

Acoustic Cosmology

Mapping audible worlds

INTRODUCTION

A conjoining of languages, Acoustic Cosmology is an attempt to describe audible worlds.

Not so much a music of the spheres, but acoustic sculpture within Hilbert Space¹.

Pythagoras was said to have lectured from behind a screen, to enable his students to help them focus on his words, removing his physical presence, abstracting to sound to ensure a direct link from the auditory to the metaphysical.

Acousmatic sound is defined as that which has no direct causal physical link with its originating source. It is the difference between hearing someone singing live and hearing a recording of the same performance through loudspeakers. Any electrically amplified sound played via a loudspeaker is acousmatic - the origin of the acoustic waves that you hear and the instrument are abstracted - their physical existence is not required. This extends to all recorded music, the telephone, radio and TV. You are not listening to the voice of your parents on the phone, but an electrically reproduced sound not made by their voice, but the speaker - the physical presence of the performed version of their sampled, quantised, abstracted self.

Today, we use acousmatic sound for many different reasons. We use it to alter our perceptions, to break the linear physical nature of our biological existence and enter into hybrid worlds.

Our relationship with our auditory space has undergone massive change over the past century. Since the advent of recording our perceptions have had to comprehend unparalleled conceptual change, from absolute visually and causally-linked to the virtualised space of recorded sound. We have defined cultural structures of our society around mediated messages

One aspect of this change is our internalisation of space: the recreation of virtualised worlds which replicate the physical, attempting not to alter our perceptions of it. Another is to create worlds that bear no relation to anything physical. Finally, these combine to alter the perception of our physical space by supplanting its natural acoustic with the virtual.

One easy reference point is the walkman. We traverse physical space while altering our auditory relationships to it; a redefinition that is often more than re-contextualisation - it alters our emotional and psychological responses. One impact is that we abstract our sense of reality to the point where our metaphysical interaction is more substantive than our physical. Our ability for aural imaging (relating sounds to images) is arguably more common and stronger than visual hearing (relating images to sounds), although both elicit equally strong emotional responses.

Our near-constant engagement with media is already well established as a mediator of reality, but relatively little attention is paid to the audible aspect of this mediation. It reaches far beyond our conscious world - sound affects our perception of space at least as much as vision (hearing is "always on", even when you sleep), but is often created as a 2nd-class sense.

It is this sense of context that I am investigating, mapping, to try create an architectural language that spans music, physical space, the perception of reality and its relationship with identity.

¹ http://en.wikipedia.org/wiki/Hilbert_space

Our sound-world is polluted. The places left on Earth that contain only natural sounds are diminishing rapidly, and lead us to a point where our reality is constantly revised, intermediated and an important stability removed. In a world where all sound is a mapping and can be re-contextualised, what happens to the meaning of space?

And the meaning of words? The spoken word is no longer necessarily a causal sound. Mediated by the telephone, we have extended the reach of our intermediation devices - to be carried with us everywhere. This changes the nature of words from acoustic to electromagnetic, and alters us as a species. We now emit a constant information aura in the form of a radio transmission.

This links our once auditory communication mechanisms inextricably with "light" - we emit and radiate an abstraction of our auditory communication as a constant transmission. As we extend our digital presence, this becomes entwined with non-verbal information, such as our location and our personal data. The transfer of personal data and communication into the electromagnetic takes us into a quantum mechanical space. Not something you would expect when talking to another human.

It is well known that our first planetary extra-terrestrial presence will be seen as radio and TV transmissions. But if you were to envisage an alien visiting us now, based on scanning the strength of the various signals we emit (pressure or electromagnetic) you would have to assume they should first try a radio transmission at us to communicate.

The mapping of our auditory space now becomes interwoven with mapping radio transmission, the electromagnetic spectrum, digitisation, and quantum mechanics.

There is already a common language linking these and music: mathematics.

I am not trying to define a new set of labels, or a new method of notation. Acoustics, and Music are non label-based languages. The aim is neither to document the methodology nor satisfy the listener. The outcome may be one, both or neither. There is no intentional stance here on sound as a cultural construct, a phenomenology² although it does fall into the realms of ontology³.

I do build on Wishart's phenomenology of sound, who sought non-circuitous compositional frameworks that existed outside the conventional "lattice". I hope to extend this to a re-interpretation of the fabric that we use to construct these frameworks, invoking what may well be the opposite of Occam's razor.

It would certainly be an achievement if we could define a framework to realise the utterance of a cosmological model.

2 In this context: the philosophical premise that reality and the experience of it is understood within human consciousness and not independently of it. A method of studying Being.

3 In this context, for example, what may constitute a non-physical object?

Conjecture:

That there exists a mapping between two mediated languages: music, and mathematics as applied to cosmology.

Corollary:

That the description of an acoustic cosmology may yield new mechanisms to disintermediate acoustic spaces that have been forced apart since the advent of the acousmatic world.

Discussion

Until very recently, human communication was based on verbal presence. Our scribe culture then dramatically proliferated and extended the reach of knowledge. Over the past century, audio and visual technology has emerged and accelerated to find a place in the communications landscape. Over the past decade, all have combined in a dramatic shift in communications culture. There are frequent apparent “redefinitions” of interaction, combined with a broad sense of being “overwhelmed”. The spaces surrounding what were previously autonomous personal, social, media and communication spaces are eroding via digitised media.

All our non-physical communication is now quantised to a level that is “physically aligned with the limits of human perception”. There are some interesting immediate derivatives of this statement, most notably that the total logical permutations of text, audio and video are bounded, not infinite. The human-perceived dataverse is huge, but not infinite.

Pressure waves (i.e. sound) can be created in an infinite number of ways. The result, however, is a 2-dimensional phenomena that is perceived and represented as amplitude and time. Every sound conceivable can be expressed as;

$$2^{(16 \times 44100)} = 5 \times 10^{212406}$$

per second. The number of options is based on 2^{16} potential values per “word” with a sample size of 44,100 words per second (as per CD). While this number is greater than the number of atoms in the universe and it would take 10^{212399} years to listen to (the universe is 10^{12} years old) it is still finite.

So in a large but finite dataverse, the challenge is navigation.

Our ability to navigate has evolved in complexity from the basic notation, which initially included broad representation of pitch and rhythm, to scores which had very limited language of nuance, timbre or gesture. Our exploration of the micro-structure of soundscapes adds to our repertoire. It opens new aesthetic dimensions for composition, enables deeper sculpting of the acoustic world.

While our documentation of music expanded, we have transitioned from significant complexity in acoustic instruments, through a comparatively “un-complex” digital instruments into a sonic universe that has increased in size. This increase is a result of the digital age providing tools to navigate beyond the limits of natural and human physics.

In trying to develop Acoustic Cosmology I have spent a lot of time avoiding being a word scribe, attempting to allow the formation of a “wordless” language that mirrors mathematics and music.

Creating visualisations or sonifications of data or algorithms are interesting ways to navigate data spaces. They create a predictable, repeatable experiment, comparable to our scribe-desires to create empirical results. As a non-verbal language they succeed, but there is far more to explore.

Mappings drive creativity. Thoughts into words, perspectives into music, data into visualisations, representations of the tangible and intangible into mediated forms.

We enjoy the causal link between performer, instrument and audience, it provides us with a sense of logic and solidity. We also enjoy breaking these links into equally rewarding, non-causal worlds. In electro-acoustic music, we play with the cross-overs, mix the dimensions.

Somewhere in between there is a dimension to explore, orthogonal to the electro-acoustic. There exist an infinite set of mappings between the dimensions of mathematics and sound, and mathematics is our instrument, the computer our causal device.

Here, two abstract, non-verbal languages meet to describe and interpret our space. Both operate empirically and theoretically. They conjoin the worlds of physics and metaphysics in a meta-cosmology. Applied to sound, they describe an Acoustic Cosmology that we have explored for thousands of years, in the same manner we have studied the heavens. We now simply have better tools to look and deeper understanding to explore.

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