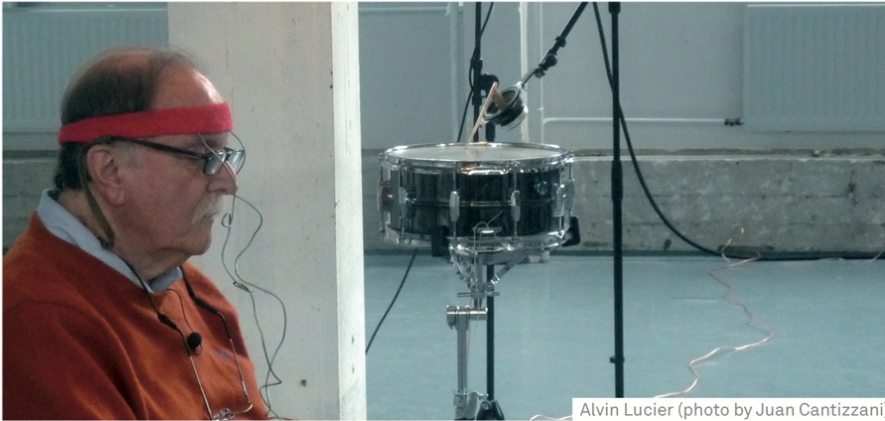


> sitting in a room

Brainwave Music: ritual systems and the biological black box



Alvin Lucier (photo by Juan Cantiziani)

“ I am sitting in an art gallery in The Hague, it's 2010 and I have been invited by Anne Wellmer to take part, as student of the Royal Conservatory, in a production of Alvin Lucier's *Music for Solo Performer*. Premiered 45 years earlier, this groundbreaking work was the first piece to employ brainwave signals in a musical context. Nicolas Collins is telling us about what we are getting into. “The title of the piece is a lie!”, he asserts humorously, expressing both his affection and a comprehensible frustration for taking once again a role within the shadow of his former mentor. Just a few weeks later Alvin Lucier, approaching his 80th birthday, will be honoring us by taking the stage himself as he first did in 1965 at Brandeis University. In front of an eagerly attentive audience, he will sit quietly and alone, with eyes closed and in a state of trance. Injected with Lucier's brainwaves, the percussion instruments distributed all around us will rattle as if shaken by an earthquake. As Lucier openly admitted “one of the inaccuracies in the title is that it's not really for solo performer, you need someone to run the amplifiers, to pan the sounds around”. Collins, from behind the mixing desk is in charge of articulating the unwritten dynamics, timbre and spatialization of the piece, by routing the alpha brainwave signals picked up on Lucier's scalp to the individual instruments. Even if in the shadow, this role is by no means dishonorable: the first to conduct this task at the premiere of the work was none other than John Cage. The title of the piece describes what the audience

sees (a single person sitting on stage), not its method of production. In 1965 Lucier was simply unable to realize what he proposed in his text score: “design automated systems, with which the performer may perform the piece without the aid of an assistant”. Later on Nicolas Collins was able to develop such systems, but Lucier was unsatisfied with the results and so the original ‘duo’ version is the one that he still prefers. It is Lucier's followers who have taken the route of automation much further. David Rosenboom was amongst the early pioneers in this field, using EEG signals as control voltages for psychedelic synthesizer music. He gained the attention of the media and was also featured in a television broadcast demonstrating his work together with John Lennon, Yoko Ono and Chuck Berry. More recently Rosenboom, as well as artists and researchers such as Eduardo Reck Miranda, have been designing complex computational systems that analyze the EEG brainwave signals to derive a variety of parameters which are then fed to another set of algorithms in order to generate the intended music. While exhibiting an increasing level of complexity, it is hard not to be perplexed observing the loss of simplicity and clarity that these systems entail. Lev Manovich wrote in 2002, in relation to the data-mapping frenzy of media arts: “Even the very best works which use mapping suffer from this fundamental problem. This is the ‘dark side’ of mapping and of computer media in general – its built-in existential angst. By allowing us to map anything into anything

else [...] computer media simultaneously makes all these choices appear arbitrary”. In engineering terms the brain is a black box, as we still know so little about how it functions and even less about the relationship between the brain and the mind. When we talk about an artist ‘expressing himself’, what we are really fascinated with is gaining access to another person's mind. Though ways that remain unexplained, art grants privileged access to this biological black box. Alvin Lucier is an artist who has always shunned self-expression, in *Music for Solo Performer* he tells us: let's forget what I am thinking about, let's just listen to the electrical flows that are the physical manifestation of my mind. Pauline Oliveros remarked once in relation to *Music for Solo Performer* that “we no longer needed electronic music studios; we already had them in our brain”. What is there to gain then by coupling a biological black box with an artificial black box whose inner workings appear equally inaccessible to an external observer? In his recently published *Connectome*, Sebastian Seung, Professor of Computational Neuroscience and Physics at MIT, explains the current state of neuroscience and proposes a path for future research which he believes could eventually lead to a complete mapping of the brain. According to Seung, if computational power keeps increasing exponentially, mapping all of the connections between each of our 100 billion neurons might be possible by the end of the 21st century. If this is achieved, it would be conceivable to develop mind-reading technologies. For now, methods based on EEG provide information that is generic enough that Seung falls short of equating neuroscience to phrenology. It is interesting then to compare the degrees of optimism expressed by scientists, technologists and media designers in relation to brain research. According to Seung, Henry Markram, the Director of the Center for Neuroscience and Technology at EPFL in Switzerland, who “has become famous as the creator of the world's most expensive brain simulation”, just a few years ago promised to deliver a simulation of the human brain by the end of this decade. On the more



facetious side, the Nordic Society for Invention and Discovery, a “small Scandinavian research lab”, has managed to gain the attention of the world through a crowd funding campaign proposing to develop a gadget named No More Woof. This particular device, a variation of other popular consumer EEG headsets, promises to enable house pets to speak in human language. The signals of the canine brain picked up by non-intrusive EEG sensors will be analyzed by an embedded computer and translated into vocal sounds emitted on a small horn attached to the dog’s head. It is obvious that telepathic technology generates enormous attraction. But when is this desire for telepathic communication channeled legitimately, and when does it lead to delusion or fraud? The circus impresario P.T. Barnum, a master of hoax who was attributed with coining the phrase “there’s a sucker born every minute”, published *The Humbugs of The World* in 1865, in which he exposed all sorts of scams that were popular in his day. One of Barnum’s primary targets were the spiritualist mediums who offered the possibility of communicating with the deceased. Several chapters of his book explain the tricks employed in this practice. The paying customers would gather in a dark room, where they would listen to sources of audible vibration attributed to the invoked spirits, but which were in fact produced by the mediums themselves under cover of darkness. As a performance practice, it is easy to see the connection between brainwave music and the séances described by

Barnum in the 19th century. Today the brain, as the frontier between the known and the unknown, offers itself as a portal into the spiritual world, and as a profit source for unscrupulous entrepreneurs.

Lucier had his own doubts about his brainwave piece: “Most people thought the material was too simple. And I began to think that I was some kind of charlatan”. This opinion about the excessive (perceptual) simplicity resulting from analogue sonification of raw brainwave signals is shared by Eduardo Reck Miranda, who in explaining the motivation for his investment in complex computational systems writes: “The problem is that the raw EEG data is a stream of unsystematic, ‘random-like’ numbers of little musical interest. Sophisticated analysis tools are needed to decipher the complexity of the EEG before any attempt is made to associate it with musical parameters”. On the other hand, Lucier was more interested in the theatrical and the spiritual dimension of his music. He “was touched by the image” of the immobile, meditating performer who “could communicate with a configuration of electronic equipment with what appears to be power from a spiritual realm”. Enabling a connection to be suggested between naturalistic aesthetics of the sublime and the ritual practices considered further in this article, Lucier continues: “I found the alpha’s quiet thunder extremely beautiful and, instead of spoiling it by processing, chose to use it as an active force in the same way one uses the power of a river”.

The accusations made by Barnum on 19th century American spiritualism are easy to understand in a cultural framework dominated by rationalism. It is hard to believe that the spirit mediums described in *The Humbugs of the World* were not consciously taking advantage of their clients in a fraudulent manner. However, considering other cultural practices that involve the channeling of spirits through the employment of sound making artifacts can help us to analyze the ritual aspects of brain wave music in a more complex way.

Donald Tuzin was a scholar who conducted anthropological fieldwork living with the Ilaḥita Arapesh in Papua New Guinea. In a daring and controversial paper published in 1984 entitled “Miraculous Voices: The Auditory Experience of Numinous Objects” he argues that sound is the privileged vehicle for religious experience. In particular Tuzin points to the effects of infrasound in evoking a sensation of the supernatural. As many other indigenous cultures from the region, the Ilaḥita Arapesh employed the sound making instrument known as the bullroarer during the initiation rituals of the secret men’s cult of the Tambaran. The bullroarer is a thin slat of wood that is hung on a piece of rope. When swung rapidly in the air it produces a deep ominous sound, unlike most found in nature, with the exception of the acoustic manifestations of seismic activity or of thunder.

According to Tuzin, Tambaran initiation rituals traditionally occurred during the dry season of

the Sepik region in Papua New Guinea, when the Ilahita Arapesh were exposed to the “dramatic visual productions” of distant storms occurring in the mountains on the southern horizon. “At these times the area is literally bathed in infrasonic waves of very great intensity”. As if attempting to artificially synthesize an appropriate soundtrack for the storms seen at a distance, the Ilahita men then “unite with and exploit the roar of the unheard thunderstorm”. In his paper Tuzin further relates his claims on the connection between infrasound and religious experience to historical accounts and neurological studies of epilepsy. Of particular notice is a reference to Dostoevsky’s *The Idiot*, in which the Russian novelist (widely considered as suffering from epilepsy himself) defines the aura preceding an epileptic fit as a moment of great spiritual enlightenment, for which “one might give one’s whole life”. The associations between low frequency periodical stimulation of the central nervous system and epileptic manifestations has been the subject of many studies. Music for Solo Performer came into being as a spin-off of research conducted by a colleague of Lucier at Brandeis, Edmond Dewan, on the effects of propeller motion on epileptic pilots. The US Air Force was troubled by the fact that helicopter pilots prone to epilepsy were experiencing fits during landing, when the rotation of the propeller locked onto critical frequencies, inducing patterns of evoked potentials (brainwaves originating from sensory stimulation), that disrupted the

internal rhythm of the brain. It was Dewan who approached Lucier with the idea of making a musical composition with brainwaves and provided him with the necessary EEG equipment.

Considering the combination of these intersecting stories, a line can be imagined connecting the spirit channeling of the Ilahita Arapesh through the rotating bullroarer, and the theatrical channeling of the mind staged by Alvin Lucier using EEG technology. This connection is interesting not only because of the similarities on the perceptual and neurological level (the effects on the brain caused by intense exposure to infrasound), but also because it allows us to understand the relationship between performer and audience within ritual systems that act on the distinction between revealed and hidden forms of knowledge.

Douglas Kahn tells us that during the preparations for the premiere of *Music for Solo Performer* at Brandeis University, Alvin Lucier was rehearsing the piece with his assistant Tony Gnazzo “No one else was in the theatre and Lucier thought his privacy was assured. When someone unexpectedly entered, Lucier instructed Gnazzo to throw a towel over his head so no one could see the electrodes”. It is well known that the cult of the Tambaran is held in great secrecy, to the point where the uninitiated (particularly women) intruding on its secrets without permission could be faced with death. Tuzin writes that “Ritual sounds invented there by the secret men’s cult are

specifically designed to mystify and intimidate cult outsiders: they are the voices of dangerous cult spirits. This much is fairly straightforward – a case of the deliberate use of ritual ideas and devices for political ends”. What is interesting however, and this is the central element that separates this form of spirit channeling from the hoaxes described by Barnum, is that “these sounds are mysterious also to the men who produce them. The initiate discovers that the interpretation revealed to him, viz., that the sounds are man made, is inadequate to the experience he continues to have upon hearing them”. What prevents the discovery of the sound making technique from breaking the ritual enchantment is the fact that the aurally induced psychological effect transcends the method of production. This allows participants to be simultaneously involved in the artificial construction of the ritual as well as to be carried by its transcendental power.

This same confluence of art, mysticism and technology is what musicians working at the boundaries of neuroscience have been tapping into since the sixties. Gordon Mumma, in reflecting on the work of Lucier, suggests another similarity with the cult of the Tambaran: “I am impressed with the paradox that, as the musical use of elaborate and sophisticated electronic technology increases, passing works of art on to succeeding generations requires reverting to a kind of ancient oral tradition.”

> Matteo Marangoni