

'Sudronen' (Cornish for 'drone') is a piece of experimental drone-music 12 minutes in length. It is the production of a project demonstrating an exploration into the history and application of drones and noise within music and sound, using audio recorded in their natural environments (i.e., not created through synthetic means or digital manipulation) and natural means of drone enhancement, by way of reverberation, acoustics, and noise. In my personal practice I typically create drone music through synthetic means, or use of heavily processed field recordings (through granular synthesis, VST's, time stretching, and many other forms of digital manipulation), so for this project I wanted to expand on my creative practice and create a piece exploring traditional and timeless techniques which don't require anything more than a microphone (a Zoom H4n and LOM Geofón), DAW for organisation of recordings (Logic Pro), and a speaker (HEYSONG Bluetooth Speaker). I have explored techniques which expand upon, and challenge, the traditional means of creating drone music, including themes and techniques relating to minimalism, noise and silence, ambient music, space and place, and aural architecture in music and sound. From the start I was heavily influenced by Harry Sword's newly released 'Monolithic Undertow: In Search of Sonic Oblivion', which I will reference frequently in this essay. In this book, Sword explores the power of the drone through research into historic, ritualistic, modern, and futuristic applications of the drone.

The Britannica definition of 'drone' in music is "a sustained tone, usually rather low in pitch, providing a sonorous foundation for a melody or melodies sounding at a higher pitch level" (DeVoto, 1998). In this essay I use 'drone' to refer to something more developed and rawer than just a "sustained tone", to include sounds which vary drastically in pitch, and furthermore, which do not involve any instruments or synthetic production in the process of tones. Rather, I used recordings of the inner workings of household appliances, using a LOM Geofón microphone, borrowed from Goldsmiths EMS. I initially intended to use recordings of large metal structures (industrial pipes, trains, buses etc.), but when testing the microphone on my hob extractor fan I realised it wasn't necessary to even leave the house, as the low hum of household objects was captivating enough. Similar to La Monte Young's 'Poem' (1960), where he "was inspired by the drone of wooden benches dragged across the floor of a Berkley laundromat" (Sword, 2022, p.150), I recorded a huge variety of sounds in my daily environment, such as the hum of a car on a long journey, the sound of the wind, traffic on London Road, someone using a hairdryer in another room etc., but for the final piece I ended up using only Geofón recordings of an extractor fan, washing machine and household water pipes. The sound produced by micro vibrations is the sound our ears don't actively hear when these devices are functioning, you can only really feel the sounds through the Geofón recording. Andrej Chudý suggests when commenting on the microphone, "the hum is part of you, your resonating body" (Chudý, 2020). It also picked up faint muffling of voices in the room which I've kept in the audio.

Once I had finalised and exported the drone piece in Logic, I played it back in different iron age, neolithic and natural structures unique to Cornwall to explore the acoustic ecology and sound production of the architecture. These included a fogou (“a cave or underground chamber either man-made or natural” of which “no two structures are exactly alike” (Cooke, 1993, p.33-35)), a cave, viaducts, mines, tunnels, and a slate cavern. I re-recorded the audio in these natural environments, focusing on picking up reverberation and echo. I repeated the technique in various locations, each time playing back the newest recording, and thus eventually almost masking the original audio; developing the drone further through use of natural acoustics. This technique involved some trial and error.

You can't talk about drone music without mentioning Minimalism. As a genre Minimalism began in the 1960s, a product of the Avant-Garde scene, and, as the name suggests, is distinctive for its “extreme reduction of materials and extensive repetition of ideas” (Geiersbach, 1998). Minimalist pioneers like La Monte Young (claimed by Brian Eno to be “the daddy of us all” in regards to ambient music (Tannenbaum, 2015)), Philip Glass and Terry Riley (although Riley “dislikes the term”, “and doesn't consider himself a 'minimalist' at all” (Sword, 2022, p.147) were heavily influenced by the drone in traditional Indian music, most notably played by Ravi Shankar, and also adopted by artists in other genres such as The Beatles and John Coltrane. Artists like Pauline Oliveros, John Cale, Brian Eno, Angus Maclise, and in slight divergence, The Velvet Underground, took the drone beyond the bounds of minimalism, setting the tone for future artists working within the realm of drone, such as Sun O))), Godspeed You! Black Emperor, Laura Cannell and Richard Skelton. I took particular interest in the work of both Cannell and Skelton during this project due to their use of natural and historical man-made spaces in their work. They're both inspired by the acoustic resonance and landscapes of spaces specific to their surroundings. Cannell recorded her 'Hunter Huntress Hawker' (Cannell, 2019) in the ruins of St Andrew's Church in Suffolk, and her album 'The Earth With Her Crowns' (Cannell, 2020) in a decommissioned hydraulic power station in Wapping (Sword, 2022, p416-417), while Skelton's 'Lastglacialmaximum' (Skelton, 2020) explored the ominous tones of glaciers.

Tim Hecker recorded his 'Rave Death 1972' (2011) in Frikirkjan, a church in Reykjavik, Iceland, to incorporate the reverb of the church, the sound “ricocheting off the rafters, ancient and decayed and immense” into his “imposing dronescape” (Sword 2022, p.48). It is believed that in some caves, like Lascaux, humans living in the Upper Palaeolithic period painted large animals where the “echoes are overwhelmingly loud”, and small animals were painted where “the decibel level of the reverberations is very low” (Toop 1995), suggesting that the artists were conscious of the theory that loud sounds are powerful and attractive because of the “thrill that people gain from controlling the natural fear response” (Welch & Fremaux, 2017). Although my project would work using recordings in any reverberant structures, not strictly Cornish architecture, I knew that I would be spending two weeks in Cornwall and, being Cornish, I wanted to incorporate my heritage into the project. Through exploring such a variety of Cornish architecture that exists for different purposes, I feel I've channelled an other-worldness reflected in

Cornish myth, folklore, and Cornish people in general. By doing it through drone-music, using its meditative qualities, I've tapped into a connection with the extreme state of tranquillity I personally experience being in Cornwall.

The first structure I recorded in was a fogou in the iron age village at Carn Euny on the Penwith peninsula. The fogou consists of an entrance passage and a round corbelled chamber. Possible explanations for its use have included a storage chamber, a refuge from raiding parties, and a temple for the worship of the Earth Goddess (Cooke, 1993). I recorded in the entrance passage and the round chamber. No official research has ever been done into the acoustics and/or sound in a fogou, and I had never been in one, so I went into it completely unaware of what the outcome would be. Unfortunately for my reverb-centred project, once entering the fogou all sound went completely dead, and I was only able to hear the “geophony” sounds (a term coined by Bernie Krause for “nonbiological ambient sounds” (Pijanowski, Villanueva-Rivera, Dumyahn, Farina, Krause, Napoletano, Gage, Pieretti 2011)) in the fogou, like the sound of drips, with no reverberation at all. This could be down to the corbelled roof acting almost like an anechoic chamber – a room designed to prevent any reflections. I had more success recording in Cornish Holy Wells, caves, and tunnels. Although I initially regarded the fogou recordings as unhelpful for my project, I was influenced by John Cage’s “exploration of the nature of silence” which “pointed out that every ‘silent’ concert hall has an acoustic context, a surrounding sonic environment, a background ‘noise’” (Till 2014), and Luigi Russolo’s claim that “we must break out of this narrow circle of pure musical sounds and conquer the infinite variety of noise sounds” (Russolo 1986). I recorded as planned, with a whole new layer of external sounds cutting in, which I mixed into the final audio track. In his book, ‘Silence’, John Cage imagines a conversation with Erik Satie, where Satie proposed to: “bring about a music that is, which will be part of the noises of the environment, will take them into consideration” (Cage 2012). In a similar vein, Chris Watson famously uses his field recordings to “communicate the transient nature of a natural world in flux” whereby there’s “no background manipulation or editing”, he “simply mikes up the environment” and “records what is happening in front of him” (Sword 2022, p.23-24).

Pauline Oliveros was an American minimalist composer who coined the term ‘deep listening’ - the act of “learning to expand the perception of sounds to include the whole space/time continuum of sound” to “heighten and expand consciousness of sound” (Oliveros 2005). She was at the “drone’ end of minimalism” and was “something of an unsung pioneer” (Hazlewood, 2022). On noise, John Cage said, “wherever we are what we hear is mostly noise, ... when we ignore it, it disturbs us. When we listen to it, we find it fascinating” (Cage 1973). With these ideas in mind, the final product of this project is a drone piece created using the LOM Geofón, then enhanced through the addition of silence, noise and the reverberative acoustics of sacred and special Cornish architecture.

Taking the “background noise” into further consideration I ended up changing my project drastically from the initial plan. I still worked with layering reverberation, but also ended up incorporating the silence and unexpected noise of the structures themselves. I

made the active decision to let the environments function completely naturally, and to not disrupt anyone talking or walking nearby. This decision was made primarily because of the time restraint in place, but also to truly experience the relationship between the structures and humans. The “recorded environmental sounds” ended up becoming the structure’s “instruments” (Westerkamp 1999). John Cage “pointed out that every ‘silent’ concert hall has an acoustic context, a surrounding sonic environment, a background ‘noise’” (Till 2014). Evidently, in my case, this statement can refer to any structure, closed or exposed. Noise is unavoidable in life. Described as “pollution” by Murray Schafer (Schafer 1993), Schafer categorised noise into 3 principal types: “unwanted noise, unmusical sound and any loud sound or disturbance in any signalling system” (Sword 2022, p.18), these categories, combined with the World Health Organisation (WHO)’s definition of noise, which indicates it “seriously harms human health and interferes with people’s daily activities” (Ndwiga, no date), portray noise as an acutely unwanted pandemonium. However, hearing is the first of our five senses to develop, and the “maternal drone”, made from bodily sounds like blood rushing, heart beating and digestion, will be the first sensation a foetus experiences. A study conducted in 1990 discovered that sound levels in the womb were around 72 to 88db (Smith, Satt, Phelan, and Paul 1990, p.312-315). Contrary to WHO and Schafer’s explanations of it, noise is natural to us, we are born into noise, and without noise we would live in an unnatural world (see anechoic chambers); drones produced by noise in the womb “remain demonstrably soothing for the early years of a child’s life” (Sword 2022, p.12).

My final visit was to Carnglaze Caverns, a former slate mine consisting of 3 man-made caves. It is currently closed to the public, but I was fortunate enough to be allowed into the Caverns to do some recording. The visit was amazing and far surpassed what I had expected. I planned to record my piece in the style of Alvin Lucier’s ‘I am Sitting in a Room’ (Lucier, 1970), re-recording each playback in this incredibly reverberant space. However, due to the vastness of the caves and the insufficient quality and loudness of my speaker for playback, and my very old Zoom recorder, I struggled to capture the sound as intended. Instead, I once again modified my project to adapt to the situation on the ground. I still wanted to use the reverberation from the caves, so I took to convolution reverb, a technique used to digitally recreate a physical space by generating a frequency specific reverberation. Although convolution reverb within my project frame initially felt like I was abandoning my original plan, it led me to discover the practicality and efficiency of it for use in any project aiming to emulate a physical space, for example, effects in film, TV, and videogames. Specialists in these areas “are finding it extremely useful to capture IRs on location for use later on when placing overdubbed dialogue or effects into a real acoustic space” (Walker, 2022). Martin Walker suggests abandoning realism and “convolving other audio files” (Walker, 2022) to explore a whole new experimental world of audio treatment.

I recorded the reverb in various parts of the cave by playing a short, fast tone and recording until the reverb audio tail ended. In noisier environments you would use a sine wave sweep for a better signal-to-noise ratio (Walker, 2022). I converted this audio into an impulse response in Logic’s Space Designer and tailored it for use in my project. Although I intended to use only natural techniques for creating reverb on my track, I am

glad I delved into creating a reverb for Carnglaze Caverns, as it was such a great opportunity, and has added a new layer to my project. I had a restricted time limit in the caves, so the owners of Carnglaze Caverns have welcomed me back to do more recording, which I will take advantage of when I have better equipment, to get better recordings for impulse responses in different areas of the caves.

One clear highlight from my research into drones and reverb is the relationship between them, and the devotional music/sound of sacred spaces, ritual, and religion. The reverb in a church gives the illusion of the performer/speaker sounding “larger than life” (Musitechnic, 2019), the drone of the Gregorian chant is for the praise and service of God (New World Encyclopaedia, 2017), and an ‘ison’ is a drone note used in Byzantine chant to “provide pleasing resonances” (Glaros, 2022). A likely explanation for the universal use of drones in a spiritual/religious context is that they can create an altered state of consciousness. This is perhaps the reason why drone music re-emerged in the 1960s connected with the use of mind-altering psychedelics. Groups such as The Theatre of Eternal Music, The Beatles and The Velvet Underground were directly influenced by Hindustani and Carnatic ragas (forms of Indian music which use the tanpura, a drone instrument), particularly the sitar- based ragas of Ravi Shankar. Although Shankar himself hated being linked to drugs, and “tried to make the young people sit properly and listen” and “assured them that if they wanted to be high, I could make them feel high through the music, without drugs” (Grise 2012), his western followers combined Shankar’s influence with that of psychedelic drugs to create mind altering drone-music for a western audience. There is reason to believe that this relationship between drones and reverb, and altered states of consciousness, existed from the dawn of modern humans in the Upper Palaeolithic. The relationship between the type of animals depicted in early cave art and the loudness of the reverberation in that spot strongly suggests that some form of drone was used by early humans in these spaces to create a religious, spiritual, or ritual experience. Even as a non-believer myself, I can readily appreciate the ethereal pull of drone and reverberation.

For the purposes of this submission, the piece is only 12 minutes long. From the beginning I knew I wanted to take the piece further than I could within the submission restraints, by developing the original drone composition into a longer amount of time, with more chance for subtle changes, as Laurie Spiegel points out “the mind doesn’t perceive constancy after a while. It habituated what is unchanging and listens for something that it hasn’t yet sensed” (Anderson, Tublitz and Haar 2015), invoking Oliveros’ deep listening. A good example is Éliane Radigue’s ‘Kyema (Intermediate States)’, an hour of slowly evolving drones that has the ability to send one into a deep, meditative state.

I originally planned to use reverb to enhance the drones and make them sound less 2-dimensional, I now realise there’s no need for the reverb, and it’s the subtle changes over time that give the drone such immense depth. Instead, the reverb I’ve added to ‘Sudronen’ enhances an element of noise, and demonstrates the beauty of the Cornish structures explored, both of which I hadn’t accounted for when planning the project. Although I always intended to use the natural reverb of Cornish structures, I now realise

that the focus on reverb alone is an entire project in itself, with the potential to study the sound archaeology of these different structures in a lot more depth. Given more time I would have explored this further, incorporating the extensive techniques demonstrated in the 'Songs of Caves: Sound and Prehistoric Art in Caves' case study. Including the sine wave sweep recording I use in my project, I'd like to explore techniques used by Till et al such as calibrated measurement microphones to record the acoustic response, a Soundfield microphone to sample acoustics from multiple positions, recording background 'silence' in the caves, and a high-quality speaker for playback (as opposed to my low-quality speaker) (Till, Wyatt, Fazenda, Sheaffer, and Scarre, 2013).

My lack of sufficient equipment became a hindrance in particular recording environments, something which I had not sufficiently anticipated and accounted for. However, in an ideal world where I have more time, or was able to restart this project, I would explore convolution reverb techniques and software programs further to create a library of reverbs from the Cornish structures which I have explored during this project.

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