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# The Liminal State of Matter

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### **Introduction of Particles**

The physicality of my work seems to sit in a liminal state of potential, partly acting outside of our perceptive range. The ad hoc tectonics (sculptural assemblages) displayed could be read as part of an experimental laboratory; a sort of three-dimensional diagram involved in refraction, reflection and the creation of waves outside of our immediate perceptive spectrum. The work is purposely aestheticised to be representative of a more cosmic consciousness, where the object configurations are both the observed, as well as the tools used for observation.

My investigation into material substance and the search for meaning within it is being replaced by an interest in less tangible material on the spectrum of detectable radiation. The attempt to combine the physicality of material with less tangible material such as sound is the core of my current practice.

### **Dreaming Radio**

As a child my family lived rural on a farm and on a windless night, it could be dead silent. I used to listen to a transistor radio at my bedside. Having the radio on was probably a form of comfort, a way to fill the silent void that appeared at that hour.

I regret not having that void now. I can't quite remember but I probably had preferred stations and I dread to think of what they were. In the morning I often woke to the radio still on and de-tuned to static, slipping out of reception sometime through the night.

My youthful imagination attempted to guess at possible reasons for this slow change into static. I considered that it could be due to extra-terrestrials trying to communicate with me, inputting alien data into my sleeping brain via radio waves which resonated with my dreaming waves (the delta ones). But more realistically and upon recent reflection, the de-tuning I think is most likely just the universe's tendency to amplify its so-called voids.

When I turned the radio on, I would find a suitable level of amplitude, which would start at a low level and over the course of a few hours, appear to get louder. I would turn the notch down to a new comfortable low level and repeat this process a few times until I eventually fell asleep.

This was perhaps my first observation and acknowledgement of auditory perception. In experiencing first hand the relationship between sound and my ears, were my ears amplifying the radio or was the silent space (the void) amplifying my ears?

This is how I began to question our audible perception and the importance of location and duration of sound in space, if only in a simplified child-brained manner. After my initial observation, I decided to act out some basic experiments. First I attempted surround-sound, taking the radio apart and wiring up more speakers with cabling long enough to evenly disperse the sound around the room.

This experiment didn't come to much, except to infuse the space a little more evenly with the same mono-sounding white noise exerted from different locations.

Secondly, (like a lot of children I suspect) I had yet to drop my interest in extraterrestrial activity. While only having a very basic understanding of radio transmission and reception, I did manage to formulate a connection to the white noise I sometimes woke up to and: as far as I was concerned: deep outer space (a theme commonly reflected in the popular culture/media of the time). So I made some recordings in between the broadcasting bands in the hope of capturing any alien transmissions. On playback I was always disappointed of course, but was acutely aware of the shifts in the statics frequency. Could this be alien signification?

Many of the recordings seem to be experimenting with various tunings. Through holding the pause button half down which slows down the tape recording, I hoped to slow down the static as another potential method of capturing alien signification. I admit most of my actions were intuitive and not theoreticized concepts.

My current understanding of the open bandwidth of white noise, is that it seems to be both empty and full of signifiers at the same time (a liminal state of matter). If only we had the means to process this information into something legible.

What I appeared to be doing as a kid was experimenting with the tools themselves, in this case the radio receiver, with the hope of unravelling the unknown or uncovering hidden phenomenon (even if it was just hidden from me). But in any case this lack of preconceptions, as well as my exploration, observation, and experimentation, formed the beginning of my ongoing investigation into expanding the void.

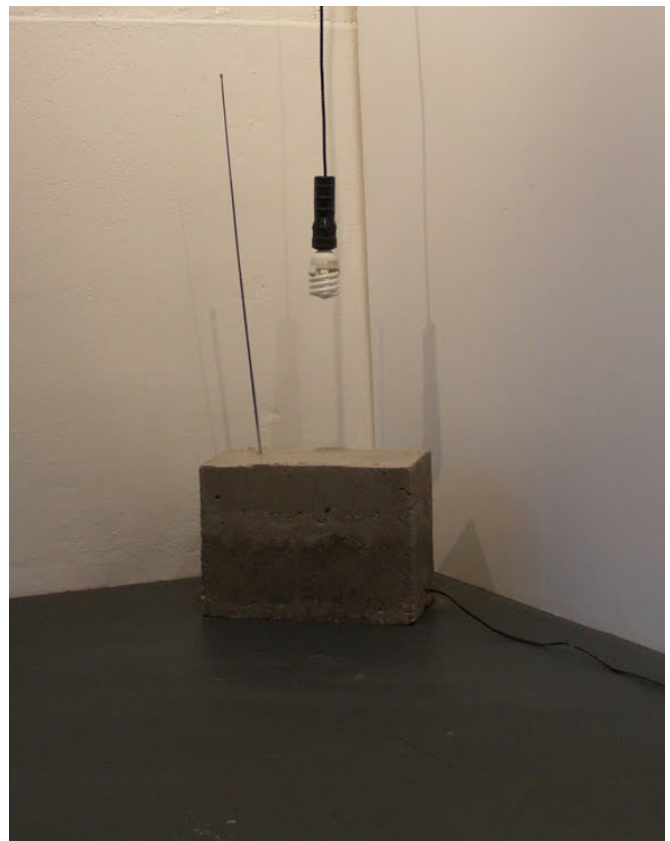
## Wave Watching

*“Arguably the most radical of paradigm shifts in our view of the world over the past century, has been the insight that the universe – from the very small to the very large – can, in an uncannily effective way, be understood as a compound of waves, as a conglomerate of various vibrations. Sound, of course, we have always known to be vibrational in nature. Among the panoply of universal, concrete and abstract, waves and strings and things that, according to current understandings, concordate and discordate in composing our world’s myriad dimensions, it stands out because of its fundamentally material origin. In order for sound to be, something has to move. All that sounds, moves; all that moves, sounds. And sound, in a very literal sense, moves us” (Schellinx, 2012).*

Human senses react to only a very limited range of known energy. Much information exists beyond our ability to experience and perceive it. Were the Beach Boys onto something with their hit song Good Vibrations?

Sound waves have to travel through a medium, i.e. gas, solid or liquid. Because they have to travel through a medium it is a mechanical wave as opposed to a electromagnetic wave which can travel through a medium or a vacuum. Light is an electromagnetic wave. Radio waves are electromagnetic waves that have to be interpreted and translated into sound through a radio receiver.

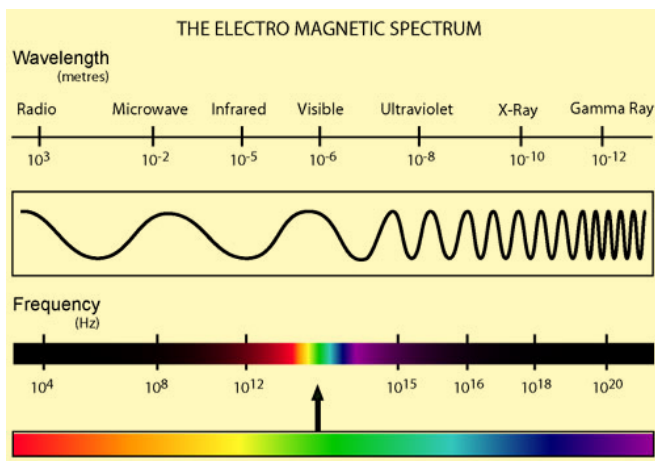
I first showed the relationship of light and radio waves with my work ‘Concrete Radio’ (between bands) in 2011, where I set a radio in concrete with just the antenna showing. Because most of our communication systems rely on electromagnetic waves as a means of transport, they sometimes affect each others’ signal. In my case though, I discovered this cross over with a light bulb, which amplified and changed the overall sound of what was coming out of the radio.



**Concrete Radio/ Between Bands (2011).  
(Radio, Concrete, Electricity)**

A wave is a disturbance or oscillation that travels through space/time, accompanied by a transfer of energy. Wave motion transfers energy from one point to another - that is, with little or no associated mass transport. Waves consist, instead, of oscillations or vibrations around almost fixed locations. Mechanical waves propagate through a medium, and the substance of this medium is deformed and then usually reformed.

The Electromagnetic spectrum extends from below the low frequencies used for modern radio communication to gamma radiation at the short-wavelength (high-frequency) end, thereby covering wavelengths from thousands of kilometres down to a fraction of the size of an atom. The limit for long wavelengths is the size of the universe itself, while it is thought that the short wavelength limit is in principle infinite and continuous.



Sound waves possess special characteristics: 'frequency' represents the number of complete wave cycles per unit of time (usually one second). Frequency is expressed in hertz (Hz), which means cycles per second. Low-frequency sounds are those that vibrate only a few times per second, while high-frequency sounds vibrate many more times per second. The term used to distinguish your perception of higher-frequency sounds from lower-frequency sounds is pitch.

The past few summers I have come into the habit of listening closely to the varying frequencies of cicadas. Cicadas make sound not by stridulation like most insects but basically by moving its abdomen in an out very fast, The interior of the male abdomen, (males make the sound not females) is substantially hollow to amplify the resonance of the sound. After looking through the spectrograph from some recent field recordings (<http://fieldwork.bandcamp.com/album/home-recording-air-waves>), the frequency image appears to reveal the actual shape of the insect, which makes me want to visualise other objects (such as my sculptures) using the spectrograph in relation to the space they occupy, as another avenue of investigating spatial acoustics.

The human ear responds to frequencies in the range of 20 Hz to 20,000 Hz (20 kHz). Frequencies above 20,000 Hz are referred to as 'ultrasonic'. Though ultrasonic frequencies are outside the range of human perception, many animals can hear these sounds. For instance, dogs can hear sounds at frequencies as high as 50,000 Hz, and bats can hear sounds as high as 100,000 Hz, other sounds, such as some produced by earthquakes and volcanoes, have frequencies of less than 20 Hz. These sounds, referred to as infrasonic or subsonic, are also outside the range of human hearing, though in some instances infra sound may be physically felt as changes in pressure when amplified.

Artists Scott Arford and Randy H.Y. Yau translate sound into a physical force which is felt rather than heard (according to their online manifesto explaining their infrasound project, <http://www.23five.org/infrasound/manifesto.html>). They regularly perform within architectural spaces, working with infrasound to an audience. *“Crossing to the other side of the room is more like swimming than walking”* explains one audience member (Sussman, 2010). They build up immersive layers of amplified sound in the 20hz - 60hz bracket, which not only affects the body through changes of pressure but also makes us aware through spatial acoustics of architectural space.

Audibly our senses detect this energy via specialised nerve cells in our ears which convert it into electrochemical impulses that can be processed by the brain which formulates our perception of it. Note that all energy travels through us and potentially affects us whether we detect it or not.

Pauline Oliveros formulated the Deep Listening philosophy, which makes the distinction between hearing and listening.

*“Hearing (the process by which sound is received by our ears and transmitted to the audio cortex) and listening (how we choose to focus on what we’re hearing)”.*

Hearing is something we’re doing all the time, whereas listening is a process by which we can immerse ourselves in, or distance ourselves from what we hear. In this way, listening becomes an activity akin to breathing during meditation (Sussman, 2010).

Oliveros’ School of Deep Listening concentrates on heightening our perceptive awareness of our environment, using the idea of listening as a guide to better living and creativity.

Our exquisite sensitivity to sound can also go wrong: Oliver Sacks in his book *Musicophilia* explores how catchy tunes can subject us to hours of mental replay, and how a surprising number of people acquire non-stop musical hallucinations that assault them night and day.

The perception of sound can vary considerably from one person to the next, electrochemical impulses that are processed by the brain can be purposely altered via substances such as Marijuana affecting our perception of sound. In the mid nineties DJ Screw from Houston Texas made use of the fact that if you indulged in codeine based cough syrup while smoking marijuana it appeared to slow down one's perception of time. He wouldn't be the first to make music on and especially for mind altering substances, but through a warped, slowed down version of hip hop he has become a sort of internet phenomena, purple drank, (being the colour of the original codeine based cough syrup) and the colour purple are now referenced everywhere in popular culture.

Actual sound waves move away from their point of origin in three dimensions and when sounds specifically resonate with human beings the cultural spin-offs seem multi-dimensional. As technology develops we are becoming even more equipped as transmitters and receivers.

**The differing approaches to field recording as a technique or tool employed in the investigation of hidden phenomena (and the expansion of space).**

Examining some of the approaches taken by various field recorders investigating sound has helped me understand the space within and around objects in a more objective manner. In my research I have tried to focus and hone in on sound phenomena within a large spectrum, as one angle to be conscious of within my sculptural based practice but not always an essential component of it. I have started my own archive: <http://fieldwork.bandcamp.com/album/kitchen-collection>, of field recordings, starting with the sound collection: *Object Potential Around the Home, Kitchen Collection, Airwaves 2012*.

My field recording investigations act as reference material for my sculptural practice and sometimes act as source material for my audio compositional project <https://soundcloud.com/nonnahs-deer>, which is concerned with audio perception through sampling and audio manipulation.

Our bodies act as multi-sensory receptors as a way of experiencing and processing an external environment, but then there is a whole multitude of problems when it comes to individual assessment and perception which is also slightly outside the scope of my current research, though I touch on it briefly. I emphasize that sound is just one form of sensing data which has been expanded into a much larger enterprise within the study of all waves. I am interested in how this moving energy interacts with its environment, how we collect/observe and experience it and how it informs us of space.

My sculptural practice is not about sound but rather informed by it, my sculptural objects can sometimes interact, reference, produce, reflect, refract and collect it.

Sound is one way of revealing hidden mechanical and electromagnetic processes which when combined with our other sensory data helps form an overall field of perception (occurring before interpretation and understanding). I think it is important to note that sound is a) a kind of by-product (or evidence) of unseen phenomena and b) a way in which these invisible-forces can be made tangible.

One of the simplest tools used in extending the reach of our ears, is amplification. Combine this with a microphone and we have the now common operation of field recording. The activity of field recording is growing rapidly. I have selected a few art practitioners some of which work more like scientists in the realm of deciphering external forces and unravelling underlying systems and others working within more musical nodes.

I consider Bernie Krause to be one of the most important traditional field recordists, quite simply a sound ecologist, employing sound as a tool to unravel hidden systems and site specific data contained in biophonies collected from what he terms *wild places* (places furthest away from human impact). He has over 50 years worth of wildlife recordings and has produced and lent invaluable data to a larger scientific community studying ecosystems.

*"The rate of species extinction and the deterioration of pristine habitat since I first started recording is huge" he says, "I estimate half these recordings are now archives, impossible to repeat because the habitats no longer exist or because they have been so compromised by human noise".*  
(Krause, 2012).



One of my favourite stories from his book *The Great Animal Orchestra* is about a locational recording in New Zealand, where he was attempting to record ants inside a tree with a hydrophone and by accident the tree itself was recorded (at that specific time of year the tree has massive growth spurts). While processing back in the studio he managed to pick up audible sounds from the tree itself; he had accidentally amplified the transportation of water within the tree's vascular system.

Bernie once proved to a local government agency in Canada that there was a major change in the ecosystem within a natural habitat which had been forested via the selective logging method, considered to be non-destructive and to not change the forests ecosystem in any major way. Before and after photos of a seven year period, which the foresting company took in support of their selected logging method, do indeed appear as if the place was unchanged. Bernie made the same before and after sound recordings. Before the logging: the biophone appears healthy diverse and rich with an overall natural rhythm which he then can show on an spectrograph. The recordings made after the logging reveal a different story than the visual evidence produced by the logging company. Eighty percent of the data is missing from Bernie's sound recordings which translates to mean eighty percent less animals. Bernie continues to use sound as a tool to extrapolate environmental problems and raise awareness.

The sound artist Joe Banks explores the capturing of infrasound through field recording, and releases his output through musical channels and art exhibitions. Banks tunes into wavelengths far out of reach of the average domestic radio set, chasing after atmospheric phenomena such as magnetic storms and sunspot activity, submarine communication systems, emissions from the National Grid, and civilian data, as well as navigation and timecode broadcasts.

Bank's has a specialists knowledge of not only microphones, piezo transducers, home made aerial transceivers (usually reserved to amateur radio enthusiasts) and hams used to capture various sound sources, but also has a vast knowledge of sonic warfare and the history of sonic weapons. Banks acts more like a gadget nerd which is emphasised in his suggestion that his work is...

*"Not so much the recording of a phenomenon as a record of the equipment's inability to accurately record it"* (Banks, 2012).

Putting emphasis on the tools, the tools themselves become the subject of investigation.

*"The hunter who became more interested in shooting a bow than the prey itself".*  
(Tsunoda)

We may bring similarities to this notion of tools becoming subject matter with Marshall McLuhan's slightly outdated proposal that media themselves, not the content they carry, should be the focus of study. McLuhan suggests that a medium affects the society in which it plays a role not by the content delivered through it, but by the characteristics of the medium itself. McLuhan pointed to the light bulb as an example. A light bulb does not have content in the way that a newspaper has articles or a television has programs, yet it is a medium that has a social effect; that is, a light bulb enables people to create spaces during night time that would otherwise be enveloped by darkness (McLuhan). McLuhan states that...

*"A light bulb creates an environment by its mere presence".*



**Periapsis Of The Sun / Estimated 25000 hrs Remaining, (2012), Helical Fluorescent Eco Bulb, Concrete Block, Electricity.**

I think we can safely extend this to a certain degree to the tools and technology employed in sound recording, in this case the recordings of audible phenomena, but I wouldn't say this is entirely the case. McLuhan's famous quote "*The medium is the message*" is perhaps better stated as: "*The medium is definitely part of the message*", as VLF's, (very low frequencies) do carry content to some extent.

As technological tools develop, we start to see changes in the overall content which reflects the devices rather than the initial signifiers. Comparisons can be made with the cassette tape and its playing devices as opposed to a compact disc and digital processes of recording and playback. What we hear is partly the tape itself which is not really too noticeable at first, only when a variation of tools are employed in which we can then make comparisons with, can we reveal that what we may really have captured is more a reflection of itself than the thing itself. In other words the received information is muddled by technologies' inability to decipher it clearly.

New trends in musical composition such as the underground hip hop coming out of LA, William Basinski's *Disintegration Loops LP* and James Kirby's *The Caretaker- An Empty Bliss Beyond The World* release all emphasise the material or medium as a major component of musical narrative. John Cage's 1930's vision of noise and sound broadening the scope of music is very much in play right now. A lot of so called 'experimental' music stems from Cageian ethos, testing the potential of the machine and its various sound manipulating gadgetries. The exploration of esoteric processes using sound is exemplified right here in New Zealand with the likes of *The Dead C* and *Birchville Cat Motel*.

LA's *Leaving Records* (Recording Label) can loosely be described as a genre stemming from hip hop which emphasises the hums and hisses of cassette tapes and the recording devices' malfunctioning sounds. The atmosphere created as a by-product of cassette tape technology is placed in the foreground, creating an overall layer of nostalgic noise (for the eighties child). Heavily emphasised, manipulated into the overall structure; the beats and the so-called music appear more in the background, often struggling to break through. Its interesting that the noise from old technology becomes an integral part of the music, exemplifying the complexity of the human/machine/sound relationship.



**Tape Wreck / Metal Expansion, (2010), (Walkman, Tape, Electromagnetism).**

William Basinski's 2011 release: *Disintegration Loops LP* concentrates on the disintegration of music being played on magnetic tape. He makes shortened tape loops of musical recordings which slowly disintegrate as the ferrite on the magnetic tape slowly peels off as it cycles through the tape head on the playing device. The process itself becomes the music, as the original signifier becomes entwined with the noise of the medium itself until the mechanisms originally intended to play the music become the music, outliving the intended message.

*The Caretaker* uses loops from old vinyl records to emphasise the history of the record itself. Unlike Basinski there is little to no change over the duration of individual tracks; the chosen part of a record is just looped for a time. The loop is chosen by how the crackles and pops interact with the recorded music, creating another warm layer of beats and rhythms.

I see these musicians partly as field recorders of the machines themselves who carefully play with nostalgia and cultural artefacts but also as the bridge from scientific investigation to creative exploration.

The field recordist Toshiya Tsunoda explores the transmission of sound waves specific to location. He makes recordings of what he calls air vibrations and solid vibrations using specific microphones and piezo transducers suitable for capturing the site or object. He has captured metal grates, asphalt, the interior of buoys and more specific aspects of a location such as his *Maguchi Bay Observations* (recordings of the smallest and oldest pier in the bay). He then processes the recordings by taking all the sound above 20hz (human audible range) out of the recording and juxtaposing them next to the original. This makes an interesting comparison and another extension to work being done with infrasound.

Tsunoda often picks several different locations and performs repeated recordings to see the depth of activity in a place, which has slight differences every time. Any particular place forms a pattern of vibrations that is specific to it depending on the physical conditions of the space.

*"By seeking the point for recording, I search for the nature of the place. There are various movements of waves such as resonance, interference and overtones happening everywhere".* (Tsunoda, 2009)

Tsunoda asks:

*"What kind of condition is ongoing at a metal fence, on the surface of pavement, in a narrow passage or inside a pipe; is it a secondary incident that is like a by-product of the space, or is it considered to be a nature of the space itself"?*

I read Tsunoda's method as a kind of microscopic study of how molecules behave in various substances resulting in site-specific sound vibrations. He is helping to open up space and in a way asking whether voids exist at all, as there seem to be vibrations everywhere. Is a void just a lack of reception? Tsunoda uses a variety of equipment and techniques to capture vibrations, I think this is because he understands the importance of expanding one's methods to capture phenomena. Both Banks and Tsunoda explore space in search of anything that can be detected, both are highly aware that the tools and processes are part of what's being explored.

The visual/sound artist Nina Canell along with Robin Watkins captured the electromagnetic waves of the Aurora Borealis. Canell works like a scientific researcher and has a distinctive practice which cross-examines the scientific method through an art practice. She enlarges the context of pure field recordings. The recordings become part of scientific research including an essay entitled *The Luminiferous Aether*, and part art document; by way of her releasing the material in the usual audio circles as well as within an art context.

Although sounds accompanying intense auroral displays have been reported throughout history, and in the last decade recorded extensively... there still remain questions as to the origin, properties and exact nature of the existence of acoustic sound waves accompanying magnetic storms such as the Aurora Borealis.

*"While electrical monitoring methods have provided substantial material of infra sounds, a far richer history of accounts relating to Auroral sounds within the human hearing range can be found in the folklore of Inuits, Lapps, Siberians and most inhabitants or travellers of Northerly latitudes. Often dismissed by the scientific community as perceptual artefacts or unverifiable stories, the mythologies and descriptions by indigenous peoples in disparate parts of the polar regions have developed over manifold centuries, and provide strikingly similar and accurate descriptions of Aurora-related sounds. The seeming impossibility of humans ever hearing these sounds as they are apparently too far below our audible range opens up a fresh argument, whether formulations of sound in these instances stem from the imagination, actual magnetic interruptions, a heightened sensory intuition or that of a fully audible discharge. It can at least be stated that they resonantly describe what can be heard by receiving the elf/vlf signals which invisibly permeate our atmosphere and all things within it" (Canell & Watkins, 2011).*

In Werner Herzog's 2007 Antarctica documentary; *Encounters at the End of the World*, there's some underwater recordings of Weddell Seals done by a group of scientific researchers who are working at the southern pole. The sounds recorded underwater of the Weddell seals are so strikingly similar to the recorded Auroras or in this instance The Southern Lights, that it has lead some people to speculate. Though they are thousands of kilometres apart, there bears a relationship. Could the Weddell Seals be receiving these magnetic signals somehow and mimicking them, or are we listening to the medium again and projecting it as content?

Canell also proposes a relationship between the electromagnetic nature of the earth itself and *Cemi Field Theory* (a slightly experimental theory put forth by a number of neuroscientists which suggests that consciousness operates in a magnetic pattern which could, as a basic model, be considered similar to that of how a field hovers around its nucleus (like the Magnetosphere envelops or hovers around the Earth)). Her pseudo-scientific explorations are presented in an art context, away from the scrutiny of the scientific method, which I think allows for more room to explore openly what science might dismiss.

The ultimate field recording exploration in terms of scale and quest for unravelling natural occurring phenomena must go to the profession of Radio Astronomy. Stars, galaxies, the sun, the planets, and many other objects radiate electromagnetic waves.

The reception of extraterrestrial radio waves was discovered by accident when in 1933, a Bell Telephone engineer named Karl Jansky was sent out to tackle a very practical problem of locating the source of interference hampering transatlantic telephone links. He constructed an antenna in a way that he could detect distinct signals being produced by what he assumed were thunderstorms and lightning flashes happening on earth. He noticed in his research a continuous hissing sound, it did not take the intuitive Jansky long to realise that the hissing was coming from the milky way, moving across the sky, producing varying radio waves. He thus discovered a new branch of scientific investigation, by accident, confirming the accidental as having merit and sometimes the key to making new discoveries. Radio Astronomy is actually built on accidental encounters: astronomers looking for one thing and finding another.

Another surprising bond is Radio Astronomies relationship with the amateur or home radio enthusiast, emphasised by the work of amateur radio astronomer and artist Thomas Ashcraft. Ashcraft has spent years building home made electro-receptors, which he sometimes installs right in his backyard. With fully functioning equipment and his keen eye for detail he has even contributed observational findings to NASA.

*“Ashcraft thinks of his equipment as an extension of the body, a type of technological evolution of human reception”* (Harger, 2012).

With the help from scientists and amateurs we have made new discoveries by observing waves and we have better estimates on the scale and age of the Universe. Radio Astronomy has identified countless objects within the universe and even gave us evidence of the Big Bang.

Honor Harger (of *Particle Decelerator Blog* <http://decelerator.blogspot.co.uk/> and *Radio Astronomy* <http://www.radio-astronomy.net/>) suggests that radio astronomy can also be interpreted within the avant-garde tradition...

*“A music concrete reading of radio astronomy would depict the telescopes as grand concrete instruments, performing an ongoing and automated composition, nuanced by the complex interplay of the astronomers’ target observations, the atmospheric conditions of a particular period, and the operational condition of the telescopes. Read within an avant-garde music theory framework, radio astronomy could be a new iteration of Johannes Kepler’s slightly mystical “music of the spheres”, where Kepler related planetary movements to musical scales and intervals”.* (Harger, 2004).

### **Alternative methods employed for observation.**

Scientific diagrams and the equipment used in experimentation have a special charm and when put to use sometimes appear to reveal sudden glimpses of a mysterious reality.

This feeling seems to me to give a modern person an insight into the alchemical and magical tradition from which experimental science partly originated. It may be a slightly romantic notion to see these activities within some kind of cosmic frame as the basis of the scientific method is a tightly disciplined means for the acquisition of certified knowledge.

Does the scientific method provide the only contemporary rational way of cognitively organizing our experience? Should we consider more irrational approaches? Is this a major role of contemporary art, to highlight irrational methods?

## **Methods outside of the indoctrination of science.**

I summarise Paul Feyerabend's dissatisfaction with the scientific method from his controversial book: *Against Method*. *Against Method* explicitly draws the *epistemological anarchist* conclusion that there are no useful and exceptionless methodological rules governing the progress of science or the growth of knowledge.

Any method inhibits scientific progress by enforcing restrictive conditions on new theories. Feyerabend believes that the scientific method is too narrow a view and states that in fact "anything goes" should be the new motto.

He goes on to stipulate that science is much closer to myth than a scientific philosophy is prepared to admit. It is one of the many forms of thought that have been developed by man, and not necessarily the best.

It is conspicuous, noisy, and impudent, but it is inherently superior only for those who have already decided in favour of a certain ideology, or who have accepted it without ever having examined its advantages and its limits.

Science is a collection of theories, practices, research traditions and world views whose range of application is not well-determined and whose merits vary to a great extent. All this can be summed up in his slogan: "Science is not one thing, it is many".

What I take from Feyerabend's slogan is not the obliteration of method as that would be a method in itself. Maybe it's better to state that unreason should also be considered into method.

I agree with Feyerabend that science is not just one thing and there has been many different almost universal methods employed depending on what era you want to look into.

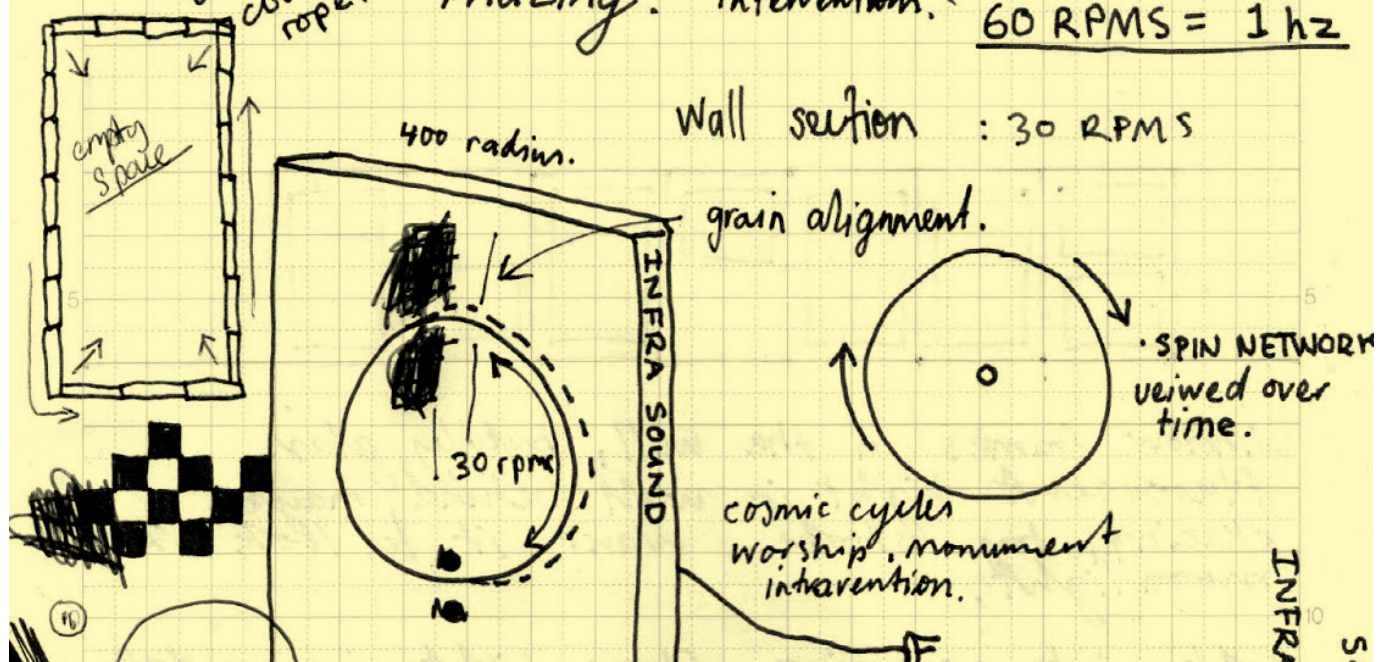
We should stay aware that scientific methods change over time. New tools and advancements in measurement shift our knowledge of things. There is no one special method of observation and as a result the separation of science and non-science is not only artificial but also detrimental to the advancement of knowledge. If we want to understand nature, then we must use all ideas, all methods, and not just a small selection of them.

Indigenous peoples' knowledge of the environment is often overlooked because of their differing approach to accumulating knowledge but quite often comes to similar conclusions as science. For example a variety of plants have been used for their healing and so called magical properties by indigenous people for thousands of years. In some cases those same plant compounds are used in contemporary societies as scientifically proven medicine. Indigenous people did not come to this specialised knowledge through the scientific method but in some cases managed to reach the same conclusions.

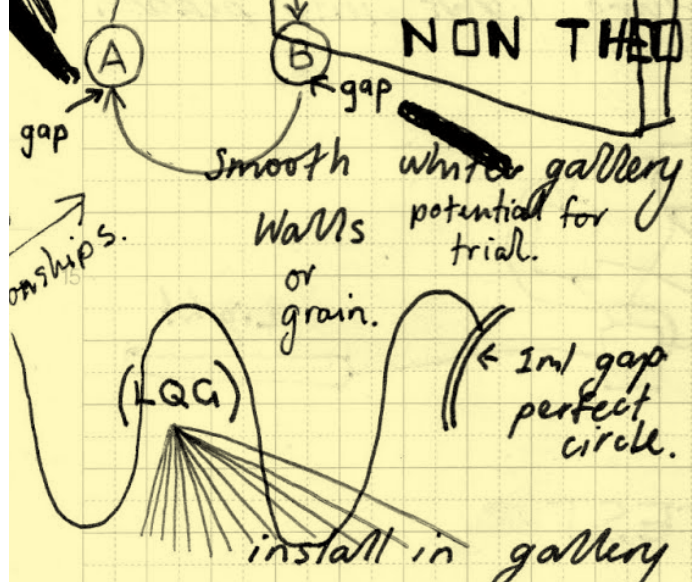
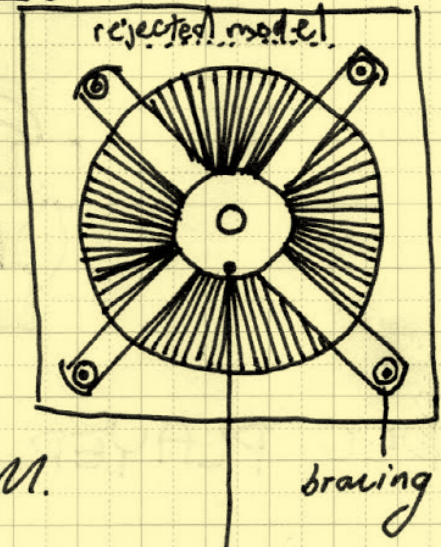
I am not proposing we ditch the scientific method for a more archaic or mystical one as science is undoubtedly a good method, but maybe just not the only one we should solely rely on. Perhaps believing strictly in one method is aligned with monotheism, which I believe is destructive.

My 2011 essay *An Argument for Shamanistic Practice in Contemporary Art*, was fuelled by the belief that the contemporary artist's role was similar to that of an archaic shaman, in that the shaman has to gain specialised knowledge, acquired by intense observation, intuition and sometimes unusual methods. The shaman has to separate herself somewhat from what's considered normal society and behaviour in order to get alternative perspectives on the nature of things.

Beyond the Standard Model  
 back wall colored rope.  
 RPM Phazing. intervention.  
 LOW GRAVITY finite systems.  
 60 RPMs = 1 Hz

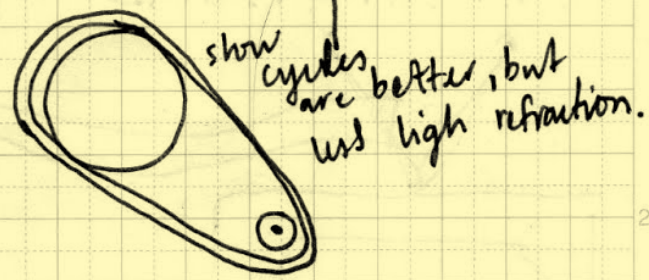


**NON THEORIES:**



- White space is better, clean up keep minimal.
- Potential to rework.

• Subtly - to help centre attention on space & object based support structures.



• source commercial products motor + fabrication methods (LQG) Network of loops Place in Kilbirnie for circle fabrication.



# Intervention 001 -

( 01 )

## ~~figmented concrete~~

Diagrammatic reasoning

motion studies: physical forces

deflected wake (Magnus force fields)

ceiling

tennisball trajectory mapping experimental not sure about this

rod as support structure

black rubbish bag

SPACE EXPANDER

micro studies  
emphatic sound interior

thing supported by its self function

Fan

Floor

deflected wake

fan blows the bag up through the wall

magnus force

anti sculpture

sand back wall

to reveal

Wall section

plug back into wall

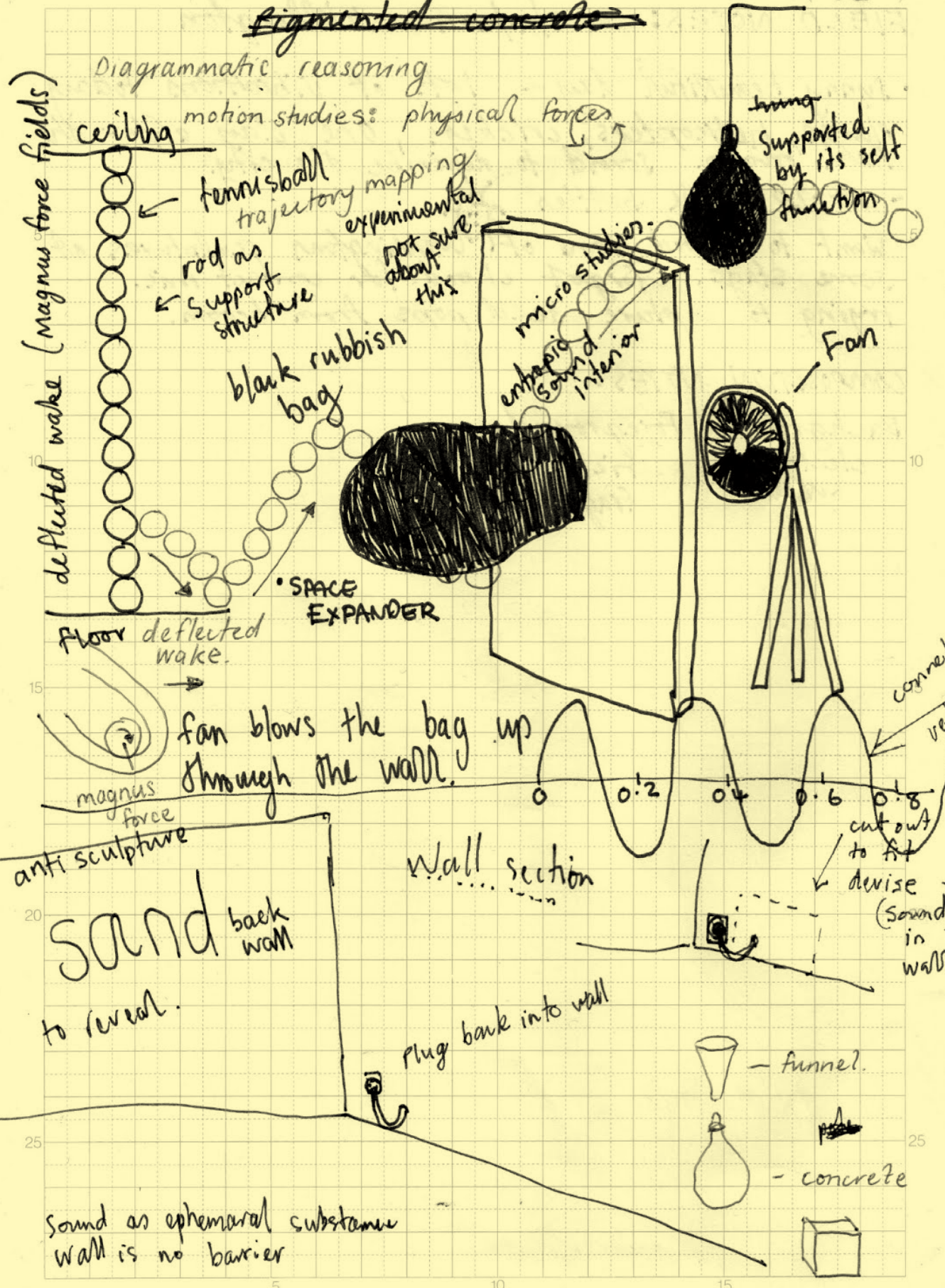
cut out to fit  
devise (sound) in wall

funnel

concrete

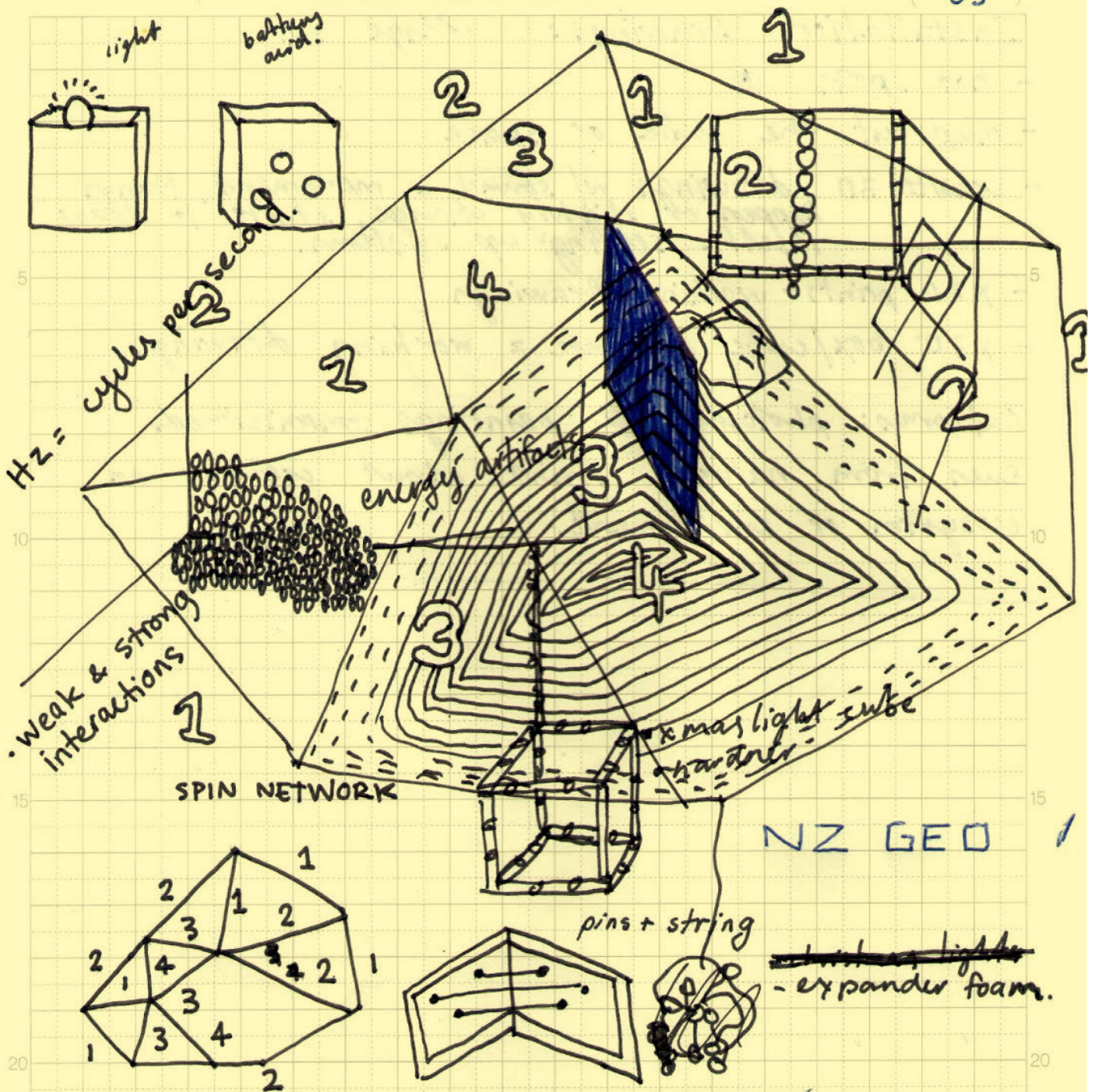
Sound as ephemeral substance  
Wall is no barrier

DETECT RADIATION FROM WALL.

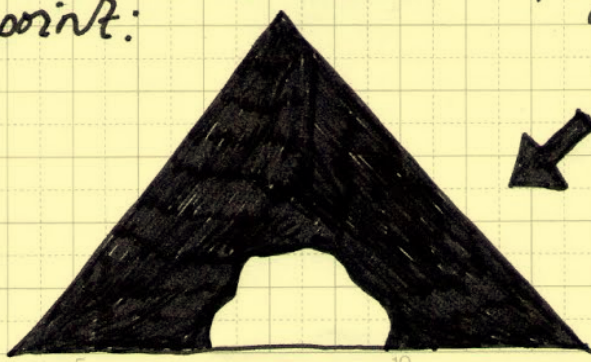


1 revolution 30secs  
space techtonics:

0.5 RPMs  
( 03 )



Drawings installments to be photographed. & videod, think about movement, lighting angles or focal point:



- rock - quartz (AMP)
- bluetak
- black triangle (spray)
- amplified quartz
- how?

Paul Cullen (NZ) makes work that demonstrates obscure hypotheses with the arrangement of everyday materials to produce simple actions, acting in a way like models or three dimensional diagrams.

*“Cullen’s work begins to evoke the mythology of the obsessive inventor, backyard engineer, or gentleman scientist which attaches itself to the independent and historical pursuit of new discoveries” (Laing).*

His work *Orange Theory* is this: An orange hovers over a notch cut out in a white wooden chair. The orange rotates anti clockwise with an assumed measured RPM. It gains its energy from a small motor which could have originally been the inner workings of a mirror ball. Under the chair hangs an industrial builders lamp which shines upward through the notch passing reflective tinfoil on its way towards lighting up a portion of the orange. A small part on the backing of the chair has been cut down to size which could be a comment on the irregularity within a scientific hypothesis as all tools used in experimentation have subtle variations. The model appears to be a measurement of the suns orbit or even a galaxies orbit around the sun. In a text written by Tessa Laird for Cullen’s RPM publication she suggested that it’s probably better to think of *Orange Theory* as something suggestive of plotting the path of an inner universe. I would extend this inner universe as subjective truth, questioning the nature of true reality in regards to various measurement systems and methods employed in observation.

You can see this more clearly in another Cullen assemblage *Motel*. *Motel* is an installation represented in an ongoing series of work under the banner *Falseworks*. *Motel* was developed over a period of five months as a sequence of re-configurations of materials and objects. New objects were added as the project progressed and others were removed. Domestic objects are arranged in the space as if they are trying to measure a problem presented in physics: chairs hang from the ceiling, a globe of the earth attached to a corner of a table allows the table to balance on three legs. The globe holding the table in equilibrium is connected to string which runs through a pulley attached to the wall which is held in position by a cinder block on the floor. The objects are all connected in a balancing act that forms the overall composition.

There are many readings of this installation, a few of which you could say were wrong, or a move away from the modernist pursuit of absolute truths towards plurality. The fact too that the components are re-ordered, some objects lost, some gained, adds to the many ways, the many tools, the many methods we have employed in arranging and rearranging systems to back up our arguments that form supposed truths.

I consider *Motel* to represent a model of understanding, that we are unsure about one system of gaining knowledge, and that the many ways of presenting the model reflects our very human inability to measure absolute truths.

The tools of measurement help form what is measured, which helps confirm the idea that the tools used for observation are part of what's being observed.

The ad hoc method employed by Cullen in the constructions suggests an imperfect representation of an imperfect world which questions our methods in the understanding of nature while conjuring up alternative possibilities.

*"We are our consumers of theories, whether those produced by other people or by ourselves", (McKenna, 1990).*

Cullen's work represents a means of criticising theories, changing them, and maybe even demolishing them, in order to replace them by alternative ones.

*"It is not easy to measure the ocean, but we can be measured by it, confront it, and be in it. You have to take seriously the notion that understanding the universe is your responsibility, because the only understanding of the universe that will be useful to you is your own understanding"*  
(McKenna, 1990).

I often think about this statement in terms of the importance of experience and also experimentation. Within my wave research I can seek examples from various sources of different waves, though the real understanding comes from first hand observation and practical experience or experimentation.

Through field recording I can experience sound waves directly with the recording equipment and microphone. I can then experiment with varying methods and in experiencing them, I can experiment with the tools themselves. I can also visualise the data with various software. This type of tinkering with material is part of the way I understand the nature of things.

My practice began as an investigation into sampling material and re-configuring it often in the form of collages. I am interested in how collage and sampling material can be used within a more of a scientific setting.

My blog: *Terrestrial Tumblr* <http://terrestrial-spillway.tumblr.com> acts as an extension of my body, a memory bank of ideas, material and content which has potential to become sampled and re-configured into my working drawings. I see my working drawings as diagrams, a starting point to my physical work with actual materials. My approach to drawing is similar to the act of collage.

Sampled ideas from scientific journals are visualised onto paper and re-configured repeatedly in various ways to gain differing perspectives in my understanding of physical forces, exploring links between the immaterial and the material and how they act upon each other, questioning the nature of material in a world full of symbolism.



**Harmonic Currents / Kinetic Energy Of A Short Wave Triangle (2012)**

Nina Canell is particularly interested in the physical and poetic characteristics of the objects and found items that she works with.

*"I like the tactile quality and the knowledge stored within. These are things that we understand. What they can be used for, how they feel, how heavy they are. There is nothing mysterious about the objects themselves, and this once again opens up a sense for their symbolic capacities".*

I am also interested in the symbolic capacities of objects as I often reference symbolism and popular culture in my work as I feel this is something hard to stray away from. Objects are cultural artefacts thus defining their meaning. This is exemplified in the repeated use of the triangle, circles and the suggestive titles of my work, such as Tape Wrecks (Metal Expansion) which is a direct reference to heavy metal, (image displayed). Another work: Wild Horses (cover version) completely relies on the acknowledgement of popular music where I positioned a particular reference into a new material.



**Wild Horses (Cover Version), (2012), Found Print & Frame.**

Maybe there is nothing mysterious about the objects themselves as Canell suggests, but the material that makes up an object and the space that an object occupies creates room for further investigation. This is the direction I am a trying to move towards.

I have presented a community of objects and ideas for this symposium that I hope interact with each other through modest arrangements which not only represent hidden phenomena and systems but act out as three dimensional diagrams.

These objects are arranged as potentials. Part of a larger network, they are tools ready to measure themselves, and the space they occupy. I would like these object compositions to develop more as tools whereby they perform a function, like helping to solve a problem. The problem arises somewhere in between the material and the immaterial, forming and questioning the solidness of material and mental reality.

The works act out as part of an installation sitting within one space but they are also individual components that have been measured, for example the work: *Mesopotamian circle / One Million Fifty-One Thousand Two Hundred Revolutions Per Year. Emits 0.03 Hz of Radiation. Resonant Frequency Parameters: Earth's Surface Waves/Earthquakes* in which a full piece of ply has a circle cut out and reinstalled to rotate, has been measured which is exemplified in it's title. Making and researching feel like part of this work.

The Mesopotamians are reportedly the inventors of plywood and the simple shape of the circle is also an archaic symbol with multiple meanings, one loosely being 'ouroboros' which in its essence represents cyclicity in the sense of something constantly recreating itself. This loose representative part of the title is subjective which is fine but I wanted to also measure the material and the systems it is contained within.

In my workings the rotation of the circle is measured to emit 0.03 Hz of radiation and oscillates once every 30 seconds and if left on would revolve One Million Fifty-One Thousand Two Hundred times in a year. It is left obscure what connections this sculptural object has with the other sculptural objects apart from relying on the same measuring systems. I am interested in the yet perceivable connections. By using the same objects repeatedly, I can arrange them to sit next to my other work and re-configure the works as new discoveries and ideas are made.

The work *Periapsis of the sun / Estimated 25000 Hrs Remaining* is where a helical eco light bulb sits half in a concrete block. The Impermanence of the work is reflected in the title. The estimated time span of the work is based on the average lifetime of this particular eco bulb doubled (which allows me to change the bulb one more time).

In the past, I have made a clearer connection with this work and another work where a radio was installed inside a wall cavity. The white noise of the radio tunings and the eco bulb share the same bandwidth, and the eco bulb audibly interrupts the white noise coming from the radio by amplifying and changing the pitch of the sound.

I also became interested in how a light bulb works and the substances within a bulb such as the natural gases and rare earth metals. Over a period of 25000 hrs of running time it is possible that a small amount of mercury is emitted into the immediate surroundings which would stain the concrete yellow. I take this as further evidence of not only substance exchange between objects but of a re-configuring of its own accord.

I have chosen to work on multiple pieces at once as a way to entice a cross pollination of ideas through making and research, another work or rather an experiment was to try and describe a circle through sound. I hung a microphone above a fan, the circular wind current informed the microphone to rotate accordingly. I could hook the microphone up to an amplifier which would produce sound but instead decided to let this work be skeletal or unfinished which allows one to conjure the potential of sound. This work feels close to a three dimensional diagram. By letting the objects act within their own system I hope to conjure the idea of sound as a force which can influence object behaviour.

Electromagnetic waves and other forces of nature such as electricity, act within and around my pieces. I am searching for more ways to expose the hidden interaction of the systems within a space and how my own objects can be part of this system. Through my research into field recording I have learnt that what we are measuring is partly the tools themselves.

I am experimenting with the material as potential tools that not only measure themselves and each other but form a network all working within a system (physics for example). The systems and the materials change. My goal is nothing more than exploring these changes, how objects can act within a current knowledgeable system but with the realisation that there are no singular truths.

There is an abstraction in the arrangement and choice of objects I use as a way of stating my position of being comfortable in a liminal state between mind and matter or myth and science. As soon as a discovery is made or a method is confirmed, there is always a new one waiting, ready to take over.



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