Traces of Sound

Reflections of Sounds Unheard

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Cajsa S. Lund

An inaudible prologue

The year is 2007. A unique music-archaeological band, Heimdalls Borduner, was invited to perform in Malmö at Sweden's major international festival of contemporary music, Sound Around.[1] Heimdalls Borduner combine art and knowledge, improvising timeless sound events with prehistoric sound tools, but also with raw materials such as branches, sticks, logs, stones, bones, nutshells, and animal skins. The message is provocative: that we really do not know anything about the music created in prehistory. The inspiration comes from composers such as Edgar Varèse (1883–1965), Luigi Russolo (1885–1947), John Cage (1912–1992) and R. Murray Schafer (1933–2021).

The performance in Malmö ended with a solo on a fox fur, the performer slowly pulling his hand along the fur several times. It was inaudible. It was quiet in the hall when the performer stopped playing the fox fur. There was no applause. Then suddenly a composer present in the hall stood up and whispered to the audience, 'Silent music. Inaudible. You hear what you want to hear.'

1 The person in charge of the festival was Peter Wilgotsson, today the CEO of the Swedish regional music foundation Östgötamusiken.

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The sounds of Nordic prehistory

As a music archaeologist, I am interested in societies with little or no written language, meaning prehistory. Nordic prehistory comprises about 13,000 years or some 390 generations. This is a short prehistory in a pan-European perspective and a drop in the ocean in a global perspective, which is measured in millions of years and billions of people, or at least human-like creatures. Nordic prehistory is customarily divided according to the three-period system: the Stone Age (12,000–1700 BC), the Bronze Age (1700–500 BC), and the Iron Age (500 BC–AD 1100). The final phase of Nordic prehistory, from AD 750–1100, is called the Viking Age. The boundary between prehistoric times and the Middle Ages is naturally flexible. Archaeological practice places it today at AD 1100 for southern Scandinavia, but it occurs later the further north we are. The continental Middle Ages, meanwhile, are usually considered to begin with the fall of the Western Roman Empire in AD 476.

There are several constituent fields of music-archaeological research in the Nordic countries (Fig. 1). How did prehistoric humans relate to the sounds made by other living organisms, that is, the rest of the animal kingdom and vegetation? How did they listen? Listening habits of course depend on the availability of sounds in the environment, but the meanings we attribute to them determine how we hear. It was important in prehistoric times—sometimes perhaps a matter of life or death—to recognize different animal sounds, to hear where the hunting pray was and from where predators threatened. Equally important were the sounds of the weather such as wind, rain, and thunder.[2]

What sounds did people themselves create, intentionally and unintentionally (Fig. 1)? In the latter category were the sounds of human activities, such as the rasp of scraping tools against animal hides, flint

2 Compare soundscape ecology, the study of the relationships between the sources of sound comprising a soundscape. As coined by Bernie Krause 2002, sounds generated by non-human living organisms are referred to as the biophony; those from non-biological natural categories are the geophony; and those produced by humans are the anthropophony. See also Kolltveit 2014, 73–84.

FIGURE 1. Music–archaeological research in the Nordic countries. Model by Cajsa S. Lund

knapping, shooting arrows, axe blows, a blacksmith working iron, or scythes cutting grass and corn. I think it safe to assume that, like us, unintentional sounds were mostly part of a background of natural, ordinary sounds for our prehistoric ancestors. However, some unintentional sounds may at times have been deliberately used, reinforced, and structured. Thus, the thump of stone axes, hoes, and horn hammers may have been synchronized in regular patterns that regulated a working rhythm and kept the work going. Work sounds of this kind were probably also further enhanced with rhythmic shouts and songs to help with heavy, time-consuming work such as rowing or prying loose heavy boulders. Take a custom known from late peasant society in southern Sweden, Denmark, and Ireland: horse skulls were buried in barns under the threshing floors for acoustic reasons, to amplify the

sound so the threshers could coordinate what was usually collective threshing work (Egardt 1950, 149–60) in something reminiscent of sound pots in medieval churches (for example, Valière et al. 2013, 70–81; Brycki 2018).

The key question in the field addresses an all-embracing issue (Fig. 1): how to arrive at an understanding of the nature of the soundscapes and their changes, uses, and functions in prehistoric societies? It may seem almost utopian to try to answer questions of this sort. But music archaeology has a responsibility to see to it that such questions are posed and must also be responsible for tackling them. The central concept, soundscape, was coined in 1977 by the composer and academic R. Murray Schafer. Soundscapes, according to Schafer, refer to the entire acoustic environment, including natural sounds such as animals or wind and rain, as well as humans. His concept includes not only environments, however, but also perception: how people hear, perceive, process, and interpret sounds.

If we are to achieve any useful research results about intentional soundscapes and our human ancestors' music, whether Early Stone Age hunters, fishermen, and gatherers or the inhabitants of the Viking Age villages, we must go beyond the musical concepts and terms of our own time and culture. I, for example, prefer to use the term sound tool or sound instrument for the objects people used in prehistoric times to produce sound. True, there are no clear dividing lines between sound production and music, or indeed sound tool and musical instrument; however, there is always a place for pragmatism, so there will be times I call a lyre a musical instrument and not a sound tool, if only to be able to communicate with other archaeologists and the general public.

Potsherds, plow furrows, flint axes, and other traces of prehistoric work processes are all silent traces of lost soundscapes (Fig. 1). The main sources for Nordic music archaeology, though, are intact or fragmentary finds of musical instruments and other sound tools or their images—the material traces of presumed sounds. A specific and enigmatic type of instrument that has been found in large numbers in southern Scandinavia since the first find in 1797 is the bronze lur (Fig. 2).

FIGURE 2 Bronze lurs found in the Brudevaelte Mose bog in Denmark. Late Bronze Age (700 BC), length c.220 cm. Photo National Museum, Copenhagen.

First steps in music archaeology

The first music archaeology was done in Sweden in the 1970s and worked on the hypothesis that the archaeological collections and magazines held traces of prehistoric sounds in the form of sound tools that had been overlooked, uninterpreted, or misinterpreted. The belief was that traces of sound lay hidden in objects used for various socially beneficial sound productions, for example, signalling, decoy hunting, in rites, magic, and children's games (Lund 2019, 6). The primary method was to track the use and function of traditional sound tools in the Nordic countries as far back as possible.

This ethno-music-archaeological approach promised new interpretations of archaeological finds. On the initiative of what is now the Swedish Museum of Performing Arts in Stockholm, inventories of archaeological collections across Sweden were carried out, funded by Riksbankens Jubileumsfond between 1975 and 1980 and sporadically thereafter. They were supplemented by surveys of collections in other Nordic countries (see Reimers 1977, 67–8; Lund 2010, 186–7). Music archaeology in Sweden, which like the rest of Europe was then in its infancy, thus had the unique opportunity, albeit with a time limit, to

FIGURE 3 Green instruments. Photo Annemies Tamboer.

systematically collect data from archaeological collections. Music archaeologists were—and are—digging into already excavated material to register all kinds of potential sound tools. To date, roughly 1,000 confirmed or possible sound tools from Nordic prehistory have been documented. Compared to the amount of other types of archaeological finds, the surviving sound tools are few in number. Qualitatively, however, Nordic music archaeology has access to an outstanding source material, namely two homogeneous groups of specific sound instruments: 250 *rangler* (Norwegian Viking Age iron rattles) (Lund 2019, 91–128) and 60 bronze lurs (South Scandinavian Bronze-Age S-shaped horns) (Lund 1986) (see Fig. 2).

Many sound tools remain hidden in the ground, of course. From time to time there are reports from field archaeologists that a sound instrument has been found. Future excavations will doubtless result in even more finds. Due to the composition of the soil, some bone and wooden sound instruments will have been destroyed over time, but

FIGURE 4 Hollow tube with beveled ends made from a bird bone, found in a cave on the island of Gotland, Sweden. How it was used is unknown, but it can easily be blown as a whistle (Lund 1984/1991, track 9). Late Stone Age (2500 BC), length 8 cm. Photo S. Hallgren.

above all it is likely that most prehistoric sound tools were lost at the time they were manufactured and used, namely those made of plant parts and other perishable materials such as flutes and pipes of sallow, reed, or bark, or blowing on dandelion stalks, leaves, and straws of grass and other types of spontaneous instruments made for the day—what I call green music (Fig. 3) or the sounding herbarium (Lund 2018, 47–9).

On the other hand, maybe our prehistoric ancestors did not use many specially designed sound instruments. Instead, several objects may have had double functions. The metal shield was struck for the sake of sound, a hunting bow could be used as a stringed instrument, and a bone tube (Fig. 4) may primarily have been, for example, a bead, an amulet, a shaft or a needle case, but was perhaps sometimes also used as a whistle. It should not be forgotten, however, that tool-based sound production and music-like activities may have mattered little to prehistoric Nordic people: their voices may have been the dominant means by which they created their non-lingual or language-enhancing sound worlds.

Prehistoric voices are forever lost to us. Although perhaps not, given that researchers have recently succeeded in recreating how a mummified priest in Egypt, Nesyamun, who died 3000 years ago, may have sounded (Fig. 5). His throat and vocal organs were fairly intact, and measured with a CT scan were used to construct a 3D-printed version of the mummy's vocal organs (Fig. 6), which was connected to an artificial larynx and a special loudspeaker. The resultant six-second sound

FIGURE 5 The mummified Egyptian priest Nesyamun. 1000 BC.
FIGURE 6 The parts of the throat of the mummy were measured with computed tomography and then a 3D-printed version of the mummy's vocal organs was created. https://www.bbc.com/news/world-middle-east-51223828. Accessed August 20, 2021.

is said to imitate a vowel as uttered by the priest three millennia ago (BBC 2020). However, the synthetic sound is far from a natural voice, and the researchers admit the accuracy is not perfect because the mummy's tongue has lost much of its volume.

There is also a fascinating hypothesis presented by Paul Åström (1929–2008), a classicist and professor of archaeology at the University of Gothenburg, known for his achievements in the prehistoric archaeology of Cyprus. He suggested that sounds from ancient pottery workshops could have been stored in the clay when turning pots, and that these sounds could be played back in a modern laboratory. This has not proved successful thus far, though in collaboration with an acoustics expert he did complete a scoping study (Kleiner & Åström 1993).

Probability groupings

I would categorize music-archaeological finds in the Nordic countries into five groups according to the probability they were used for sound production, whether primarily or secondarily—the probability groupings. Group 1 includes objects which were clearly sound tools, such as cow horns with finger holes, bells, and lyres. Others are possible sound tools, on a diminishing scale, so that Group 5 has objects with the smallest probability of being sound tools. The majority of the objects fall into Groups 2–5 (Lund 1981a, 247). At the same time, there is a problem with this approach: how best to substantiate, or at any rate corroborate, the assumption that a particular archaeological artefact, or a whole group of similar artefacts with unknown or unclear functions, was used for sound production, either primarily or secondarily? When verifying or rectifying the preliminary assignment of an object to one of the five groups—or wholly excluding it—I have drawn on a combination of theoretical and practical investigative methods, using all the archaeological data, analogy analyses, laboratory examinations, and practical experiments. The experiments include making substitutes or reproductions of the objects in question in order to test their possible methods of playing, tonal qualities, sounding ranges, and possible social uses.

From sound tool to multitool

The worked humerus of a swan was found in 1913 among the remnants of a fishing net near the town of Antrea in what was then Finnish Karelia (Fig. 7). Dated to 8500 BC, the hunter–gatherer Stone Age, it is an example of an object in Group 5, which after the results of an extensive, international research project was excluded as a possible sound tool following a detailed laboratory analysis (Fig. 8–9). One of the subprojects was to make substitutes or reproduction models of the swan bone as a possible instrument, in this case a tongue-and-lip duct flute—a recorder, but with the tongue or lip used as a block instead of an artificially made block (Fig. 10–11)—which was a relatively unknown type of flute, found mainly in Arctic areas (Lund 1981b, 106–109). The swan bone was also reconstructed as a reed instrument (the clarinet family) with a reed of birch bark (Fig. 12).

Various experiments with the models showed the wind instrument hypothesis could be abandoned, it being neither a flute nor a reed instrument, and the swan bone was probably not a sound instrument at all. It was more probably a multipurpose tool, perhaps used by people going fishing. According to extensive experiments, it may have been

FIGURE 7 The Antrea find, a worked swan bone. Stone Age (8500 BC). Photo K. Mannermaa.

FIGURE 8 Notes on the laboratory analyses of the swan bone by the osteologist K. Mannermaa. Drawing K. Mannermaa.

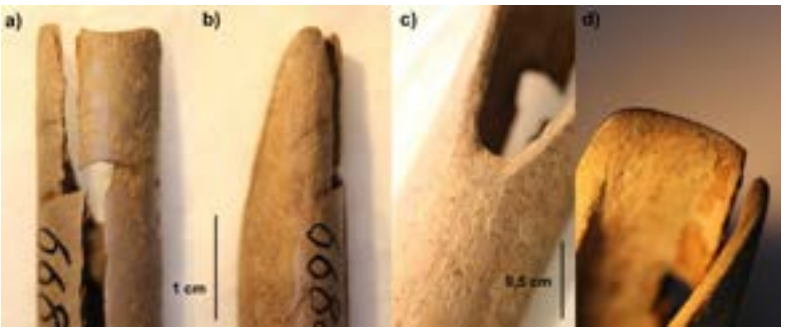

FIGURE 9 Detail of the swan bone. Photo K. Mannermaa.

FIGURE 10 The swan bone reconstructed as a tongue duct flute. Photo A. Lund Lavoipierre.

FIGURE 11 The reconstructed swan bone played as a tongue duct flute. Photo A. Lund Lavoipierre.

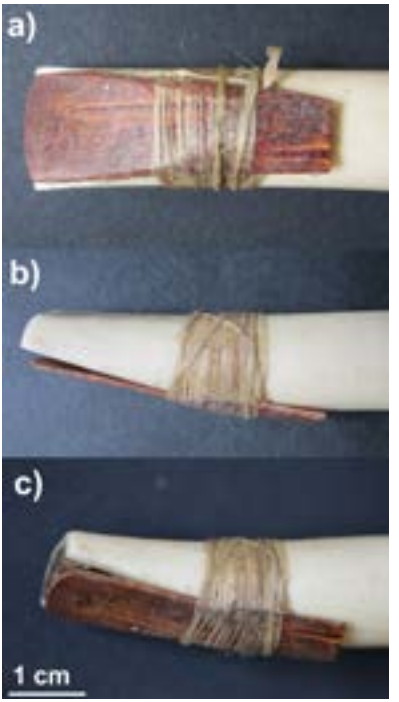

FIGURE 12 The swan bone reconstructed as a reed instrument with a birch bark reed. Photo R. Rainio.

FIGURE 13 The swan bone reconstructed as a multitool for (a) peeling bark, (b) scaling fish, and (c) removing thorns. Photo R. Rainio.

used to peel bark, scale fish, remove thorns from raspberry bushes, or make and repair fishing nets (Fig. 13a–c). The thinning and sharpening of the edge of the original—seen on the models after the scaling and peeling experiments—indicate those kinds of functions (Lund et al. 2015, 6–23).

A 7000-year-old soundscape

Archaeology today is a complex multidisciplinary science, which in addition to its own special research techniques also uses methods and findings from many other sciences, especially the natural sciences. The results of interdisciplinary investigations of the 7000-year-old hunter–gatherer Stone Age settlement of Skateholm on the Swedish south coast illustrate this. In a scientific analysis of charred plant remains and meal residues in the form of animal bones and the like, traces of 89 different animals have been found. House remains, hearths, objects made of flint, stone, bone, and horn and remnants from flint knapping shed light on which tools were manufactured there and the contexts where they were used. A probable fragment of a drumstick has been found, and several possible rattling sound tools in the form of pierced animal teeth. A large number of skeleton graves are an indication of their notions of death (Larsson 1984, 5–38).

In one of the skeleton graves, a woman was buried in a seated position with a baby on her hip, probably in a baby sling (it does not survive, but there are traces of red ochre) to which some 30 pierced animal teeth visible by her hip seem to have been attached (Fig. 14). The baby was perhaps newborn or stillborn—the woman may have died in childbirth. The baby sling, which was probably made of leather and coloured with red ochre, has been reconstructed in an extensive interdisciplinary project (Fig. 15), with one of the project researchers demonstrating how the woman in the grave was placed (Rainio & Tamboer 2018). The many pendants on the sling may have been purely decorative or intended to act as a rattle, whose subtle sound might have calmed the child. At the same time, the rattling sound may have served as a magical defence against evil forces.

FIGURE 14 Skeleton grave of a woman and baby at Skateholm in southern Sweden. Some 30 pierced animal teeth are visible at her hip, thought to have been attached to a baby sling. Stone Age (5000 BC). Photo L. Larsson.

FIGURE 15 Reconstruction of the Skateholm skeleton grave showing the baby sling. Photo R. Rainio.

It is possible to put together a detailed picture of how that coastal Stone Age society in southern Scandinavia about 7000 years ago functioned socio-economically, how everyday life was lived, how death and burials were handled, how flora and fauna were shaped. And this picture gives clues as to how it may have sounded there, because the acoustic dimension, a possible soundscape, is within our hearing, evident in the artefacts and natural surroundings. R. Murray Schafer (1977) has given us the 'keynote sound', a sound that is more or less continual and forms a background that other sounds are heard against, and a tool for analysing and recreating all soundscapes, past and present. The sound of the sea in a coastal community is a prime example.

Pitfalls

There are pitfalls in any attempt to identify traces of sound and recreate an ancient soundscape. They were discussed in detail by me and music archaeologists when in the 1980s I was commissioned by the Musica Sveciae project, under the auspices of the Royal Swedish Academy of Music, to make a gramophone record with music and sounds from Swedish prehistory—a real challenge. I chose to create short probable sound milieus, scientifically based as far as possible, where I placed one or more reproductions of sound instruments. For example, an Iron Age cow bell was hung around the neck of a grazing cow in a pasture with other cows and was duly recorded (Lund 1984/1991, track 28).

A problem I raised with the palaeozoological experts was the breed of cows which we had the opportunity to record were not the same as the skeletal remains found in the same context as the bell. What did prehistoric cows really sound like?

Sound archaeology

The relevance of the term music archaeology, originally launched in Sweden, is nowadays debated. International colleagues (especially Rupert Till at Huddersfield University) advocate sound archaeology as the umbrella term, with music archaeology as one of several sub-dis-

ciplines. Other sub-disciplines include auditory archaeology, acoustic archaeology, archaeomusicology, palaeo-organology, and archaeo-organology (Till 2020, 31–53).[3] 'All music is sound, but not all sound is music,' says Till (40). What then is music? There is no unambiguous answer to that. Music, in the words of the Swedish musicologist Jan Ling (1983, 2), has become an almost unmanageable universal concept for various sound phenomena in time and space. Similarly, the relevance of the term for Nordic music archaeology has rightly been questioned by Sweden's musicologists and archaeologists. One reason is that I and others have been concerned with the why and what of the sounds prehistoric people may have deliberately organized, as well as the actual and potential objects they used to generate such sounds. Further, it was only in the sixteenth century that the word 'music' entered the Swedish language, taken from the Greek *mousiké*; there was no uniform concept nor delimiting term for 'music' in the oldest Nordic texts such as Snorri's Edda or the Icelandic Sagas (Nilsson 1994, 39). Music archaeology is still regarded by most researchers, and not least by the general public—both children and adults—as an exciting and appealing term, which also clearly states what the subject is.

An inaudible epilogue

Finally, some reflections from an ethno-music-archaeological perspective that pick up where the 'Inaudible prologue' left off. First, a rattle made of clay, found in a children's grave in Denmark and dated to the Early Iron Age, AD 200–400 (Fig. 16). As a confirmed sound tool it belongs in Group 1. There are several finds of prehistoric clay rattles in Europe, and in other continents, too (Eriksson 1960, 80–3; Sachs 1975,

3 Auditory archaeology seeks to identify and reconstruct the significance of hearing and mundane sounds (Mills 2001; 2005). Acoustic archaeology is the study of the acoustic properties of caves, chambers, churches, and other manmade or natural structures (Lawson et al. 1998; Devereux 2002; Scarre & Lawson 2006). Archaeomusicology is synonymous with music archaeology (see, for example, Lund 1981a). Palaeo-organology or archaeo-organology is the science of prehistoric musical instruments, organology being the science of musical instruments and their classification. See also Kolltveit 2014.

FIGURE 16 Clay rattle found in a child's grave in the Vendsyssel region, Denmark. Early Iron Age (AD 200–400), length 8 cm. Photo A. Lund Lavoipierre.

146; Both 2018, 42–3). On the basis of ethnomusicological and ethnographic knowledge, the general hypothesis is that rattles in ancient children's graves were not placed there as toys in the first instance, but instead they primarily had a magical function, protecting the children from evil forces (much like the baby sling found at Skateholm). Rattling sound tools in most parts of the world are used for apotropaic purposes in natural folk contexts, for example by shamans and medicine men (Eriksson 1960, 72–83). Particularly interesting was the information given to me in the 1970s that for generations small children in western Skåne, Sweden's southernmost county, had a clay rattle placed in their cradle or under their mattress to keep away evil—but the rattle would not make a sound and had to be inaudible for the children (Lund 1985, 23).[4] As recently as the early twentieth century, a couple of silver bells hung in the window frame of the nursery in the academic home in Lund where the professor of archaeology Carl-Axel Moberg (1915–1987) grew up. They too were there to protect the Moberg children from evil forces, but not by rattling. On the contrary, the rattles were meant to be silent. Just the fact that there were

4 Cf. Eriksson 1960, 77–8 for the use and function of traditional children's rattles in Sweden.

FIGURE 17 Hollow clay bird with a large hole in the forehead found in a grave at Bjerkreim, near Sandnes in Norway. Early Iron Age (AD 400), width c.18 cm. Photo Museum Stavanger.

rattling sound tools in the room, although inaudible, was enough to protect the children.[5]

A hollow, bird-shaped figure with a large hole in its forehead made of clay was found in a grave near Sandnes on the south-west coast of Norway (Fig. 17). It dates to the Early Iron Age, around AD 400. In the 1970s I studied this object at Museum Stavanger, where it was catalogued as a bird-shaped goblet or a vase (which if nothing else raised questions about the shape of Norwegian vases). Yet it can easily be blown as a flute, like blowing a glass bottle, which evidently no archaeologist in Norway had thought to do. The object was documented by me as a possible sound tool, in Group 5—a distant possibility (Lund 2019, 157–73). Since the Middle Ages, Norway's production of clay cuckoos was located in Sandnes, not far from Stavanger, because of the access to the right sort of clay. Even the Norwegian name for the clay cuckoos is *Sandnesgauk*. Could the Iron Age bird figure be its forerunner? I spent a long time in Sandnes and studied the clay

5 Personal information by C.-A. Moberg to the author in 1980.

cuckoo tradition there. It emerged there was a local tradition stretching back generations that the oldest woman in certain families wore a small Sandnesgauk on a necklace or kept one in a purse or pocket to ward off evil. It was not to be blown, not used, it just existed—it was about sound, but it would not be heard. When the woman died, she took her clay bird with her to the grave and the next oldest woman in the family received her magical *Sandnesgauk* (Lund 2019, 164–5).

Most people are familiar with buzzers of various kinds, for example in the form of a button threaded on a string. In 1980, I met an 80-year-old woman, born and raised in the fishing village Råå in Skåne, who told me she made buzzers out of oyster shells as a child (Fig. 18). She also told me her grandmother had taught her, who had learnt it from her great-grandmother. We are then almost in the eighteenth century. And it was on the women's side the tradition was practised and passed down. What the women told their grandchildren and great-grandchildren was to use an oyster-shell buzzer at the sea's edge, alone, and not

FIGURE 18 Traditional oyster shell buzzer from Råå in southern Sweden. Photo A. Lund Lavoipierre.

as a sound toy nor to hear the sound, which is almost inaudible. It would be heard only by a sea monster such as a mermaid; such creatures could hear and understand even inaudible sounds. A buzzer was an auspicious mode of communication with a dangerous mermaid (Lund 1985, 23).

> 'A mermaid hears what she wants to hear',
> as the old woman said to me.

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