trained as an archaeologist... “The study of ancient acoustics, or archaeoacoustics, covers a variety of sonic phenomena of the prehistoric world, from research into early musical instruments such as bone flutes and percussion instruments, to the possibility of whether grooves in pottery could have recorded sounds from thousands of years ago. ... Iegor Reznikoff has studied the location of Paleolithic art in European caves, and has found a strong correlation between the presence of art or distinctive markings in a given location, and the quality of the resonance in those locations.”

At the major temple complex (900-600 BC) of the Peruvian archaeological site of Chavín de Huántar, John Rick (Stanford University) has “put forth a provocative theory: that the structures at Chavín were used in rituals where the dominant ‘priests’ (or whatever class was in power) relied on sensory manipulation, in combination with hallucinogenic drugs, to reinforce the perception that they had supernatural authority. ... The stone passages known as galleries have very unique sonic characteristics, where sounds are difficult to localize. Within these galleries, Rick recently excavated a number of decorated trumpets, carved from the *Strombus* conch:”

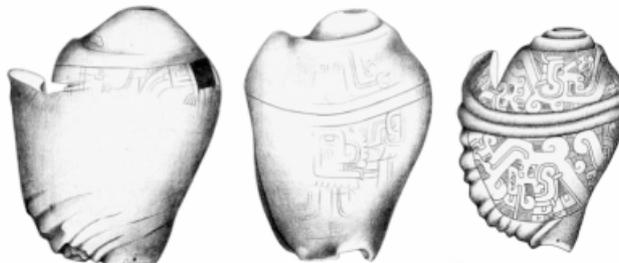


Figure 5.10. Three of 20 *Strombus* shell trumpets excavated in 2001 from the Caracol Gallery, showing wear that has effaced engravings on the two examples on the left (drawings by Helene Bernier).

“The ritual would have begun, most likely, by ingesting a hallucinogenic powder or a liquid extracted from the San Pedro cactus. As the Chavín subjects walked through the dark, cramped halls, the sound of *Strombus* trumpets echoed around them from some unseen source. Water roared through canals beneath their feet (or, strangely, overhead), producing a heavy percussion amplified by the drugs. Mirrors placed in ventilation ducts to reflect the sun poured brilliant shafts of light into the subterranean hallways, only to be ‘turned off,’ thrusting the occupant into blackness as dark as obsidian. By the time the subjects emerged from the chambers, staggering and stunned, their perspective had been altered forever. The unmistakable impression: somebody powerful was in charge.”

So where does this all link up with the digital world? Well, Stanford U’s *Center for Computer Research in Music and Acoustics* performed research at the archaeological site. They developed specialized equipment such as a “Configurable Microphone Array with Acoustically Transparent Omnidirectional Elements”:



“The reverb time increases as a function of the number of turns between the source and the receiver, with sources several gallery turns away from the receiver having a longer perceived reverb time. The reverberation in the Chavín galleries is characterized by dense and energetic early reflections, and low inter-aural cross-correlation. All 3 of the galleries have a quick onset, where the reverberation reaches Gaussian statistics within 20 milliseconds of the initial impulse. The quick build to Gaussian (i.e. random) statistics, and the low amount of cross-correlation between the left and right ears, is responsible for the strange sonic characteristics of the galleries, where it is difficult to localize where a signal is coming from in the absence of a direct signal.” You can read more about their findings at the [Chavín de Huántar Archaeological Acoustics Project](#) website. Finally, here’s a nice example of how the conch trumpets mentioned sound inside one of the galleries at the site:



[Tito la Rosa performing in Chavín de Huántar, Peru 2008.](#) from [otoplasma](#) on [Vimeo](#).

Leave a Reply

Name (required)

Mail (will not be published) (required)

Website

Submit Comment

Archived Entry

- **Post Date :**
- Thursday, Sep 2nd, 2010 at 5:41 pm
- **Category :**
- [archaeology](#)
- **Do More :**
- You can [leave a response](#), or [trackback](#) from your own site.

Design adapted from www.vanillamist.com