

# Noise

A Human History of Sound and Listening

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I

# Prehistoric Voiceprints

# Echoes in the Dark

If you have ever been into one of those preserved caves that our prehistoric ancestors visited, you will know that two things usually happen at once. You are pretty quickly smothered in complete darkness, and you suddenly leave behind the sound of the outside world. A blissful respite from the noise and bustle of modern life, you might think. In fact, it's far from silent and peaceful. As a listening experience, it can even be quite unnerving.

During the Middle and Upper Palaeolithic, some 40,000 to 20,000 years ago, small groups of men, women and children – Neanderthals at first, then our most direct ancestors – would have gathered near the entrances of caves across Western and central Europe for shelter, and perhaps gone deep inside for rituals. These enclosed spaces have their own acoustic character:

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echoing voices, of course, but also intensifying them. If you visit them today, you will notice that every sound you make as you walk through them lingers longer, reverberating, and coming back to you from unpredictable directions, thanks to the irregular shape of the walls.<sup>1</sup> In certain places there is a cacophony of echoes – each one lasting long enough to merge with the next to create an almost continuous wall of sound, rich, complex and, to the untrained ear, pretty disorientating. When we whisper, hum, speak or sing, they shout and sing back to us. These caves are alive.

Perhaps it's not all that surprising that caves resonate. But several archaeologists have tried an experiment that reveals something rather more remarkable. Moving slowly, and in total darkness, along the narrower passages of caves such as Arcy-sur-Cure in Burgundy, and Le Portel near the Pyrenees, they have used their voices as a kind of sonar, sending out a pulse of sound then listening out for any unusually resonant response. Most of us can do this, by the way: almost without noticing it, we tend to use subtle cues such as variations in loudness and variations in the time of arrival at our ears of different echoes to very swiftly 'localise' sound – to navigate, in fact, a bit like bats in the night sky.<sup>2</sup> The point, in any case, is that when these archaeologists felt the sound around them suddenly changing, they would turn on their torches. And at that precise point they would often see on the wall or ceiling a painting. This might be something as simple as a small dot of red ochre. Or it could be more complex – a pattern of lines, a negative handprint, an animal.<sup>3</sup> What is significant is that wherever a cave *sounds* most interesting, you are also likely to find the greatest concentration of prehistoric art.

The first person to map in detail this stunning coincidence of resonance and art was the musicologist Iégor Reznikoff. After walking carefully through the caverns and tunnels of Arcy-sur-Cure for himself in the mid-1980s, and making a

detailed map of what he heard and saw, he reckoned that about 80 per cent of the images are in spots where the acoustics are particularly unusual.<sup>4</sup> For example, near the bottom of a cave called the Grand Grotte, where each sound might provoke up to seven echoes, there are paintings of several mammoths, some bears, a rhinoceros or two, a salmon, some sort of cat and an ibex. And in a mezzanine area near the so-called Salle des Vagues (the ‘Hall of Waves’), just where the resonance is really striking, there’s a ceiling densely packed with animals of all kinds, and, on the floor, the delicate outline of a bird. At other caves there’s the same pattern: at the cave of Niaux in the Pyrenees, for instance, almost all the animal paintings are in the Salon Noir, which Reznikoff describes as sounding like a richly resonant Romanesque chapel;<sup>5</sup> and at Le Portel, a whole series of red dots runs along a ten-metre tunnel, each one, again, precisely where, as Reznikoff puts it, a ‘living sound point lies’.<sup>6</sup>

Why didn’t the artists who made these prehistoric paintings work nearer the cave entrance, where there’s much more space and light? We don’t know for sure: it’s impossible to guess their thoughts. But clearly *something* drew them to the darkest, deepest and most inaccessible parts of each underground complex. Even prehistoric art that has been found outside caves is sometimes located in inconvenient places: high on canyon walls and cliff faces. Again, it’s crowded on to some surfaces while other rocks nearby are left strangely blank. And again, it’s sound that seems to provide the link.

Go rock-art hunting in Horseshoe Canyon, Utah, or in Hieroglyph Canyon, Arizona, for instance, and you’ll find that those places with the greatest concentration of pictures – human figures, mountain sheep or deer – are exactly the same places where echoes are strongest or where sounds carry furthest.<sup>7</sup> The connection between the sound quality of a particular spot and the art that is nearby just keeps cropping up.

So much so that it's a good guess that our prehistoric artists didn't select by accident those surfaces – whether deep inside a cave or high up on a cliff – that created the most interesting acoustics. They seem to have chosen them deliberately – as if they couldn't shake these echoes out of their minds.

What, then, was going on? Why did the sound of an amplified echo apparently fascinate prehistoric peoples so much? One clue has emerged at the Music School in Cambridge, where an intriguing experiment was conducted in 2000. The musicologist Ian Cross, the anthropologist Ezra Zubrow and the archaeologist Frank Cowan came together in an open-air courtyard to practise the prehistoric craft of flint-knapping. Bone pipes or flutes excavated from various sites in Europe had already shown that humans were making music from about 36,000 years ago. But what about before then? The three investigators wondered if even older, stone objects might also have been used to make music.<sup>8</sup> They tried holding the flints and striking them in different ways, and they soon discovered an array of sounds could indeed be made.

It was impossible to prove that these sounds were actually exploited by prehistoric peoples for anything we might recognise as 'music'. But in the middle of all the testing something unexpected happened. A stone blade being held between two fingers was tapped, and the three men in the courtyard suddenly heard a high-pitched flutter – what sounded very like a bird nearby flying away from them. Though they were out of doors and in the full afternoon sun, Ian Cross recalled the effect as being 'quite unearthly ... it seemed that the tapping had suddenly awoken some real yet invisible entity' – like an avian spirit.<sup>9</sup> He knew there was a perfectly good scientific explanation to hand: the shape of the courtyard, the mix of building materials, the sound produced, the men's position – all this had set up a pattern of sound waves, which created a moving, fluttering echo with a life of its own. For the rest of

the afternoon they tapped the stone blade again and again, and discovered that, given the right mix of circumstances, they could keep evoking the sound of a bird flying across the courtyard. They knew there was hard science behind the phenomenon. But they claimed this ‘did nothing to dispel the “magical” qualities’ of the fluttering sound they’d created.<sup>10</sup>

What is most interesting about the Cambridge experiment isn’t just the creation of a special effect. It’s the idea of an invisible animal spirit having been unleashed through sound. In fact, at many prehistoric sites, echoes conjure up something similar: when a clap in a cave bounces back in a series of overlapping echoes, it’s not so much the cave that comes alive, but the animals painted or engraved on the walls nearby. They gallop and stampede about, as if the sound of hooves really were coming from within the walls themselves. The sound isn’t just sharing its space with the image; it’s *mimicking* it. Or perhaps the image is mimicking the sound. At other times, a noise made in one place appears to be answered from somewhere else entirely. Occasionally, a sound might seem to come from behind a rock rather than from its surface, as if its point of origin were deep within or the surface itself were a chimaera. All these effects are uncanny. Prehistoric people would have had no understanding of the science of sound waves and reverberation. For them any echo would surely have seemed like a new sound, coming from some invisible being or spirit – something, perhaps, from within the rock, speaking back, making its own presence felt.<sup>11</sup> In other words, it would have seemed supernatural.

And sure enough, if we look at different cultures around the world, time and time again we find myths involving supernatural echoes – myths with their roots almost certainly deep in prehistory. Among the Native American Paiute people, for example, there are stories of witches living among the rocks, taking great delight in repeating the words of passers-by.